



# Comparison between on- and off-campus behaviour and adaptability in online learning: a case from China

XIAOYAN XIE<sup>†</sup>, FUZONG LIN<sup>†</sup> and TAO ZHANG<sup>‡</sup>

<sup>†</sup>State Key Laboratory of Intelligent Technology and Systems, Department of Computer Science and Technology, Tsinghua University, Beijing, PR China 100084; e-mail: {wendy, lfz}@s1000e.cs.tsinghua.edu.cn

<sup>‡</sup>Department of Automation, Tsinghua University, Beijing, PR China 100084; e-mail: zhangtao@mail.au.tsinghua.edu.cn

**Abstract.** More and more universities and colleges are providing online courses not only for on-campus students but also for off-campus students. Tutors have to consider the differences between on- and off-campus students in order to improve effective instruction. Comparisons are made in this paper between on- and off-campus performances in online learning from four areas: learning time, path of browsing courseware, intercommunication and adaptability towards online learning. The last two areas are emphasized. Multiple approaches were adopted to collect data, which include questionnaires, posted documents, online logs, interviews and observations. This study shows that the rush time of online learning, paths of browsing courseware and favourite intercommunication means of on- and off-campus students are similar. But there are also some differences between these two groups such as competence of self-learning, enthusiasm of interpersonal exchange, dependence on tutors, feeling of learning stress, etc.

## 1. Introduction

With the rapid development of information technology in this information age, the Internet has increasingly been used in education to improve the quality of learning and renovate the fashion of instruction. Continuing education has gradually become an absolute necessity in our lives, in order to accommodate knowledge updates at a higher rate than ever before. However, it is almost impossible for some employees to put their job aside completely to be an on-campus student. So distance education will become a very significant aspect in the future society. One of the greatest characteristics of online learning is the freedom of learning time and

space, which naturally makes online learning become a widely used form of distance education.

On the other hand, online learning is also introduced into residential high education. One benefit from this is that a large quantity of students (e.g. 2000) may participate in the same course in the same semester, which is hardly realized and satisfied in the conventional classroom. Other important reasons for such introduction are that it can improve instruction in some aspects and can help students to possess the competence of knowledge acquisition and interpersonal communication via Internet.

As an unconventional instructional medium, the Internet not only changes the appearance of learning resources but also constructs fresh learning environments. Teachers and students are expected to adapt themselves to such resources and environments. Although potential benefits of the Internet to students, as Ward and Newlands (1998: 171-184) state, include 'richer and more effective learning resources and a more flexible pace of learning', MacFarlane (1995: 52-65) points out that students will have to learn how 'to manage their own learning processes to an unprecedented degree... to swim in a sea of information, to use the rich resources of a supportive learning environment, to self pace and self structure their own programmes of learning'. The Internet also provides a space for synchronous and asynchronous mediated interaction, which is a very distinct characteristic compared to traditional instructional media used in the classroom, where students or teachers mostly intercommunicate

face-to-face directly, no matter what traditional instructional media are used. Dede (1991: 146–158) states that a general characteristic of mediated interaction is that technologies create environments, that shape interpersonal exchange. Furthermore, Light *et al.* (2000: 257–267) argue that ‘computer mediated communication is a medium which is not devoid of social cues. Existing offline relationships can affect online activities’. Moller (1998: 115–122) also states significant functions of community of learners. Media, individual and community, therefore, interact with each other.

Experience has shown that there are significant differences in demography, technology experience and community culture between on- and off-campus student groups. It is naturally supposed that such differences might lead to differences in behaviour and adaptability between the two groups in their online learning. Studying these differences of behaviour and adaptability will be helpful for media experts to design online technology environments and for instructors or faculties to provide online materials and manage instructional process according to different objects. Some researchers, e.g. Griffiths *et al.* (1999: 76–85), have studied online behaviour of students, but little behaviour comparison has been made between on- and off-campus students. Palmer (2000: 141–154) studied differences in computer usage, mainly including differences in computer and Internet usage patterns and access to computers and the Internet, between on- and off-campus students groups. As a whole, however, it is inadequate in terms of comparison between the two groups. Are there any differences of self-learning pace between them? How is their adaptability to online learning environments? Do different community cultures impact on their behaviour? To address these questions we compare the behaviour and adaptability of on- and off-campus postgraduate students at Tsinghua University in China, learning the online course of ‘Multimedia Fundamentals & Applications’.

## 2. Methodology

### 2.1. Course and Participants

Part of the postgraduate students attending the online course of Multimedia Fundamentals and Applications (MF&A) served as the participants for the study. MF&A is the first online postgraduate course at Tsinghua University in China. Before it was moved onto the Internet, it was taught face-to-face in classrooms for many years and lectures to off-campus students via satellite living transmission had just begun. More than 1300 on- and off-campus students attended

MF&A from September 1998 when it first appeared on the Internet, to present. On-campus students at Tsinghua University must achieve excellent results in order to gain entrance to the university. The on-campus students attending MF&A came from about 20 various departments at Tsinghua University including Department of Automation, Department of Chemistry, Department of Educational Technology, Department of Mechanical Engineering and so on, and most of the students have no or very few formal career experiences. However, the off-campus students attending MF&A had to work at the same time of study. They resided in different cities in China and accepted continuous education from Tsinghua University without a strict entrance examination. Their undergraduate majors were also various. Those on-campus students attending MF&A in the autumn semester in 2000 and off-campus students attending it for credit in the spring semester in 2000 were observed and studied. They will be referred to as on-campus group and the off-campus group respectively.

The online learning platforms the two groups used were very similar. Each of them consisted of such components as web-based courseware, Notice Board, Question and Answer Field, Forum and Chat Room. Web-based courseware was the most important component. It corresponded to an electronic book designed for self-learning. Notice Board was used to inform students of new additions to the supplementary web materials and of other administrative arrangements. Students could submit their questions to tutors through a form in the Question and Answer Field, and tutors could post answers so that all students could see them. Forum provided a space for interpersonal exchange, in which all tutors and students could post essays and reply to others’ essays. In the autumn semester in 2000, two special seminars about Wavelet and TTS (Text to Speech) were organized. Essays in relation to these two seminars were posted in special boards in Forum. Chat Room was developed for synchronous interactions with text between tutors and students. In order to send a chat request to others online, a chat pager was also provided. In addition to those main components listed above, there were, of course, some other components relating to introduction, administration of students, etc.

### 2.2. Method

This study focused on the students’ performances not in an experimental environment but in a natural state. The research paradigm of this study was empirical study. The researchers conducted instructions from beginning to end and used a multi-method approach to collect data, which included questionnaires (see the

appendix), posted documents, online logs, interviews and observations.

Questionnaires referred to students' learning time, learning pace, intercommunication fashions and times, the differences between learning online and face-to-face, and some other personal basic information. Collected documents included all e-mails tutors sent to and received from students, essays posted in Question and Answer Field and Forum, and some chatting records. The servers providing online learning environments automatically produced logs. Comparison was made in the following four areas: learning time, path of browsing courseware, intercommunication and adaptability towards online learning. Among the four areas, emphases were put on intercommunication and adaptability towards online learning.

### 3. Main outcomes and results

The two groups being studied included 161 on-campus students and 61 off-campus students respectively. A total of 159 on-campus questionnaire returns and 37 off-campus questionnaire returns were received. A few students did not answer all the questions in the questionnaire. Servers automatically recorded logs and documents, so log information and documents of all 222 students could be acquired.

#### 3.1. Learning time

Students' online learning time was recorded in online logs. Figure 1 gives the distributions of on- and off-campus learning time. The numbers below the horizontal axis represent 24 hours in a day. For example, '0' represents 0:00 to 0:59, '1' represents 1:00 to 1:59, and so on. The bars in figure 1 represent the percentages of the time students spent in a special hour out of the total online time for on- and off-campus students.

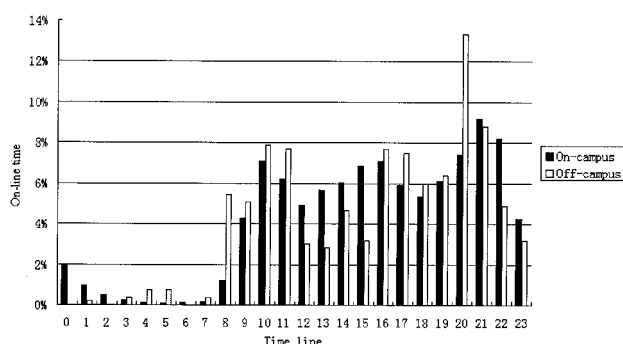


Figure 1. Distributions of online learning time for on- and off-campus students.

#### 3.2. Path of browsing courseware

In questionnaires, on- and off-campus students answered the question whether they browsed the courseware of MF&A along the chapter path from the first chapter to the last. Proportions and numbers of respondents can be seen from table 1.

#### 3.3. Intercommunication

The data on students' intercommunications were collected in two ways of questionnaires and documents. In questionnaires, students were asked to answer the following four questions.

- Did you prefer a real name or an alias in online intercommunications?
- If you met with some difficulties during online learning, did you prefer asking tutors for help or discussion with other students?
- Did you make friends through online intercommunications in this course with some other students who you had been unacquainted with before?
- What intercommunication means did you like best among e-mail, synchronous online chat, asynchronous online forum and telephone?

Tables 2 to 5 give the percentages and numbers of on- and off-campus respondents who chose different answers. The relation between the second question and the third question was also studied. Table 6 shows the respondents who preferred appealing to tutors or preferred discussion with companions and how many respondents made new friends and how many respondents did not do.

Another approach to collecting data on students' intercommunications was all kinds of documents such as students' e-mails, questions students raised in Question and Answer Field and essays students posted in Forum. It was different from the approach of questionnaires; documents of all 161 on-campus students and 61 off-campus students could be collected. Students' inter-

Table 1. Proportions and numbers of on- and off-campus students reporting path of browsing courseware.

	On-campus (n = 158)	Off-campus (n = 37)
Along the chapter path	69.6% (110)	60.0% (21)
Not along the chapter path	30.4% (48)	40.0% (14)

communications with tutors were studied through e-mails they sent to tutors and questions they raised in Question and Answer Field, and students' intercommunications with each other were studied through essays they posted in Forum. On-campus essays in relation to

Table 2. Proportions and numbers of on- and off-campus students preferring a real name or an alias.

	On-campus (n = 155)	Off-campus (n = 30)
Real name	12.3% (19)	50.0% (15)
Alias	87.7% (136)	50.0% (15)

Table 3. Proportions and numbers of on- and off-campus students who preferred appealing to tutors or discussion with companions.

	On-campus (n = 153)	Off-campus (n = 28)
Appealing to tutors	17.0% (26)	46.4% (13)
Discussion with companions	83.0% (127)	53.6% (15)

Table 4. Proportions and numbers of on- and off-campus students making new friends or not.

	On-campus (n = 155)	Off-campus (n = 28)
Making new friends	41.3% (64)	42.9% (12)
Not making new friends	58.7% (91)	57.1% (16)

Table 5. Reported favourite intercommunication means for on- and off-campus students.

	On-campus (n = 154)	Off-campus (n = 30)
E-mail	27.3% (42)	30.0% (9)
Online chat	19.5% (30)	26.7% (8)
Online forum	51.9% (80)	36.7% (11)
Telephone	1.3% (2)	6.7% (2)

Table 6. Relation between seeking help and making friends for on- and off-campus students.

	On-campus (n = 150)		Off-campus (n = 25)	
	Making friends	Not making friends	Making friends	Not making friends
Appealing to tutors for aid	7	19	4	7
Discussion with companions	55	69	8	6

the two special seminars—which had been posted separately from other essays in Forum— were left out of this account because off-campus students did not take part in those seminars. Table 7 gives the data reflecting students' intercommunications with tutors and companions.

All essays in Forum were categorized as original essays and reply essays. The first essay on one topic was an original essay, and the others on this topic were reply essays. All essays were also classified to four categories according to their main contents: course administrations, interpersonal relationships, learning platforms and course contents. Table 8 gives the percentage and number of each category essays for on- and off-campus students.

Table 9 lists several topics replied by the most essays in Forum. The number of the essays on each topic is also shown in table 9. Table 10 lists several topics replied to by most students in Forum. The number and percentage of on- and off-campus students who posted essays on each topic is also listed in table 10.

3.4. Adaptability towards online learning

Data on students' adaptability towards online learning came from questionnaires. Students were asked to answer the following three questions.

- Is online learning more convenient than traditional learning in classroom?
- Is there less stress in online learning than in traditional classroom learning?
- Are you more active or more lax in online learning than in traditional classroom learning?

Tables 11 to 13 give the percentages and numbers of on- and off-campus respondents who chose different answers.

The researchers also studied whether a relation exists between gender and learning stress, and between the approaches of seeking help and learning stress. The researchers considered that the approach of seeking help— appealing to tutors or discussing with companions—

Table 7. Students' intercommunications with tutors and companions.

	On-campus	Off-campus
Total of students	161	61
Total of e-mails students sent to tutors	181	123
Average of each student's e-mails	1.12	2.02
Total of questions students raised in Q&A	263	44
Average of each student's questions in Q&A	1.63	0.72
Percentage and number of students raising questions in Q&A	54.0% (87)	32.8% (20)
Percentage and number of students not raising questions in Q&A	46.0% (74)	67.2% (41)
Total of essays students posted in Forum	3244	136
Average of each student's essays in Forum	20.12	2.23
Percentage and number of students posting essays in Forum	88.8% (143)	62.3% (38)
Percentage and number of students not posting essays in Forum	11.2% (18)	37.7% (23)

Table 8. Proportion of each category essays in Forum for on- and off-campus students.

	On-campus	Off-campus
Original essays	22.7% (735)	61.0% (83)
Reply essays	77.3% (2509)	39.0% (53)
Course administrations	13.5% (439)	25.7% (35)
Interpersonal relationships	22.9% (743)	16.2% (22)
Learning platforms	8.9% (289)	13.2% (18)
Course contents	54.7% (1773)	44.9% (61)

reflected the student's personality to some extent. In questionnaires, 158 on-campus students and 35 off-campus students answered the question of whether there is less stress in online learning than traditional classroom learning. Table 14 shows how many male and female respondents felt less learning stress and those who felt more or the same. A total of 153 on-campus students and 28 off-campus students answered both the questions on the approaches of seeking help and on learning stress listed above. Table 15 shows—in the respondents who preferred appealing to tutors or preferred discussion with companions—how many respondents felt less learning stress and how many did not think so.

The researchers also studied the relation between learning stress and activity in order to find out whether stress made students learn more actively. A total of 157 on-campus students and 31 off-campus students answered both the two questions on learning stress and learning activity listed above. Table 16 gives the numbers of more active students and more lax students among the respondents feeling less stress and the respondents feeling more or the same amount of stress.

## 4. Analysis and discussion

### 4.1. Learning time

As seen from figure 1, the online learning time of on- and off-campus students was mainly concentrated between 8:00 to 24:00. On-campus rush time was at 10:00 to 10:59, 15:00 to 16:59 and 20:00 to 22:59. Off-campus rush time was at 10:00 to 11:59, 16:00 to 17:59 and 20:00 to 21:59. It suggests that tutors may consider arranging online synchronous troubleshooting or organizing online synchronous discussion in the rush time.

A significant difference was found in the distributions of online learning time between on- and off-campus students ( $\chi^2 = 198.066$ ,  $P = 0.000$ ) although these two distributions had some similarities. The main difference was at 0:00 to 0:59, 4:00 to 5:59, 8:00 to 8:59 and 20:00 to 20:59. Off-campus students usually begin to work in their corporations at 8:00, so they have to rest before 0:00 at night in ordinary cases. But on-campus students usually do not have strict restrictions of work and rest time. Therefore, off-campus students often began learning in the day at 8:00, but on-campus students were seldom online before 9:00 in the morning. Some on-campus students were still online after 0:00 at night, but off-campus students were mostly off-line at 0:00 to 3:00 at night. Several off-campus students downloaded online courseware or other materials at dawn because of slow transfer speed of dial-up networks at other times of the day.

### 4.2. Path of browsing courseware

The courseware of MF&A was designed to allow students to select an entrance chapter and jump from

Table 9. Topics involving the most essays in Forum for on- and off-campus students.

On-campus		Off-campus	
Topic	Essay number	Topic	Essay number
Suggest Wendy organize a party!	54	Applications of protocols of communication between web server and local browser	6
Did you prefer real name or virtual alias in learning here?	50	Troubles I met on uploading and solutions	5
I have no originality in making web pages. How difficult!	34	(1) Is there degree of difference between distance learners and residential students? (2) How to understand the definition of analogue signals?	4 for each

Table 10. Topics involving the most authors in Forum for on- and off-campus students.

On-campus		Off-campus	
Topic	Student number (%)	Topic	Student number (%)
Did you prefer real name or virtual alias in learning here?	36 (22.4%)	(1) Troubles I met on uploading and solutions (2) Problems on playing MPEG video (3) How to add title, caption and dubbing to a video? (4) Why cannot use frames in web page correctly? (5) My homework has been uploaded.	3 (4.9%) for each
Suggest Wendy organize a party!	31 (19.3%)		
I have no originality in making web pages. How difficult!	29 (18.0%)		
Can we consult reference materials in the final exam?	23 (14.3%)		
Let's write down contact approaches	21 (13.0%)		

Table 11. Proportions and numbers of on- and off-campus students reporting whether online learning is more or less convenient.

	On-campus (n = 158)	Off-campus (n = 36)
More convenient	91.8% (145)	77.8% (28)
Less convenient	8.2% (13)	22.2% (8)

Table 12. Proportions and numbers of on- and off-campus students feeling more or less stress in online learning.

	On-campus (n = 158)	Off-campus (n = 35)
Less stress	63.9% (101)	34.3% (12)
More stress	36.1% (57)	65.7% (23)

one chapter to another freely and conveniently. But the survey indicated that most of on-campus respondents (69.6%) and off-campus respondents (60.0%) browsed the courseware of MF&A along the chapter path, from the first chapter to the last. The paths of browsing courseware were not significantly different between on-

and off-campus students ( $\chi^2 = 1.216$ ,  $P = 0.270$ ). This shows that although students had much more freedom of controlling their learning process in online learning than in traditional classrooms, most of them did not construct their own learning path but were led by the structure of courseware. So, courseware will become

something of a teacher if learning instruction is merged into the structure of courseware.

### 4.3. Intercommunication

Online identity is necessary in computer mediated interaction. A vast majority of on-campus respondents (87.7%) preferred an alias as identity in the virtual learning space. But in off-campus respondents, those who preferred real names and those who preferred an alias were half and half. There was a significant difference in the online identity students preferred between on-campus students and off-campus students ( $\chi^2 = 23.868$ ,  $P = 0.000$ ). The high rate of reporting of preferring an alias in on-campus students may relate to the online culture in the campus of Tsinghua University, where there is the famous BBS (Bulletin Board Systems) in China, which has been indispensable in most on-campus students' daily lives. In the BBS, few students use their real name. 66.9% (91 out of 136) of on-campus respondents who preferred an alias used their BBS aliases as identities during the course of learning MF&A. It seems that many on-campus students became adapted to their virtual identities in the BBS and so

applied them to other online intercommunications. At the same time, on-campus students brought a lively, sometimes not very polite, climate of the BBS into this course. Compared with on-campus students, off-campus students' interaction climate was friendlier, but more solemn. A few off-campus students reported that online learning was a solemn thing and therefore using a real name was appropriate.

When meeting difficulties in online learning, a majority of on-campus respondents (83.0%) preferred discussion with other students. But in off-campus respondents, the rate of preferring discussion with companions (53.6%) was only slightly higher than the rate of preferring appealing to tutors (46.4%). A significant difference was found in the on- and off-campus students' preferences of approaches of seeking help ( $\chi^2 = 12.131$ ,  $P = 0.000$ ). It was shown that on-campus students were more willing to interact with each other and were better at helping each other than off-campus students, which made on-campus students find a 'nice' learning community more easily so as to eliminate loneliness and improve effective learning. This difference may also relate to on-campus students' adaptation to online interaction in the BBS. More off-campus students hoped to receive direct solutions from tutors. However, because of the rapid update of knowledge, sometimes tutors cannot quickly give students answers to the questions raised by them, which may result in students' feeling isolated and frustrated.

A total of 41.3% of on-campus respondents and 42.9% of off-campus respondents made new friends during MF&A. These two rates were very close and there was not a significant difference between them

Table 13. Proportions and numbers of on- and off-campus students feeling more active or more lax in online learning.

	On-campus (n = 157)	Off-campus (n = 31)
More active	84.7% (133)	64.5% (20)
More lax	15.3% (24)	35.5% (11)

Table 14. Relation between gender and learning stress for on- and off-campus students.

	On-campus (n = 158)		Off-campus (n = 35)	
	Less stress	More stress	Less stress	More stress
Male	83	40	10	21
Female	18	17	2	2

Table 16. Relation between learning stress and activity for on- and off-campus students.

	On-campus (n = 157)		Off-campus (n = 31)	
	More active	More lax	More active	More lax
Less stress	84	16	7	4
Not less stress	49	8	13	7

Table 15. Relation between the approaches of seeking help and learning stress for on- and off-campus students.

	On-campus (n = 153)		Off-campus (n = 28)	
	Less stress	More stress	Less stress	More stress
Appealing to tutors for aid	13	13	2	11
Discussion with companions	86	41	8	7

( $\chi^2 = 0.024$ ,  $P = 0.877$ ). It can be seen from table 6 that the rates of reporting of making new friends in the students who preferred discussion with companions (on-campus: 44.4%, 55 out of 124; off-campus: 57.1%, 8 out of 14) were higher than in the students who preferred appealing to tutors (on-campus: 26.9%, 7 out of 26; off-campus: 36.4%, 4 out of 11), not only for on-campus students but also for off-campus students. But these differences were not significant (on-campus:  $\chi^2 = 2.693$ ,  $P = 0.101$ ; off-campus:  $\chi^2 = 1.066$ ,  $P = 0.302$ ). It shows that the fact that on-campus students liked interaction with companions more than off-campus students does not lead to the result that more on-campus students made new friends than off-campus students.

As seen in table 5, among the four intercommunication means of e-mail, synchronous online chat, asynchronous online forum and telephone, both on- and off-campus students liked asynchronous online forum best, then e-mail, synchronous on-line chat, and, lastly, telephone. There was not a significant difference in the intercommunication means students liked between on-campus students and off-campus students ( $\chi^2 = 5.209$ ,  $P = 0.157$ ). It is unexpected that the proportions of on- and off-campus students who liked telephone best (on-campus: 1.3%, off-campus: 6.7%) are so low, even though interaction by telephone is synchronous and convenient. One important reason of this phenomenon may be that in many cases students want to transfer information to not one but many other students in intercommunications of online learning.

In this study, students' interactions with tutors were investigated through e-mails they sent to tutors and questions they raised in Question and Answer Field. The average of each off-campus student's e-mails to tutors (2.02) was significantly higher than the average of each on-campus student's e-mails to tutors (1.12) ( $t = 3.449$ ,  $P = 0.001$ ). However, the proportion of off-campus students who raised questions in Question and Answer Field (32.8%) was significantly lower than the proportion of on-campus students (54.0%) ( $\chi^2 = 8.001$ ,  $P = 0.005$ ). The average of each off-campus student's questions was also significantly lower (0.72) than the average of each on-campus student's questions (1.63) ( $t = 3.406$ ,  $P = 0.001$ ). Thus it can be seen that in the interactions with tutors, on-campus students used Question and Answer Field more actively than off-campus students did, but off-campus students were more inclined to e-mail than on-campus students were. Many off-campus students might be afraid that their questions were simple or stupid in the view of other students and, therefore, they were not confident enough to publish their questions in Question and Answer Field. The fact that off-campus students posted much less essays in

Forum than on-campus students did (which will be referred to thereafter), also reflects such a psychology of off-campus students. This suggests that tutors have to do more to remove shame from off-campus students than from on-campus students.

Students' interactions with each other were also studied through essays they posted in Forum. Most on-campus students (88.2%) and off-campus (62.3%) students posted essays in Forum, which is consistent with the intercommunication means students liked best—asynchronous online forum. But the proportion of on-campus students who posted essays in Forum was significantly higher than the proportion of off-campus students who posted essays in Forum ( $\chi^2 = 20.670$ ,  $P = 0.000$ ). The average of each on-campus student's essays (20.15) was also significantly higher than the average of each off-campus student's essays (2.23) ( $t = 7.727$ ,  $P = 0.000$ ). It reflects that on-campus students had much more enthusiasm for posting essays in Forum than off-campus students had. As seen in table 8, in all the essays posted in Forum, 77.3% of on-campus essays were reply essays and only 39.0% of off-campus essays were reply essays. A significant difference could be found in the proportions of original or reply essays between on- and off-campus students ( $\chi^2 = 104.770$ ,  $P = 0.000$ ). It shows that the interactions among on-campus students are much stronger than among off-campus students. Many off-campus students could not see any reply essays to the essays they posted, which made them feel frustrated and depressed. Off-campus students, just like on-campus students, liked asynchronous online forum, but as an off-campus student said, they were so afraid at being laughed at by others that only several of them often posted essays.

All essays were classified to four categories according to their main contents. It can be seen from table 8 that the essays on course content occupied the largest proportion of on-campus essays (54.7%), followed by essays on interpersonal relationships (22.9%). The essays on course content also occupied the largest proportion of off-campus essays (44.9%), followed by essays on course administrations (25.7%). The distributions of essay numbers of the four categories were significantly different between on- and off-campus students ( $\chi^2 = 21.471$ ,  $P = 0.000$ ).

From the topics involving the most essays listed in table 9 and the topics involving the most authors listed in table 10, it can be seen that a vast majority of on-campus essays with those topics belong to the category 'interpersonal relationships' except those with the topic 'Can we consult reference materials in the final exam?'. Therefore, the topic on-campus students were most interested in was on interpersonal relationships although, in total, the largest proportion of on-campus



essays were on course content. However, the topic off-campus students were most interested in was course content. In the off-campus topics listed in table 9 and table 10, only the topic 'Is there degree difference between distance learners and residential students?' and the topic 'My homework has been uploaded' are on course administrations and the other topics are on course contents. Passionate discussions on spontaneous topics on interpersonal relationships made on-campus students' very happy. Many on-campus students indicated that they had deeply loved this course and this learning community. They actively appealed to other students and shared their intelligence. Even in the 20 days after the final exam, they still came to Forum to express their feelings and bless others. Such phenomena did not occur among off-campus students. Favourable interpersonal relationships became a big difference between on-campus students and off-campus students. Another noticeable phenomenon is that the destination of an off-campus essay on interpersonal relationships used to be a certain person who was mentioned by name in the essay, but the destination of an on-campus essay on interpersonal relationships used to be not a person but a community. This may partly explain why the rate of reporting of making new friends for on-campus students was very near to the rate of reporting of making new friends for off-campus students although on-campus students had more enthusiasm in interactions with companions than off-campus students had.

#### 4.4. Adaptability towards online learning

Students reported that the convenience of freedom of time and space was a large advantage of online learning. A vast majority of on-campus respondents (91.8%) and most off-campus respondents (77.8%) thought online learning was more convenient than traditional classroom learning. But a significant difference was still found in the attitude to convenience between on- and off-campus students ( $\chi^2 = 5.948$ ,  $P = 0.015$ ).

The feeling of learning stress was also significantly different between on- and off-campus students ( $\chi^2 = 10.371$ ,  $P = 0.001$ ). Most on-campus respondents (63.9%) reported that there was less stress in online learning than in traditional classroom learning, but most off-campus respondents (65.7%) did not agree. This may relate to the environments students exist in. Students require excellent competence of self-learning because of the reduction of tutors' supervision in online learning. An on-campus student lived in the environment where he or she could easily acquire learning tools or materials, and conduct research with other students who did not take the same online course with him/her

perhaps. Students and tutors around the student formed a large, helpful information source. Some institutes at the University even gave on-campus students a course on the searching of academic databases. It can also be seen from the process of the course MF&A that on-campus students had a much stronger competence of searching for useful information and interacting with each other. Therefore, reduction of tutors' supervision made on-campus students feel less stressed. Oppositely, an off-campus student lived in the environment where he or she often felt helpless because taking courses, as a personal thing, might be not suitable to be talked about in his or her workplace. Unlike on-campus students, many off-campus students could not even find common shareware by themselves—they still depended on tutors. Therefore, reduction of tutors' supervision did not make them feel comfortable. As seen from table 15, a majority of off-campus respondents who preferred appealing to tutors when meeting difficulties (84.6%, 11 out of 13) reported that they did not feel less stress in online learning. In off-campus students the approaches of seeking help related to learning stress ( $\chi^2 = 4.368$ ,  $P = 0.037$ ). It also shows depending on tutors was a reason of off-campus students' feeling of stress. In on-campus students the approaches of seeking help did not relate to learning stress ( $\chi^2 = 2.966$ ,  $P = 0.085$ ). Table 14 shows how many male and female respondents felt less learning stress and how many felt more or the same. For on- and off-campus students, gender was not a factor of differing amounts of learning stress (on-campus:  $\chi^2 = 3.044$ ,  $P = 0.081$ ; off-campus:  $\chi^2 = 0.495$ ,  $P = 0.482$ ).

Most on-campus (84.7%) and off-campus respondents (64.5%) were more active in online learning than in traditional classroom learning. However, a significant difference was found in activity between on- and off-campus students ( $\chi^2 = 6.970$ ,  $P = 0.008$ ). It was found that on-campus students were more active than off-campus students were. This report is consistent with students' performance in Forum and in Question and Answer Field. Table 16 gives the number of students with different stress and different activity. Analysis of table 16 shows that learning stress was not a factor of resulting different activity for on- or off-campus students (on-campus:  $\chi^2 = 0.108$ ,  $P = 0.742$ ; off-campus:  $\chi^2 = 0.006$ ,  $P = 0.939$ ).

#### 5. Concluding remarks

This study compares online behaviour and adaptability between on- and off-campus students. The results show that there were some similarities between on- and off-campus students, such as the rush time of online

learning, the paths of browsing courseware and favourite intercommunication means and so on. There also existed significant differences in many aspects between on- and off-campus students.

Online learning was a pleasing thing for most on-campus students. They were more active but felt less stress in online learning than in traditional classroom learning. They seemed more interested in interaction with companions than with tutors. They easily self-constructed a helpful learning community, which had many characteristics of other public BBS. For example, students liked to use an alias in online intercommunications, the climate of the community was lively and sometimes not very polite; a topic raised by one of them aroused many reply essays; and so on. On-campus students appeared infinitely interested in topics on interpersonal relationships, which intensified the social relationships among them. They had stronger competence of learning and intercommunication than off-campus students had.

For most off-campus students, online learning was not relaxing. They did not feel less stress in online learning, but they were active. Their activity might be from their interest in the course itself because it did not relate to stress. Off-campus students liked to appeal to tutors for aid more than on-campus students did. Dependence on tutors was one of the reasons for their stress. Off-campus students were afraid to post questions or essays in view of so many companions. At most, only 4.9% of them discussed the same topic in Forum although the intercommunication approach they liked best was online forum. They liked to send e-mail to tutors more than on-campus students did. Compared with on-campus students, more off-campus students liked to use a real name in online intercommunications and the climate of off-campus learning community was polite and solemn. The destination of an off-campus essay on interpersonal relationships was usually a single person, who was mentioned by name in the essay, but the destination of an on-campus essay on interpersonal relationships was not usually a single person but a community.

Differences listed above suggest that tutors need to adopt different teaching strategies for on- and off-campus students. For example, for on-campus students, it is necessary to supervise asynchronous online forum so that it does not become too impolite. Essays in online forum need to be classified and partly deleted at times, otherwise they will be too many. For off-campus students, tutors need to encourage them to boldly interact with companions and organize their interactions. It is also necessary to give off-campus students more instruction in learning methods and help them cultivate self-learning competence.

It is impossible to thoroughly compare learning time and learning paths between on- and off-campus students

in this study because the researchers did not have sufficient right to develop a complex log system for off-campus students as for on-campus students. Another regretful thing is that logs and documents, which are analysed in this study, cannot be tightly paired with the questionnaires because students were allowed not to write down their names in questionnaires. These two aspects need to be in place for future analogous study.

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## Appendix: Questionnaire on Multimedia Fundamentals and Applications (MF&A)

Dear schoolfellows

Hello and thank you for attending our investigation. The purpose of this investigation is to find out your behaviour in online learning and opinions to online teaching, in order to improve our online education. For multiple reasons, there are some problems in the course of Multimedia Fundamentals and Applications, which we apologize for. To promote the quality of online teaching, we would like you to fill in the blanks below according to the facts, and give your suggestions to us.

### 1. Personal Information

- 1-1 Department \_\_\_\_\_ Major \_\_\_\_\_
- 1-2 Gender ☐ Male ☐ Female
- 1-3 Before you took this course, which kind of software had you used? ☐ Image manipulation software ☐ Audio manipulation software ☐ Digital television or motion picture

manipulation software ☐ Multimedia  
 authoring tools ☐ Visual editor for web  
 pages ☐ WWW browser ☐ E-mail client  
 software

## 2. Course Learning

- 2-1 What time did you usually learn our course? At ☐ 0:00–8:00 ☐ 8:00–11:00  
☐ 11:00–13:00 ☐ 13:00–18:00 ☐ 18:00–24:00
- 2-2 Your average duration of learning each time was about \_\_\_\_\_ minutes; maximum duration was about \_\_\_\_\_ minutes; minimum duration was about \_\_\_\_\_ minutes; total time used to learn this course (not including homework and test) was about \_\_\_\_\_ hours.
- 2-3 Your time interval of learning was (single choice) ☐ browsing the courseware at least once per week ☐ browsing the courseware at least once every other week ☐ browsing the courseware at least once per month ☐ finishing learning of the course in a continuous period ☐ other \_\_\_\_\_.
- 2-4 You browsed the courseware of MF&A ☐ along the chapter path from the first chapter to the last ☐ not along the chapter path, but according to the order of \_\_\_\_\_.
- 2-5 Did you buy teaching materials *Multimedia Fundamentals*? ☐ Yes ☐ No  
 Did you buy accessorial teaching materials *Multimedia Fundamentals Experiments Guide*? ☐ Yes ☐ No
- 2-6 Is online learning more convenient than traditional learning in classroom?  
☐ Yes ☐ No
- 2-7 Is there less stress in online learning than in traditional classroom learning? ☐ Yes ☐ No

- 2-8 Are you more active or more lax in on-line learning than in traditional classroom learning? ☐ More active ☐ More lax

- 2-9 Other advantages of online learning are \_\_\_\_\_  
 \_\_\_\_\_.

Other shortcomings of online learning are \_\_\_\_\_  
 \_\_\_\_\_.

## 3. Intercommunication

- 3-1 Did you prefer your real name or an alias in online intercommunications? ☐ Real name ☐ Alias (ID on the SMTH BBS) ☐ Alias (not ID on the SMTH BBS)
- 3-2 What intercommunication means did you like best? ☐ E-mail ☐ synchronous online chat ☐ asynchronous online forum ☐ telephone
- 3-3 If you met with some difficulties during online learning, you preferred ☐ appealing to tutors for aid ☐ discussion with other students
- 3-4 Did you make friends through online intercommunications in this course with some other students who you had been unacquainted with before? ☐ Yes ☐ No
- 3-5 Do you wish to celebrate with a party after the course finished? ☐ Yes, the form of the party is \_\_\_\_\_ ☐ No

## 4. Summary

What satisfied you most about this course was \_\_\_\_\_  
 \_\_\_\_\_.

The aspect you think needs to be improved is \_\_\_\_\_  
 \_\_\_\_\_.

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