

Internet Usage Status among Chinese College Students

Yan Li

Department of Education, Zhejiang University
Tian Mu Shan Rd. # 148, 310028
Hangzhou, Zhejiang Province, P. R. China
yanli@zju.edu.cn

Abstract. The study was carried out to determine Internet usage status among Chinese college students and how personal differences impact students' online activities. Quantitative research was employed and the findings were descriptive in nature. Results showed that the majority (80%) of participating Zhejiang University (ZJU) students (N=596) currently owned PCs. Averagely, they spent 3.11 hrs per day using computer, within which 2.51 hrs with online activities. ZJU students participated in nine of the fifteen listed online activities frequently. Half of them used study-related websites and browsed online programs frequently. Only 39% used major related websites frequently. Most students did not use English websites or use Internet to communicate with teachers frequently. Few students knew how to make web page. Gender and other five factors had different impact on students' different online activities.

Keywords: Internet usage, computer, college students

1. Introduction

Internet has been adopted rapidly worldwide as an innovative tool for information record and diffusion. At present, there are about 970 million Internet users in the world, accounting for 15.2% of world population. According to the 17th "Statistical Survey on the Internet Development in China" issued by China Internet Network Information Center (CNNIC), up to Dec. 31st, 2005, China had 111 million Internet users, accounting for 8.5% of Chinese population. Out of hem, 85% had an educational background of college level or higher (CNNIC, 2006). Studies showed that 80% of Chinese college students have looked online activities as an important part of their daily life (Liu, 2005; Sun, Hua, & Xiao, 2002; Xu, 2005; Yu, 2005).

Computer and Internet has dramatically changed the learning styles and daily habit of current college students, especially in information searching, communication, and resources sharing (Hannan, 2005; Lee & Tsai, 2004; Liu, 2005). Literature found that Chinese college students focused online activities mainly in four areas: 1) online chatting; 2) game playing and other entertainments; 3) sending and receiving emails; and 4) browsing news and searching information related to personal hobbies (Tian, 2005; Zhang & Jia, 2002; Yu, 2005).

Studies found that computer and Internet has become important tools for students' communication and entertainment; however, it has not yet become a useful tool for their study (Zhang & Jia, 2002). Three reasons might explain this phenomenon: 1) online resources currently available for Chinese college students were not abundant in quantity or good in quality; 2) students were not familiar with information searching tools or searching methods (Wu, 2004; Xu, 2005; Zhang & Jia, 2002); and 3)

incompetent English language ability limited students from visiting foreign websites, especially those English websites related to their study or majors (Zhang & Jia, 2002).

Based on the literature, the researcher found that it would be meaningful to make a systematic study about the detailed online activities of Chinese college students and how personal factors impact their online behaviors. That is the purpose of the study.

2. Methods

The study used random sampling method to collect data. And the author selected Zhejiang University (ZJU) as a representative university of Chinese higher education. ZJU, which was founded in 1897, currently has 22 colleges and it is now one of the largest and comprehensive universities in China. The target population of this study was 42,000 enrolled full-time ZJU students. The sample number was derived by using the table of “Determining Sample Size for Research Activities” (Krejcie & Morgan, 1970). Between October 20th, 2005 and January 20th, 2006, 650 students were randomly chosen from across the ZJU’s five campuses.

The research instrument was a two-part questionnaire, which was designed based on the review of literature. The first part was to determine students’ status of Internet usage by asking their agreements about participating in fifteen online activities. Participants could respond to a series of statements on a five-point Likert-type scale. The second part was to gather data about students’ differences, including major, gender, and etc. To test its reliability, the survey instrument was tested among 20 sophomores who were from the Department of Education, ZJU in September, 2005. A repeated test was done six weeks later. The results showed good reliability ($r=0.80$).

The researcher finally got 633 surveys back and among these responses, 37 were uncompleted, resulting in a usable response rate of 91.7% ($N=596$). The collected data were analyzed using the Statistical Package for Social Sciences (SPSS, 11.0). Descriptive statistics were used to describe each variable.

3. Findings

In the study, participants ($N = 596$) from 22 different colleges were randomly selected and the number of students from each college ranged from 18-35. Among them, 327 were male and 269 were female. Participants were distributed evenly according to their grades (18% freshmen, 19.6% sophomore, 21.6% junior, 19.8% senior, and 21% graduates). 80% of participants had PCs. Half of students bought PCs within 1-2 years and the other half owned PCs more than two years. On an average, ZJU students spent 3.11 hrs per day in using computer. About 44% of students used computer no more than 2 hrs everyday; 45.5% used computer within 2-6 hrs everyday; and 10.5% used computer more than 6 hrs everyday (Table 1). As for the Internet usage, ZJU students averagely spent 2.51 hrs online everyday. Three fourths of them used Internet less than 3 hrs; 20% between 3-6 hrs; and 5% used Internet more than 6 hrs everyday. As to the purposes of Internet usage, “study” was indicated by 41.2% of students as their first purpose, and “communication” and “entertainment” were indicated as the second and third purpose of internet usage by 42.5% and 38.4% of students, respectively. Other activities, such as browsing news, online shopping, etc. were indicated by 40.7% of students as the fourth purpose of using Internet (Table 2).

Table 1. Distribution of participating ZJU students by computer and Internet usage (N=596)

Owing computer's time			Using computer's time per day			Using Internet's time per day		
Year	f	%	hour	f	%	hour	f	%
0<t≤1	152	32.1	0<t≤1	118	20.8	0<t≤1	195	34.4
1<t≤2	86	18.1	1<t≤2	131	23.1	1<t≤2	135	23.8
2<t≤3	101	21.3	2<t≤3	89	15.7	2<t≤3	92	16.2
3<t≤5	76	16.0	3<t≤4	90	15.8	3<t≤4	72	12.7
t>5	59	12.4	4<t≤6	80	14.1	4<t≤6	44	7.8
			>6	60	10.6	>6	29	5.1
Total	474	100	Total	568	100	Total	567	100

Table 2. Distribution of participating ZJU students by their priorities of using Internet (N=596)

Study			Communication			Entertainment			Others		
No.	f	%	No.	f	%	No.	f	%	No.	f	%
1	196	41.2	1	138	29.3	1	141	30.7	1	27	29.7
2	137	28.8	2	200	42.5	2	123	26.8	2	10	11
3	132	27.7	3	126	26.8	3	176	38.3	3	17	18.7
4	11	2.3	4	7	1.5	4	19	4.1	4	37	40.7
sum	476	100	sum	471	100	sum	459	100	sum	91	100

The majority of ZJU students (ranging from 61% to 93.3%) agreed or strongly agreed with statements about nine online activities ($M > 3.50$)(Table 3). However, only half of participating ZJU students indicated that they used study related websites frequently or watched online programs frequently. As to “I use major related websites frequently”, 39% agreed or strongly agreed, 35% kept neutral, and 26% disagreed or strongly disagreed. Most students did not use English websites or used Internet to communicate with teachers frequently. Few of them knew how to make web page.

Table 3. Distribution of participating ZJU students by their Internet usage status (N=596)

	n ^o	M ^o	SD ^o	D ^o	N ^o	A ^o	SA ^o
I use LAN frequently. ^o	595 ^o	4.39 ^o	2 ^o	19 ^o	43 ^o	211 ^o	320 ^o
I use Chinese websites frequently. ^o	594 ^o	4.39 ^o	1 ^o	5 ^o	34 ^o	275 ^o	279 ^o
I use online text resources frequently. ^o	594 ^o	3.98 ^o	4 ^o	24 ^o	105 ^o	305 ^o	156 ^o
I use non-major related website frequently. ^o	592 ^o	3.95 ^o	4 ^o	26 ^o	113 ^o	300 ^o	149 ^o
I use entertainment and daily life related websites frequently. ^o	592 ^o	3.94 ^o	6 ^o	26 ^o	109 ^o	310 ^o	141 ^o
I use online audio resources frequently. ^o	592 ^o	3.87 ^o	8 ^o	44 ^o	117 ^o	268 ^o	155 ^o
I often use Internet to communicate with students. ^o	589 ^o	3.85 ^o	12 ^o	49 ^o	107 ^o	268 ^o	153 ^o
I use online visual resources frequently. ^o	592 ^o	3.82 ^o	7 ^o	34 ^o	148 ^o	274 ^o	129 ^o
I use WAN frequently. ^o	592 ^o	3.71 ^o	10 ^o	71 ^o	150 ^o	213 ^o	148 ^o
I use study related websites frequently. ^o	591 ^o	3.42 ^o	14 ^o	72 ^o	222 ^o	219 ^o	64 ^o
I watch online programs frequently. ^o	585 ^o	3.3 ^o	32 ^o	106 ^o	182 ^o	187 ^o	78 ^o
I use major related websites frequently. ^o	591 ^o	3.21 ^o	26 ^o	126 ^o	208 ^o	160 ^o	71 ^o
I use English websites frequently. ^o	593 ^o	2.83 ^o	72 ^o	178 ^o	180 ^o	106 ^o	57 ^o
I often use Internet to communicate with teachers. ^o	595 ^o	2.76 ^o	60 ^o	176 ^o	231 ^o	102 ^o	26 ^o
I know how to make web page. ^o	594 ^o	2.56 ^o	111 ^o	205 ^o	139 ^o	114 ^o	25 ^o

Note: M value: 1=Strongly Disagree(SD); 2=Disagree(D); 3=Neutral(N); 4=Agree(A); 5=Strongly Agree(SA)^o

Six personal differences (gender, grade, computer PC or not, owning computer's time, using computer's time per day, and using Internet's time per day) had different impact on the fifteen online activities of ZJU students (Table 4). Gender had no significant impact on students' most online activities except these two: 1) using online text resources frequently, $t(592)=2.24, p<0.05$; and 2) knowing how to make web page, $t(592)=2.61, p<0.05$. Female students used online text resources more frequently than did male students. And Male students knew more about how to make web page than did female counterparts.

Table 4. Distribution of participating ZJU students Internet usage by six factors (N = 596)

Online Activities ^o	Gender ^o		Grade ^o		Owning PC or not ^o		Owning computer's time ^o		Using computer's time per day ^o		Using Internet's time per day ^o	
	<i>t</i> ^o	<i>p</i> ^o	<i>F</i> ^o	<i>P</i> ^o	<i>t</i> ^o	<i>p</i> ^o	<i>F</i> ^o	<i>P</i> ^o	<i>F</i> ^o	<i>p</i> ^o	<i>F</i> ^o	<i>P</i> ^o
I use LAN frequently. ^o	0.22 ^o	0.83 ^o	14.18 ^{*,o}	0.00 ^o	8.01 ^{*,o}	0.00 ^o	1.94 ^o	0.10 ^o	12.80 ^{*,o}	0.00 ^o	6.43 ^{*,o}	0.00 ^o
I use WAN frequently. ^o	0.77 ^o	0.44 ^o	8.72 ^{*,o}	0.00 ^o	1.87 ^o	0.06 ^o	8.67 ^{*,o}	0.00 ^o	1.69 ^o	0.14 ^o	2.61 ^{*,o}	0.02 ^o
I use Chinese websites frequently. ^o	1.99 ^o	0.05 ^o	3.28 ^{*,o}	0.01 ^o	4.33 ^{*,o}	0.00 ^o	0.81 ^o	0.52 ^o	1.92 ^o	0.09 ^o	1.97 ^o	0.08 ^o
I use English websites frequently. ^o	0.71 ^o	0.48 ^o	21.13 ^{*,o}	0.00 ^o	3.00 ^{*,o}	0.00 ^o	5.45 ^{*,o}	0.00 ^o	9.29 ^{*,o}	0.00 ^o	6.35 ^{*,o}	0.00 ^o
I use major related websites frequently. ^o	0.87 ^o	0.39 ^o	19.21 ^{*,o}	0.00 ^o	0.55 ^o	0.58 ^o	1.87 ^o	0.11 ^o	2.73 ^{*,o}	0.02 ^o	1.24 ^o	0.29 ^o
I use non-major related websites frequently. ^o	0.26 ^o	0.80 ^o	1.45 ^o	0.22 ^o	1.94 ^o	0.05 ^o	2.47 ^{*,o}	0.04 ^o	1.81 ^o	0.11 ^o	1.32 ^o	0.25 ^o
I use study related websites frequently. ^o	1.69 ^o	0.09 ^o	3.40 ^{*,o}	0.01 ^o	1.85 ^o	0.07 ^o	1.02 ^o	0.40 ^o	0.69 ^o	0.63 ^o	0.84 ^o	0.53 ^o
I use entertainment and daily life related websites frequently. ^o	1.41 ^o	0.16 ^o	2.75 ^{*,o}	0.03 ^o	3.75 ^{*,o}	0.00 ^o	0.50 ^o	0.74 ^o	3.25 ^{*,o}	0.01 ^o	3.68 ^{*,o}	0.00 ^o
I use online text resources frequently. ^o	2.24 ^{*,o}	0.03 ^o	4.60 ^{*,o}	0.00 ^o	5.01 ^{*,o}	0.00 ^o	1.69 ^o	0.15 ^o	7.18 ^{*,o}	0.00 ^o	5.24 ^{*,o}	0.00 ^o
I use online visual resources frequently. ^o	0.24 ^o	0.81 ^o	3.03 ^{*,o}	0.02 ^o	5.85 ^{*,o}	0.00 ^o	1.32 ^o	0.26 ^o	2.84 ^{*,o}	0.02 ^o	2.98 ^{*,o}	0.01 ^o
I use online audio resources frequently. ^o	0.03 ^o	0.97 ^o	2.78 ^{*,o}	0.03 ^o	5.14 ^{*,o}	0.00 ^o	2.82 ^{*,o}	0.03 ^o	3.30 ^{*,o}	0.01 ^o	4.17 ^{*,o}	0.00 ^o
I often use Internet to communicate with teachers. ^o	1.57 ^o	0.12 ^o	4.20 ^{*,o}	0.00 ^o	0.90 ^o	0.37 ^o	0.87 ^o	0.48 ^o	2.46 ^{*,o}	0.03 ^o	1.68 ^o	0.14 ^o
I often use Internet to communicate with students. ^o	0.04 ^o	0.97 ^o	0.66 ^o	0.62 ^o	1.33 ^o	0.18 ^o	1.59 ^o	0.18 ^o	1.07 ^o	0.38 ^o	1.72 ^o	0.13 ^o
I watch online programs frequently. ^o	0.09 ^o	0.93 ^o	2.43 ^{*,o}	0.047 ^o	2.08 ^{*,o}	0.04 ^o	0.86 ^o	0.49 ^o	1.38 ^o	0.23 ^o	1.86 ^{*,o}	0.10 ^o
I know how to make web page. ^o	2.61 ^{*,o}	0.01 ^o	6.48 ^{*,o}	0.00 ^o	2.32 ^{*,o}	0.02 ^o	5.30 ^{*,o}	0.00 ^o	1.72 ^o	0.13 ^o	2.29 ^{*,o}	0.045 ^o

Grade had significant impact on most online activities of ZJU students ($p<0.05$): 1) I use LAN frequently, $F(4, 595)=14.18$; 2) I use WAN frequently, $F(4, 592)=8.72$; 3) I use Chinese websites frequently, $F(4, 594)=3.28$; 4) I use English websites frequently, $F(4, 593)=21.13$; 5) I use major related websites frequently, $F(4, 591)=19.21$; 6) I use study related websites frequently, $F(4, 591)=3.40$; 7) I use entertainment and daily life related websites frequently, $F(4, 592)=2.75$; 8) I use online text resources frequently, $F(4, 594)=4.60$; 9) I use online visual resources frequently, $F(4, 592)=3.03$; 10) I use online audio resources frequently, $F(4, 592)=2.78$; 11) I use Internet to communicate with teachers frequently, $F(4, 595)=4.20$; 12) I watch online programs frequently, $F(4, 585)=2.43$; and 13) I know how to make web page, $F(4, 594)=6.48$ (Table 5). Generally speaking, students from higher grades participated in the above thirteen online activities more frequently than did students from lower grades. However, graduate used online visual or audio resources less frequently than did undergraduate. Graduate also showed less confidence in making web page than did undergraduate.

Table 5. Grade had significant impact on students' thirteen online activities (N=596)

	Graduate ^a	Senior ^a	Junior ^a	Sophomore ^a	Freshman ^a	Average ^a
I use LAN frequently. ^a	4.53 ^a	4.60 ^a	4.43 ^a	4.43 ^a	3.92 ^a	4.39 ^a
I use WAN frequently. ^a	4.02 ^a	3.96 ^a	3.63 ^a	3.46 ^a	3.44 ^a	3.71 ^a
I use Chinese websites frequently. ^a	4.40 ^a	4.56 ^a	4.34 ^a	4.38 ^a	4.26 ^a	4.39 ^a
I use English websites frequently. ^a	3.46 ^a	2.99 ^a	2.83 ^a	2.50 ^a	2.27 ^a	2.83 ^a
I use major related websites frequently. ^a	3.86 ^a	3.11 ^a	3.21 ^a	2.90 ^a	2.89 ^a	3.21 ^a
I use study related websites frequently. ^a	3.68 ^a	3.36 ^a	3.39 ^a	3.36 ^a	3.28 ^a	3.42 ^a
I use entertainment and daily life related websites frequently. ^a	4.04 ^a	3.97 ^a	4.02 ^a	3.88 ^a	3.73 ^a	3.94 ^a
I use online text resources frequently. ^a	4.05 ^a	4.09 ^a	4.09 ^a	3.96 ^a	3.70 ^a	3.98 ^a
I use online visual resources frequently. ^a	3.66 ^a	3.98 ^a	3.88 ^a	3.87 ^a	3.67 ^a	3.82 ^a
I use online audio resources frequently. ^a	3.74 ^a	3.97 ^a	3.98 ^a	3.97 ^a	3.69 ^a	3.88 ^a
I often use Internet to communicate with teachers. ^a	2.95 ^a	2.64 ^a	2.91 ^a	2.74 ^a	2.50 ^a	2.76 ^a
I watch online programs frequently. ^a	3.48 ^a	3.41 ^a	3.20 ^a	3.29 ^a	3.08 ^a	3.30 ^a
I know how to make web page. ^a	2.38 ^a	2.98 ^a	2.54 ^a	2.33 ^a	2.56 ^a	2.56 ^a

Note: M value: 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree^a

Owning PC or not had significant impact on the following online activities of ZJU students ($p < 0.05$): 1) I use LAN frequently, $t(591) = 8.01$; 2) I use Chinese websites frequently, $t(590) = 4.33$; 3) I use English websites frequently, $t(589) = 3.00$; 4) I use entertainment and daily life related websites frequently, $t(588) = 3.75$; 5) I use online text resources frequently, $t(590) = 5.01$; 6) I use online visual resources frequently, $t(588) = 5.85$; 7) I use online audio resources frequently, $t(588) = 5.14$; 8) I watch online programs frequently, $t(591) = 2.08$; and 9) I know how to make web page, $t(590) = 2.32$ (Table 6). Students having PCs attended these activities more frequently than did those without PCs.

Table 6. Owning PC or not had significant impact on students' nine online activities (N=596)

	Owning	Not Owning
I use LAN frequently.	4.51	3.90
I use Chinese websites frequently.	4.45	4.16
I use English websites frequently.	2.90	2.55
I use entertainment and daily life related websites frequently.	4.00	3.69
I use online text resources frequently.	4.07	3.66
I use online visual resources frequently.	3.92	3.41
I use online audio resources frequently.	3.97	3.49
I watch online programs frequently.	3.34	3.11
I know how to make web page.	2.61	2.35

Note: M value: 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

One third of their online activities (five items) were significantly affected by the time students owned PCs ($p < 0.05$). These activities includes: 1) using WAN frequently, $F(4, 470) = 8.67$; 2) using English websites frequently, $F(4, 471) = 5.45$; 3) using non-major related websites frequently, $F(4, 471) = 2.47$; 4) using online audio resources frequently, $F(4, 471) = 2.82$; and 5) knowing how to make web page, $F(4, 472) = 5.30$ (Table 7). Generally speaking, the longer students owned computer, the more frequently they would participate in these five online activities. However, students who owned computer for less than one year showed higher frequencies in using non-major related websites than the average. Also, students who owned computer for 1-2 years indicated the highest agreement with "I use online audio resources frequently."

Table 7. Owning computer's time had significant impact on students' five online activities (N=596)

	>5 yrs	3<t=5 yrs	2<t=3 yrs	1<t=2 yrs	t=1 yr	Average
I use Wan frequently.	4.22	3.97	3.87	3.64	3.43	3.75
I use English Website frequently.	3.08	3.09	3.17	2.74	2.59	2.88
I use non-major related websites frequently.	4.22	4.04	3.98	3.79	4.01	4.00
I use audio resources frequently.	4.07	4.01	3.94	4.22	3.84	3.99
I know how to make web page.	2.92	2.75	2.81	2.65	2.28	2.62

Note: M value: 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

As showed in Table 8, half of the students' online activities were significantly affected by the time they spent in using computer everyday ($p<0.05$). These activities includes: 1) I use LAN frequently, $F(5, 567)=12.80$; 2) I use English websites frequently, $F(5, 565)=9.29$; 3) I use major related websites frequently, $F(5, 563)=2.73$; 4) I use entertainment and daily life related websites frequently, $F(5, 564)=3.25$; 5) I use online text resources frequently, $F(5, 567)=7.18$; 6) I use online visual resources frequently, $F(5, 564)=2.84$; 7) I use online audio resources frequently, $F(5, 564)=3.30$; and 8) I often use Internet to communicate with teachers, $F(5, 567)=2.46$. Generally speaking, the longer the time students spent in using computer everyday, the more frequently they participated in these eight online activities. Students who used computer for 1-2hrs per day participated in the following five activities more frequently than the average level: using LAN, using entertainment and daily life related websites, using online visual resources, using online audio resources, and using Internet to communicate with teachers.

Table 8. Using computer's time per day had significant impact on students' eight online activities (N=596)

	>6hrs	4<t=6hrs	3<t=4hrs	2<t=3hrs	1<t=2hrs	t=1hr	Average
I use LAN frequently.	4.55	4.53	4.67	4.55	4.46	3.97	4.42
I use English website frequently.	3.42	3.11	2.91	2.93	2.65	2.38	2.83
I use major related websites frequently.	3.52	3.33	3.31	3.19	3.15	2.97	3.21
I use entertainment and daily life related websites frequently.	4.05	4.03	4.08	3.95	3.97	3.68	3.94
I use online text resources frequently.	4.18	4.01	4.28	3.94	3.98	3.66	3.98
I use online visual resources frequently.	3.83	3.94	4.06	3.76	3.85	3.63	3.81
I use online audio resources frequently.	3.88	4.08	4.00	3.85	3.92	3.60	3.87
I often use Internet to communicate with teachers.	2.78	2.84	2.97	2.73	2.84	2.52	2.77

Note: M value: 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

As indicated in Table 9, almost half of ZJU students' online activities were significantly affected by the time they spent in using Internet everyday ($p < 0.05$). These activities includes: 1) using LAN frequently, $F(5, 566) = 6.43$; 2) using WAN frequently, $F(5, 563) = 2.61$; 3) using English websites frequently, $F(5, 564) = 6.35$; 4) using entertainment and daily life related websites frequently, $F(5, 563) = 3.68$; 5) using online text resources frequently, $F(5, 566) = 5.24$; 6) using online visual resources frequently, $F(5, 563) = 2.98$; and 7) using online audio resources frequently, $F(5, 563) = 4.17$. Comparing with students who used Internet for more than one hour per day, students who used Internet for less than one hour showed lower agreements with these seven online activities. Students who had online activities for 3-4 hrs or more than 6 hrs per day participated in the following five activities most frequently: using WAN, using English websites, using online text, visual and audio resources.

Table 9. Using Internet's time per day had significant impact on students' seven online activities (N=596)

	>6hrs	4<=6hrs	3<=4hrs	2<=3hrs	1<=2hrs	t<=1hr	Average
I use LAN frequently.	4.41	4.57	4.64	4.61	4.49	4.21	4.43
I use WAN frequently.	4.14	3.64	3.94	3.78	3.69	3.58	3.72
I use English website frequently.	3.45	2.91	3.17	2.91	2.95	2.53	2.85
I use entertainment and daily life related website frequently.	4.03	3.95	4.11	4.02	4.08	3.76	3.95
I use online text resources frequently.	4.31	3.86	4.21	4.07	4.08	3.79	3.99
I use online visual resources frequently.	4.14	3.70	3.97	3.95	3.90	3.68	3.84
I use online audio resources frequently.	4.07	3.84	4.08	3.91	4.04	3.65	3.88

Note: M value: 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

4. Conclusions and Recommendations

The majority of ZJU students owned PCs and half of them bought PCs within 1-2 years. Averagely, ZJU students spent 3.11 hrs in using computers and 2.51 hrs online everyday. About 44% of students used computers for no more than 2 hrs per day, 45.5% between 2-6 hrs, and 10.5% for more than 6 hrs. Three fourths of students used Internet for less than 3 hrs per day, 20% between 3-6 hrs, and 5% for more than 6 hrs.

ZJU students participated in the following nine activities frequently (ordered by their frequencies): using LAN, using Chinese websites, using online text resources, using non-major related websites, using entertainment and daily life related websites, using online audio resources, using Internet to communicate with students, using online visual resources, and using WAN. Half of them used study related websites and watched online programs frequently. Four tenths of students used major related websites frequently. And the majority of ZJU students did not think that they: 1) used English websites frequently; 2) used Internet to communicate with teachers frequently, or 3) knew how to make web page. Six personal differences had different impact on students' different online activities. Conclusions and suggestions are made as below:

4.1 Computer and Internet have become an important part of the daily life of Chinese college students.

Having PCs and doing various kind of online activities are very popular among college students in China. College student used LAN most frequently and campus network has become very important source of information for them. The majority of college students mainly browse Chinese websites and they prefer to multi-media materials, from text to audio and video. Comparing with using study or major related websites, college students showed higher frequencies in using entertainment and daily life or other non-major related websites. At the same time, comparing with using Internet to communicate with teachers, college students showed higher frequencies in using Internet to communicate with their peers. The study also found that small proportion of students (about one fifth) knew how to make web page.

Most of college students used computer and Internet in a relatively rational way and they would spend certain amount of time everyday in using computer and/or doing online activities. However, it is obvious that a small group of students spent too much time everyday in using computer and Internet. New technology, as we know, is a double-edged sword and it would bring both opportunities and challenges for college students. In 2002, ZJU dismissed 120 students who failed to pass certain amount of courses due to problem of Internet Addiction (IA). Therefore, educators and researchers should be sensitive about the emerging passive problems that computer and Internet might bring to students.

Based on these findings, the researcher recommends that further qualitative studies are needed to investigate the following questions: (1) whether those students who spent too much time on online activities had tendency of IA; (2) comparing with using Internet to communicate with peers, why students showed lower frequencies to communicate with teachers through Internet.

4.2 The usage status of study and major related websites by Chinese college students is not so satisfactory.

Results of the study found that only 40-50% of students used study and major related websites frequently and fewer students (27.5%) indicated that they used English websites frequently. There are two possible explanations for such phenomenon. One might be limited useful resources related to major studies, as mentioned in literature. Although Chinese universities have been putting lots of efforts in constructing online resources in recent years, there are still many challengeable problems facing the practitioners, such as how to make the online content more attractive and more user-friendly, how to integrate online resources effectively into curriculum design in different principles, and etc. Solutions to these problems would have direct impact on the quality of digitalization of Chinese universities. As faculty members are key factors in constructing study and major-related websites, more faculty training programs related to educational technology and constructing online resources would also be very helpful. Decision-makers of universities should propel the construction of e-universities through providing sufficient incentives to faculty, staff and students.

Secondly, some students might be unfamiliar with searching methods and skills, especially those skills related to international websites that are in English. Although

more and more educators realized the importance of information searching ability in era of information exploration, it is still noticeable that lots of college students feel unconfident in major study because of limited ability of information searching.

As to English education, it is actually heavily emphasized by the whole higher education system in China. Students must pass the national College English Test (CET) Band 4 before getting the bachelor degree and pass the CET Band 6 before getting the Master's degree. Students know the importance of English. However, current English education is limited largely in class and is mainly aimed at exam.

Thus, the researcher recommends that it might be a good idea for Chinese faculty, especially those who are familiar with international resources on the web, to develop and/or to improve college students' Internet searching ability, together with their major study and language ability, by teaching them skills about searching international websites related to their majors, like online journals or online information about specific professional associations. In this way, students could learn language more practically as well as learn major knowledge more efficiently.

4.3 Internet has contributed to more convenient student-student communication; however, it hasn't revealed its potential power in student-teacher communication.

Communication is the foundation of education. Better communication means better teaching and learning experiences. With the emergence of Web-based educational circumstances and the availability of state-of-art communication technologies, these tools are expected to change the manners of traditional educational communication by providing quicker and more diverse ways of communication. The study found that college students' online communication with their peers is very active. However, the status of student-teacher online communication was not so satisfactory. Since e-learning become more and more popular on campus, universities and faculty should be encouraged to be more involved in online communication with students.

To improve student-teacher online communication, some basic questions are worthy of our rethinking. These questions include what is the new role for teachers in information era; what's needed to be done during the process of transition from traditional education to IT-based education; how to make teacher-student interaction more effectively with the help of new multimedia communication tools (such as email, instant messages, personal web page, blog, and etc). Answers to these questions would contribute to a better relationship between students and teachers in the new era.

4.4 Gender has little impact on most of college students' online activities.

The study found that gender had no significant impact on most of ZJU students' online activities. Male students and female students have similar online experiences. However, female students were reported to use online text resources more frequently while male students felt more confidence with making web page. Such differences might be explained by different learning style and different strongpoint aroused by gender. It seems that female students more like text materials than do male students. While male students are more able in activities that need hands-on ability, such as webpage making, than do their female counterparts.

4.5 Grade has significant impact on most of college students' online activities.

The study found that, except two items (using non-major related websites or using Internet to communicate with students), grade had significant impact on most of college students' online activities. Generally speaking, students from higher grades tended to participate in the following online activities more frequently than did students from lower grades: using LAN and WAN, using Chinese and English websites, using major and study related websites, using entertainment and daily life related websites, using online text, audio and visual resources, watching online programs, using Internet to communicate with teachers, and knowing how to make web page. Experiences with computer and Internet would correspondently increase students' learning experience. And it seems that college life would contribute to students' better knowledge and skills of using resources on the web.

The study also found that, as to the frequencies related to using online visual or audio resources, graduate students and freshmen showed lower agreement than did sophomore, junior or senior students. For freshmen, the tense brought by brand-new learning and life style in college as well as relatively limited knowledge and skills related to online resources might contribute to their lower frequencies in using visual or audio resources. For graduate, pressure from research work and concerns of time might be the explanations. As to knowing how to make web page, although most of students showed negative answers, senior students' agreements are obviously above other groups of students. It might be because senior students would like to learn more practical skills for better opportunities in job marketing.

Based on these findings, the researcher proposes two suggestions. (1) More communications among college students from different grades might improve computer and Internet- related knowledge and skills of lower-grade undergraduate. (2) When curriculum planners arrange courses for students or when faculty teach specific course, it is recommended to provide students with more information about how to utilize online resources. Such activities as inviting experienced students to sharing experiences of using computer and Internet in class, holding contests related to multimedia design or course design at the college or university level, providing seminars about history & future of lifelong learning or IT-based education reform, and etc, would improve college students' experiences with information technology.

4.6 Owning computer could partly contribute to college students' better online experiences. But it is not a prerequisite for students' better learning experiences.

The study found that students owning PCs participated in nine of the listed 15 items of online activities more frequently than did students without PCs. These online activities include using LAN, using Chinese and English websites, using entertainment and daily life related websites, using online text, visual and audio resources, watching online programs, and knowing how to make web page. However, owning computer or not had no significant impact on the following activities: using WAN, using major or study related websites, using non-major related websites, using Internet to communication with teachers or students. Therefore, owning PCs would partly contribute to students' better online experiences. But it is not a prerequisite for students' better learning experiences or better online communication with others.

The study also found that the length of owning computer's time had significant impact on one third of college students' online activities. Generally speaking, the longer students owned their PCs, the more frequently they would do these five online activities: using WAN, using English websites, using non-major related websites, using online audio resources, and knowing how to make web page. New owners who owned computers less than one year had higher agreement about "I use non-major related websites frequently" than the average level. Students owning computer for 1-2 years used online audio resources more frequently than did others.

The findings indicate that universities are important places where the majority of students experienced from having no PCs to owning PCs, from being unfamiliar with Internet to being skillful with it, and from participating in online activities blindly to using online resources more rationally. Thus, to enhance students' knowledge and skills of computer and Internet, universities' computer center and every department should provide sufficient opportunities for all of students to access computer and Internet, even though the proportion of the students who had no PCs is small. Proper guidance is also useful for students' better online learning experiences. Guidance could be related to how to search for major and study related resources and how to improve communication with teachers and peers through computer and Internet. .

4.7 The length of time students spent in using computer or Internet per day have significant impact on many of college students' online activities.

The study found that the length of time students spent with computer and Internet had significant impact on such online activities as using LAN, using English websites, using entertainment and daily life related websites, and using online text, visual or audio resources. Generally speaking, the longer time students spent in using computer and Internet, the more frequently they would do these activities. However, when students spent 3-4 hours in using computer or Internet per day, they would have the highest frequencies in doing those activities. And students who use computer or Internet less than one hour had obviously lower frequencies in doing the online activities mentioned above than did other students. The length of time students spent in using computer or Internet showed no significant impact on the following activities: using Chinese websites, using study-related websites, using Internet to communicate with students, watching online programs, or knowing how to make homepage.

Therefore, to utilize online resources more sufficiently, college students are recommended to spend more than one hour per day in using computer and Internet. Although the appropriate length of time for better use of online resources would vary from person to person, the study showed that 3-4 hours per day are suitable length for students' sufficient utilization of online resources. (2) Faculty should give appropriate guidance for students about skills related to computer-assisted or web-based learning.

5. Limits of the Study

Due to the limited time and other constraints, the study hasn't explored problems such as how major impact students' Internet usage status, or how helpful Internet would be in facilitating students' major study. The researcher hopes that more studies would be done in near future to answers the two questions and other concerns mentioned above.

References

1. China Internet Network Information Center: The 17th China Internet development statistic report. <http://tech.sina.com.cn/focus/cnnic17/index.shtml>
2. Caplan, S.: Problematic Internet use and psychosocial well-being: Development of a theory-based cognitive-behavioral measurement instrument. *Computers in Human Behavior*. 18, 552-575(2002)
3. Hannan, A.: Innovating in higher education: contexts for change in learning technology. *British Journal of Educational Technology*. 36(6), 975-985 (2005)
4. Krejcie, R. V., & Morgan, D. W.: Determining sample size for research activities. *Educational and Psychological Measurement*. 30, 607-610 (1970)
5. Lee, C-I, & Tsai, F-Y.: Internet project-based learning environment: the effects of thinking styles on learning transfer. *Journal of Computer Assisted Learning*. 20(1), 31-39 (2004)
6. Lindner, J. R., Murphy, T. H., & Briers, G.: Handling nonresponse in social science research. *Journal of Agricultural Education*. 42(4), 43-53 (2001)
7. Liu, B.: The impact of BBS as a campus Internet culture on students' learning. *Modern Distance Education Study (in Chinese)*. (2), 24-27 (2005)
8. Liu, Y.: Thoughts on college students' online activities. *E-education Research (in Chinese)*. (6), 61-64 (2003)
9. Morahan-Martin, J., & Schumacher, P.: Incidence and correlates of pathological Internet use among college students. *Computers in Human Behavior*. 16, 13-29 (2000)
10. Nie, N. H., & Erbring, L.: Internet and society: A Preliminary Report. *IT & Society*. 1(1), 275-283 (2002)
11. Nie, N. H., & Hillygus, D. S.: Where does Internet time come from?: A reconnaissance. *IT & Society*. 1(2), 1-20 (2002)
12. Sun, S., Hua, H., & Xiao, Z.: A survey of the college students surfing on Internet. *Journal of Nanjing University of Science and Technology*. 15(6), 80-83 (2002) (Original in Chinese)
13. Tian, P.: On the negative influence of and solutions to "college students' addiction to the Internet." *Journal of Nanjing University of Aeronautics & Astronautics (Social Sciences) (in Chinese)*. 7(3), 75-78 (2005)
14. Wu, H.: Study on university students' utilization of network information resources. *Science/Technology Information Development & Economy (in Chinese)*. 14(4), 47-48 (2004)
15. Xu, H.: A survey report on students' online learning behavior. *E-Education Research (in Chinese)*. (6): 61-63, 73 (2005)
16. Young, K. S.: Internet addiction: The emergence of a new clinical disorder. In: 104th annual meeting of the American Psychological Association (1996)
17. Yu, X.: Investigation about the use of Internet among college students. *Higher Education Exploration (in Chinese)*. (3), 82-86 (2005)
18. Zhang, J. & Jia, H.: Survey analysis about college students Internet usage. *Chinese Journal of Medical Library and Information Science (in Chinese)*. 11(4), 51-53 (2002)