

# IDENTIFYING APPROPRIATE TEACHING AND LEARNING STRATEGIES FOR TAIWANESE COLLEGE STUDENTS THROUGH AN ANALYSIS OF THEIR INTERNET USE HABITS

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## ABSTRACT

This research attempts to understand the differences among junior Taiwanese college students with regard to their Internet use habits and the influence of these on their learning involvement and preference through questionnaire survey (academic year 2005-2006) in the "Taiwan Higher Education Database". Survey was analyzed by means of t-test, one-way ANOVA and other statistics methods. Insights into suitable teaching and learning strategies will be correspondingly provided by discussing the differences according to gender and school types. Based on the preliminary analysis, although male and female college students were shown to have no significant statistical difference in terms of total hours of Internet use, they show significant statistical difference in four types of Internet activity. In addition, college students from different types of schools were also found to have different habits in Internet use. Although the preliminary analysis indicates that college students with different hours of Internet use have no significant statistical difference in terms of satisfaction with learning achievements, the internet use purposes demonstrate the learning preference.

## KEYWORDS

College students, Internet use habits, Internet dependence, Learning preference, Learning strategies, Teaching strategies

## BACKGROUND AND MOTIVE OF STUDY

College students comprise one of the groups with the highest rate of Internet browsing activities in Taiwan regardless of their age and education (Lu and Lu, 2007). This was the result of a survey conducted in 2006. The survey conducted by the Pew Research Center (2000) also discovered the same trend as in the USA. Hsieh and Yang (2000) found that college students with different score ranks displayed significant differences in computer use behavior. Studies also indicated that college students have been regarded as a high-risk population group who constantly indulges in Web browsing because of easy Internet access. This proves that the improper use of the Internet will affect the study performance of students. Additionally, Dembo (2007) proposed that college students must develop abilities related to their self-management of study habits, including motive, study strategy, and time management, in order to be fully qualified and prepared for college life.

Donald (2000) and Ramsden (1992) have both pointed out that teachers should not only "teach," but more importantly, they should strive for "efficient teaching." *Good teaching* that brings about *effective and successful student learning* is one that is deep and meaningful. With regard to the concepts of teaching, Kember (1997) reviewed college teaching approaches in 13 universities in Western societies, and found that teaching includes two main approaches: a) teacher-centered/content-oriented approach and b) student-centered/learning-oriented approach. The

teacher-centered approach refers to the method of instilling information and conveying structured knowledge while the student-centered approach refers to the method of assisting students with understanding, conceptual change, and mental development. Kember and Kwan (1999) later visited professors of various Hong Kong colleges and universities and found similar results. Studies show that the teacher-centered lecturing approach, despite having received criticisms for creating passive learning students, is still widely adopted by colleges and universities due to its advantage of conveying knowledge in a systematic manner (Hativa, 2000). Studies revealed that over 90% of colleges and universities still use this approach (Thielens, 1987). The following trends appear to be clear according to the learning pyramid concept: the more the teacher-centered approach is used, the smaller the students' memory retention percentage; likewise, the more the student-centered approach is used, the larger the students' memory retention percentage.

In the classroom context, a large body of psychological research highlights the fact that successful learning depends on learner characteristics such as cognitive styles/preferences, learning styles, information processing strategies, and epistemological beliefs (e.g., Cano-Garcia and Hughes, 2000; Hofer and Pintrich, 1997; Schommer, 1993; Tamir, 1985; Weinstein et al., 1988). In conventional classrooms, many studies suggest that learners have instructional preferences on the methods, media, strategies, presentation styles, and assessments due to different cognitive and learning styles (e.g., Riding and Rayner, 1998; Sadler-Smith and Riding, 1999). According to the analysis by Hamberger and Ben-Artzi (2000), information access, amusement, and social intercourse are the Internet functions most often used. Tu and Chen (2001) discovered that students' Internet activities can be grouped into (1) inquisitiveness style, (2) amusement style, (3) social intercourse style, (4) enriching style, and (5) conservative style. Relevant studies on Internet using motivations also support the aforementioned views (Kaye, 1998; Korgaonkar and Wolin, 1999; Kaye, 1998; Tsai, 1995; Huang, 2002). Only few considerable amount of research investigating the influence of Internet use on college students' study performance has shown that different Internet use motivations/purposes influence students' learning preferences (Hu, 2005; Wei, 2001). Based on the statements above, understanding how the Internet use habits of college students are associated with their learning involvement has become an important issue for understanding the student-centered approach. The specific purpose of this ongoing study is to identify appropriate teaching and learning strategies for Taiwanese college students through an analysis of their Internet use habits.

## METHOD

This study used the Taiwan Higher Education Database of the Center for Educational Research and Evaluation (CERE) based in National Taiwan Normal University. This study particularly chose Junior college students because this is the so-called stage of clarification. At this stage, the students need to determine their majors, collect their life information, and establish close interrelationships between fellow students and teachers (Gorgon and Habley, 2000). Therefore, evaluating the Internet use habits of Junior college students will be a good feedback resource for our study's objective.

The data analysis phase used the one-way ANOVA, the independent sample t-test to understand the differences. If the result was significant, it was compared afterwards and used for calculating the effect size according to the proposal of Cohen (1988). Relative sampling weight was conducted prior to the statistical analysis.

## FINDINGS AND DISCUSSIONS

Based on the preliminary analysis, Taiwanese junior college students reported their classroom learning preference as the following: teacher provides cases and prototypes (3.37/5), aptitude treatment interaction (3.27/5), experiments or project research (3.21/5), group discussions and works (3.13/5), and Media-assisted Learning (3.06/5). Based on the preliminary analysis, students believe the most helpful teaching approaches were the "teacher-student interaction" and "practice and experiments," while the least helpful ones were the "one-way explanation" and "problem-solving mode." Hence, it can be deduced that Taiwan college students believe that the student-centered approach is helpful for learning. In addition, preliminary analysis also indicates that there is no substantive statistical significance in the difference of total Internet use hours between female and male students. However, male and female college students were shown to have significant statistical differences in four types of Internet activity. These activities include looking for information related to homework, visiting adult Web sites, playing online games, and browsing and analyzing information related with securities ( $d > 0.2$ ). Male students tended to be more amusement-motivated in their Internet use habits. The difference of total Internet use hours among students of different college types is not notable. As for the comparison among different Internet activity types, very small difference is found among students of different college types after effect size analysis, with no substantive statistical significance either. However, after frequency distribution cross-table analysis for different Internet activities with students of different college types, it was found that students of public colleges are more inclined to be academic-motivated/learning-motivated in their Internet use, while students of private colleges use Internet more for amusement. Nevertheless, these two types were found to be the same with regard to the social intercourse/interpersonal purpose. What the results of this study displayed is similar to what Salaway, Caruso, and Nelson (2007) found. American college students appear to use the Internet media for social interaction the most as well.

The preliminary analysis also indicated that college students with different hours of Internet use have no significant statistical differences in terms of satisfaction with learning achievements. However, in order to learn more about what impacts different Internet use habits have on college students' learning preferences, the author grouped the college students for comparison based on the time point of possible Internet addicts (those who are online for over 20 hours per week) that Taiwanese scholars had concluded. The Internet use activities were re-classified as well via the Internet use motivations: learning-motivated, interpersonal-motivated, and amusement-motivated. The following four assumptions were verified further to determine methods for identifying appropriate teaching and learning strategies for Taiwanese college students.

*Assumption 1: Students with different number of hours of Internet activity may have different classroom activity preferences.*

By setting the 20 hours online duration as the grouping point, it is found that there is no difference in the classroom activity preferences between Internet addicts (over 20 hours online per week) and non-addicts. Thus, it can be inferred that students with more hours of Internet use are not necessarily inclined to prefer multimedia teaching approaches.

*Assumption 2: A difference in learning satisfaction exists between college students with different number of hours of Internet activity.*

As shown in Table 1, it was found that the difference in learning satisfaction between Internet addicts (over 20 hours online per week) and non-addicts is notable ( $p < .05$ ). However, there is still no statistical effect. Even if three groups are divided for comparison, there is still no substantive statistical difference. Thus, it can be presumed that the number of hours of Internet use is not a key factor influencing learning satisfaction.

**Table 1. Variation analysis for "learning satisfaction" of college students with different number of hours of internet activity**

| Learning Satisfaction        | Internet Activity Period Grouping | Number of People | Average | Standard Deviation | t        | Cohen's d |
|------------------------------|-----------------------------------|------------------|---------|--------------------|----------|-----------|
| Score of Satisfaction Degree | <20 hours                         | 15,475           | 2.75    | 0.75               | 10.38*** | 0.15      |
|                              | >21 hours                         | 7,615            | 2.63    | 0.79               |          |           |

PS : Full score for satisfaction degree is 5;

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Assumption 3: The more the motivation for different Internet activities, the greater the preference for a corresponding classroom learning activity.*

Learning-motivated student Internet activity was found to have positive relationships with the teaching approach preferences of "Multimedia-aided teaching," "Providing examples or cases for discussion," "Teacher-student interactive learning (asking questions, discussing)," "Group discussion, designing and publication," and "Topics chosen by students where they collect and integrate materials for a research report." It indicated that the higher the learning-motivated score, the greater the preferences for a corresponding teaching approach. These classroom learning activities can be almost concluded as student-centered/learning-oriented. Thus, it is speculated that students with Internet use habits leaning toward "learning-motivated" are inclined to accept a student-centered learning mode.

**Table 2. An analysis of the relationship between different Internet activities and classroom activity preference**

|  | Learning-motivated | Interpersonal-motivated | Amusement-motivated |
|--|--------------------|-------------------------|---------------------|
| One-way lecturing using textbooks or teaching materials                                  | -.03***            | .01                     | -.02***             |
| Multimedia-aided teaching  | .11***             | .04***                  | -.03***             |
| Providing examples or cases for discussion   | .11***             | .03***                  | -.03***             |
| Teacher-student interactive learning (asking questions, discussing)                      | .11***             | .04***                  | -.04***             |
| Group discussion, designing, and publication   | .17***             | .05***                  | -.04***             |
| Practice, experiments, or studies with the assistance of the teacher                     | .08***             | .01                     | .01                 |
| Topics chosen by students where they collect and integrate materials for research report | .14***             | .04***                  | -.03***             |
| Invite people to give speeches or demonstrations   | .07***             | .01                     | -.02***             |
| Class outings  | .06***             | -.00                    | -.02**              |
| Field visits within the campus   | .05***             | -.01                    | .00                 |
| Co-teach joint courses with other teachers   | .03***             | -.01                    | -.02***             |
| Composite mode (traditional face-to-face + Internet-aided)                               | .08***             | .02**                   | -.01                |
| Full Internet mode (mainly by Internet, no face-to-face teaching)                        | -.01               | -.01                    | .01*                |
| Remote synchronous video teaching (remote classroom assisted by Internet resources)      | -.02*              | -.03***                 | .01                 |

\*p < .05, \*\*p < .01, \*\*\*p < .001

*Assumption 4: The stronger the different Internet activity motivations, the higher the learning satisfaction preference.*

As shown in Table 3, there is a positive relationship between learning-motivated activities and learning satisfaction, indicating that the higher the learning-motivated score, the greater the learning satisfaction; its related coefficient  $r = .06$ , low effect size. Amusement-oriented activities, however, have a negative relationship with learning satisfaction, indicating that the higher the amusement-motivated score, the lower the learning satisfaction will be; the related coefficient  $r = .06$ , low effect size.

**Table 3. Analysis on relationship of different internet activity motivations and learning satisfaction**

|                       | Learning-motivated | Interpersonal-motivated | Amusement-motivated |
|-----------------------|--------------------|-------------------------|---------------------|
| Learning Satisfaction | .06***             | < .01                   | -.06***             |

\*p < .05, \*\*p < .01, \*\*\*p < .001

Although time management is always a key learning strategy for college students (Dembo, 2007), as Ackerman and Gross (2007) indicated, the academic performance of college students has a much more complicated relationship with learning time spent than what the public commonly perceives. Through the results of this study, it is clear that the number of Internet-use hours is regarded as a key index for deciding whether one is addicted to the Internet. However, college students may not think that it is a key factor influencing their learning results. Thus, promoting restrictions in college students' Internet-use hours from the point of learning only may not be



suggested. Chu's (2000) study concluded that the most popular motivation for Internet use of Taiwanese college students is tool-motivated, while this study indicates that it was amusement-motivated, especially for male college students. Wei (2001) and Hu (2005) studies revealed that if computers are widely used for interpersonal and amusement purposes, there will be more adverse effects to academic performance. Although this study displays low relativity between different Internet use motivations and learning satisfaction, it does not examine the relationship with academic performance further.

This study does not involve the difference in sexes with regard to the classroom learning preference of Taiwanese college students. However, Sullivan (2001) once pointed out that compared to male students, female students prefer traditional classroom teacher-student interactions more than Internet learning interactions. Sullivan posited that maybe female students are more inclined to accept social learning approaches. Although restricted within the questionnaire subjects of database, the results of this study demonstrated the differences in classroom activity preferences matched by different Internet motivations, which can be used as a reference for teachers designing their teaching activities. Studies on media dependency theory, for example, Levy and Windahl (1984) and Yu (1996) have pointed out that the stronger the media use motivation of a project, the more satisfactory the project will be. Although the study results do not indicate the difference of classroom learning preferences that amusement-motivated college students have, it could still be used in the contents and activity design of textbooks or courses. The author suggests the use of more animation with acousto-optic effect to satisfy college students' the love for new and exciting things, or even to develop learning activity designing with risk factors such as extrême sports (Lu and Lu, 2007).

The study does not reveal the difference in classroom learning preferences of interpersonal-motivated college students. However, interpersonal interactions via the Internet can also improve the knowledge management ability of the user (Liu and Liu, 2007). Many studies have proposed that e-learning facilitates the formation of critical and analytical thinking skills (Carmen and Kurubacak, 2002; Leader and Middleton, 2003; Nelson and Oliver, 2004). In other words, by means of information sharing in communities, an individual may be able to integrate experiences in a more systematic manner. However as indicated in previous studies, it is essential to consider the individual characteristics in Internet learning (Chou and Wang, 2000; Chen and Macredie, 2004). Matsuba's (2006) research results suggested that the Internet may be an important aid for young adults as they search for an adult identity. Despite the teaching design of virtual learning and community discussion for interpersonal-motivated students, the majority of university-based training for faculty is perfunctorily based on basic equipment and course management systems rather than on pedagogical effectiveness (Wilson, 2004). Pedagogical training is more important.

## CONCLUSION

Studies have proven that different motivations for using the Internet will affect the study performance of college students. Especially, activities not relevant to learning usually affect college students' studies. Studies have indicated that frequent Internet use is done for interpersonal interaction purposes, which could lead to low study performance among college students (Wei, 2001; Hu, 2005). This study has helped other scholars understand the Internet use habits of college students in Taiwan (i.e., mainly for entertainment and social networking). This study has further looked into the relationship between different Internet use habits and the learning preference of Taiwanese college students. Based on statistical analysis, it can be inferred that

Taiwanese college students with more hours of Internet use are not necessarily inclined to prefer multimedia teaching approaches. Second, the number of hours of Internet use is not a key factor influencing learning satisfaction. Third, it is posited that students with Internet use habits leaning toward being "learning-motivated" are inclined to accept a student-centered learning mode. Although this study shows low relativity between different Internet use motivations and learning satisfaction, it does not examine further the relationship between Internet use motivations and academic performance. This is different from the past studies (Wei, 2001; Hu, 2005). Finally, although the study results do not indicate any difference in classroom learning preferences that amusement-motivated and interpersonal-motivated college students have, the findings could still be used in the contents and activity design of textbooks or courses. The author suggests the use of more animation with acousto-optic effects to satisfy college students' love for new and exciting things. The implication derived from this research is the emphasis on the factors influencing an undergraduate's choice of classroom learning preference. Another implication of this finding suggests the importance of developing college teachers' teaching knowledge and encouraging research related to teaching. Future studies, interviews, and discussions should study the dynamic personal characteristics of these students and provide suggestions for designing other teaching and learning strategies for such digital denizens (Prensky, 2001).

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