

Enhancing web-based language learning through self-monitoring

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Abstract

The present study investigated the effects of a self-monitoring strategy on web-based language learning. Both students' academic performance and their motivational beliefs were investigated. The interaction between the use of a self-monitoring strategy and the level of learners' English proficiency was also examined. A total of 99 college students who were enrolled in classes for Freshmen English participated in this study. The experimental group was led to a web page with self-monitoring form for recording study time and environment, learning process, predicting test scores, and self-evaluation while the control group was not. It was found that (1) the self-monitoring strategy had a significant main effect on students' academic performance and their motivational beliefs; students who applied the self-monitoring strategy outperformed students who did not apply the self-monitoring strategy on both academic performance and motivational beliefs regardless of their English proficiency level; and (2) the influence of self-monitoring was greater on the lower English level students than on the higher English level students. The positive findings suggest that encouraging students to develop self-monitoring could help increase the success of online learning. Thus, applying a self-monitoring strategy is strongly recommended for web-based instruction.

Keywords

instructional strategy, language learning, self-monitoring, self-regulation, web-based instruction.

Introduction

Applying computer technology to improve learning has been studied by researchers (e.g. Gale 1991; Scardamalia & Bereiter 1991; Guthrie & Richardson 1995; Liou 1997; Van Aacken 1999; Chang & Lehman 2002). Gale (1991) indicated that students were motivated and liked working with the computer-based courseware very much. Learners became self-directive, active, and exploratory in a short time when learning from a multimedia programme (Watts & Lloyd 2001). Students learning from a programme with relevance enhance-

ment outperformed those without relevance enhancement in a multimedia-based language learning programme (Chang & Lehman 2002). Internet technology has revolutionized traditional computer-assisted language learning and has become a popular distribution channel for information.

Web-based learning continues to increase (e.g. Lin & Hsu 2001; Liou 2001; Dlaska 2002; Liou & Yang 2002; Sun 2003). In institution-wide university language programmes, the use of Internet technology has been associated with increased resources, flexibility, interactivity, and autonomy for learners who are likely to use the target language for different purposes in which learners' individualized needs and self-paced learning are stressed. Web-based instruction is theoretically a suitable environment for students to take charge of their own learning. However, research indicates that attrition

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rates can be a problem of learning in cyberspace (Kubala 1998; Carr 2000; Edwards & Chang 2001). Online learners' motivation may decline easily when the materials fail to attract their attention, when they get lost in the instruction, or when they fail to follow the schedule (Chang 2002). Thus, strategies that encourage students to develop self-regulation must be implemented to increase the retention rate and success of online learning.

Self-monitoring is an important part of self-regulation. It focuses on an individual's ability to monitor progress towards his/her goals. It functions through self-awareness, which can lead to better and more appropriate control of intervention strategies. Those strategies can contribute to the success of staying on task and task completion during learning activities. According to Zimmerman (1999), there are three forms of self-monitoring: monitoring associated with self-evaluation, strategy implementation, and efforts to adapt the strategy from outcomes. Self-monitoring training can be effective in improving adaptive goal setting and learning. Several empirical studies have shown that students benefit from being taught self-monitoring skills (e.g. Schunk 1983; Delclos & Harrington 1991; Maag *et al.* 1992; Malone & Mastropieri 1992).

According to Coleman and Webber (2002), 'self-monitoring is the process of having individuals record data regarding their own behavior for the purpose of changing its rate' (p. 103). By observing and recording their own behaviour, students comprehend the material more thoroughly (Zimmerman *et al.* 1996; Coleman & Webber 2002). For example, Lan (1996) conducted a study on 72 graduate students in a distance learning programme and found that students in the self-monitoring group performed better academically than those in the instructor monitoring and control groups. Coleman and Webber (2002) also pointed out that self-monitoring has consistently produced outcomes of improved academic performance and classroom behaviour. Zimmerman (1995) indicated that self-monitoring activities enhance not only learners' learning but also their self-efficacy of the learning process. Self-monitoring activities give students a sense of personal control that has been shown to be a major source of intrinsic motivation to continue learning on their own. Researchers have claimed that self-monitoring skills aid learning in any instructional method (e.g. Zimmerman 1990; Lindner & Harris 1993). Therefore, to obtain a more flexible mode of ter-

tiary education, self-monitoring is one of the essential skills that students must acquire.

Monitoring activities can include tracking of attention while reading a text or learning from a lecture, self-testing through the use of questions about the material to check for understanding, the use of test-taking strategies (e.g. predicting test score and adjusting time spent). These monitoring strategies alert the learner to breakdowns in attention or comprehension that can then be subjected to repair through the use of regulating strategies (Garcia & Pintrich 1994). In this study, a self-monitoring form for recording study time and environment was used in addition to predicting test scores, a test-taking strategy. It was assumed that students' monitoring of their time and the actual place they chose to study would help them to complete the academic task, and the test-taking strategy would provide students opportunities to evaluate their own learning and make a prediction. The goal of the self-monitoring learning strategy was to help students adapt to their learning environment and improve their learning, motivation, and self-regulation.

The following research questions guided this study:

- 1 Do students employing a self-monitoring strategy outperform students without a self-monitoring strategy on academic performance and motivational beliefs in web-based instruction?
- 2 Is the effect of the self-monitoring strategy different on students with higher and lower levels of English proficiency?

Methods

The study explored the effects of a self-monitoring strategy on students' academic performance and motivational beliefs in web-based instruction for students with both higher and lower levels of English proficiency. A web-based interactive instructional programme focusing on English reading was developed. After completing the web-based learning, learners' academic performance and reports of motivational beliefs, including self-efficacy for learning and control of learning beliefs, were examined. Analysis of variance (ANOVA) and *t*-tests were used to analyse the data collected from all the performance tests and questionnaires of motivational beliefs. It was hypothesized that students who employed the self-monitoring strategy would

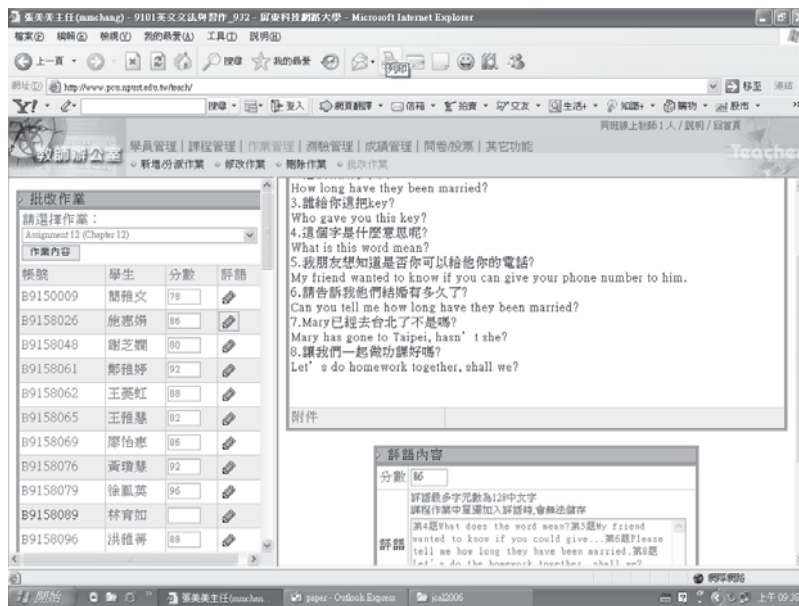


Fig 1 Screenshot of teacher’s interface – grading system.

score higher on the academic performance and motivational beliefs measures than those who did not. Students with higher levels of English proficiency who also made use of the self-monitoring strategy were expected to have the highest scores on academic performance and motivational beliefs overall.

Subjects

A total of 99 university freshmen participated in this study. All the participants were enrolled in classes for Freshmen English, which is a requirement at a university in Taiwan. The students represented different academic majors, including social science, engineering, agriculture, and management. They had been studying English for at least 6 years, including 3 years in junior high school and 3 years in high school, before the study.

Web-based instruction

The web-based instruction was developed for use in the University Network, an online course management system. An online learning research and development team worked together to create the course system. A previous study conducted at this school by the researcher showed positive responses to web-based instruction. The results indicated that most students preferred web-based instruction to traditional face-to-face classes

(Chang 2005). Students liked the convenience of the web-based course because they could learn whenever they felt like learning, and they could listen to the instruction and review the materials as many times as they needed.

For the teacher’s interface, the system had the following major functions: (1) Profile Management; (2) Course Management; (3) Assignment Management; (4) Testing Management; and (5) Grading Management (as shown in Fig 1). The students’ interface included (1) Course Content; (2) Course Information; (3) Interactive Communication; (4) Student Profile; and (5) System Question and Answer (as shown in Fig 2).

Course content

The course content (instructional materials) consisted of four components: (1) reading passages; (2) course syllabus; (3) comprehension tests; and (4) assignment submission. In the reading area, students could access various reading passages, vocabulary with definitions, oral instruction, and external hyperlinks to relevant websites where students could learn more about the topic. The testing part provided students with an opportunity for online self-evaluation. Students could choose to check their learning outcome right after they finished the lesson or wait until they were ready. The test also provided instant feedback for each question, so that students could check their answers right after finishing the

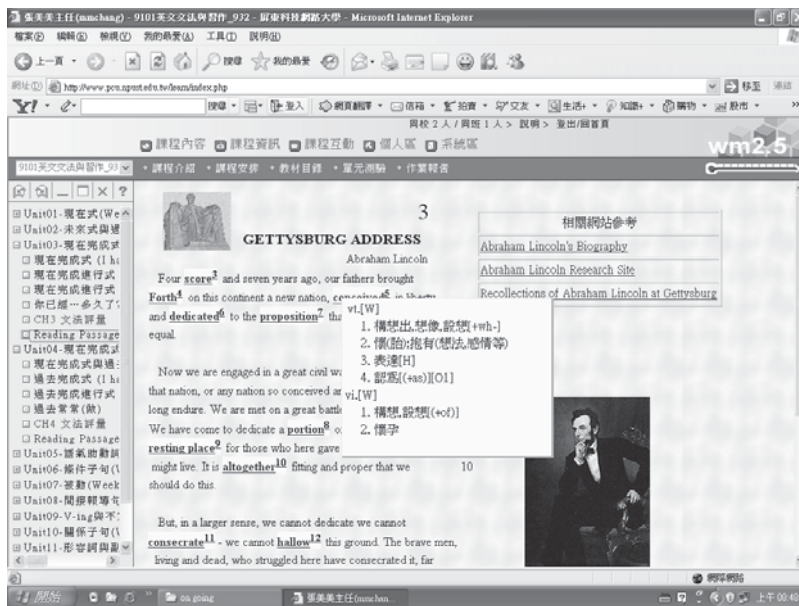


Fig 2 Screenshot of student's interface – course content.

test. In addition, students were able to turn in their assignments through an assignment submission panel.

Course information

This section provided all the information about this course. It included (1) current news; (2) a bulletin board, where the instructor announced all the information about the course; (3) students' information, where students learned all the information about their classmates; and (4) student's record, where each student could check his/her own learning history.

Interactive communication

This section gave both students and teacher the opportunity to communicate with each other. Features included (1) asynchronous communication, where students could express ideas, exchange thoughts, and raise questions anytime; (2) synchronous communication, where students could communicate with each other simultaneously; (3) topic discussion, where students were expected to discuss with each other about an issue assigned by the instructor; and (4) group discussion, where students discussed an issue in small groups.

The interactive web-based instruction enhanced students' learning from various perspectives. Through exposure to different authentic reading contexts, students could develop their cognitive learning strategies. Through the discussion panel, students were able to reflect on the readings and share their viewpoints with

peers. The exchange of ideas and thoughts helped develop students' social interaction skills. From an affective perspective, the web-based instruction provided a flexible learning environment where students could learn independently. Instead of being passive acceptors, students in this environment became active learners who could control their own learning.

Self-monitoring strategy application

Researchers have suggested that the use of a single self-regulatory strategy, such as self-monitoring, can result in improvement in writing (Harris *et al.* 1994). The specific self-monitoring strategy used for the treatment group in this study was the use of the Self-Monitoring Recording Form (as shown in Fig 3). After logging onto the course website, students in the treatment group were led to a new page where they were asked to record the starting time, the place they studied for this course, and the persons they studied with. They were also asked to predict the score for an after-lesson quiz. At the end of the learning process, students were asked to record the logout time, the real score they received for the quiz, and any distractions that happened during the learning. Figure 4 shows the whole learning process. Each time students logged onto the course website, they saw their own learning history first (see Figs 3 and 4). Through this record, students were able to scrutinize their study time and the learning environment, and this alerted them



Fig 3 The self-monitoring recording form.

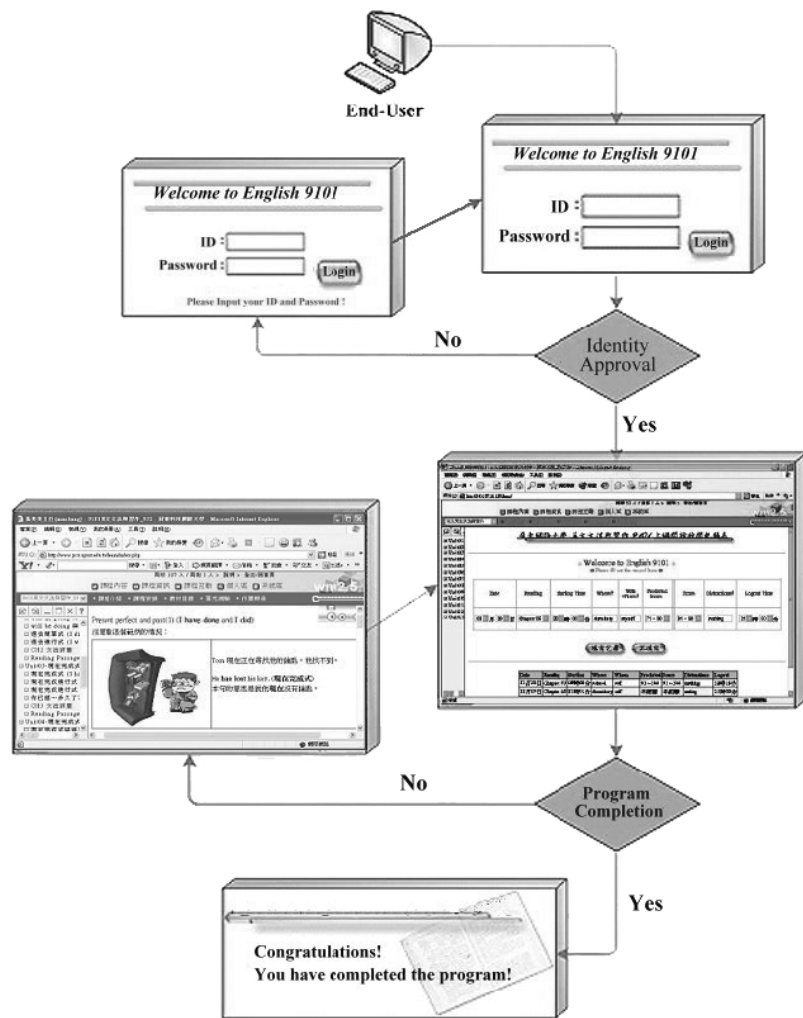


Fig 4 Flowchart of student's learning process.

to any breakdowns in attention or comprehension. In addition, the test predictions provided students with opportunities to evaluate their own learning.

Measures

Two major dependent variables, learners' academic performance and motivational beliefs, were examined. Students' course grades, which included scores of the comprehension test, assignments, and discussion, were included as the index of academic performance. The scores ranged from 0 to 100. The motivational beliefs were assessed by an adapted version of the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich *et al.* 1991). The MSLQ, developed by Pintrich *et al.* (1991), is a self-report instrument designed to assess student motivation and cognition, including task value, self-efficacy, test anxiety, cognitive strategy use, and regulatory strategy use. In this study, self-efficacy for learning and control of learning beliefs subscales were used. The self-efficacy scale included eight items such as, 'I am confident I can understand the most complex materials presented in this course', and indicated students' beliefs about how capable they were of understanding and doing the work for this subject matter. The four control of learning beliefs items asked students if they believed that their efforts to study make a difference in their learning. Question scoring was as follows: strongly agree (5 points), agree (4 points), undecided (3 points), disagree (2 points), strongly disagree (1 point). The mean scores ranged from 1 to 5. A general English proficiency test was used to measure the student's English proficiency. This test was composed of items of vocabulary, grammar, dialogue, and reading comprehension. The possible scores ranged from 0 to 100.

Procedures

Based on their scores on the general English proficiency test, students were classified into the higher-level group or lower-level English group. Students who scored higher than 86 were assigned to the higher-level group; students who scored below 86 were assigned to the lower-level group. A *t*-test indicated that the difference between these two groups was significant ($t = 24.87$, $P < 0.001$). In both groups, half of the students were randomly assigned to the control group and the other

half were assigned to the experimental group. All the participants learned from the same instructional materials. The experimental group was given a self-monitoring form for recording study time and environment, learning process, predicting test scores, and self-evaluating while the control group was not.

During the first 3 weeks of the course, students were oriented to the web-based instruction. After that, students learned the course content from the course website. Two weeks before the end of the semester, all participants completed the adapted version of the MSLQ and an instructional material-based test.

Results

Both descriptive statistics and ANOVA were used to analyse the data collected. The analyses aimed to determine if there were statistically significant mean differences on outcomes in the cognitive domain, specifically academic performance, and in the affective domain, specifically motivational beliefs, resulting from differences in students' English proficiency level and the use of a self-monitoring strategy in a web-based learning programme. The findings are reported in the following sequence. First, the descriptive summary statistics, including sample size, the means, and standard deviations of the scores, are reported. Second, ANOVA and *t*-tests were used to analyse the main effects of the independent variable, self-monitoring strategy, and *post hoc* tests were used to compare the differences among four groups.

Table 1 shows the descriptive statistics for all four groups: the higher English level with treatment (HT)

Table 1. Mean and standard deviation of academic performance and motivational beliefs for four groups.

	Group	N	M	SD
Academic performance	HT	26	70.69	13.08
	HC	20	63.00	14.84
	LT	21	68.55	12.22
	LC	32	57.59	14.73
Motivational beliefs	HT	25	3.70	0.429
	HC	20	3.43	0.542
	LT	19	3.73	0.432
	LC	32	3.24	0.982

HT, higher English level with treatment; HC, higher English level control group; LT, lower English level with treatment; LC, lower English level control group.

Table 2. One-way ANOVA on academic performance and motivational beliefs for all four groups.

	SS	d.f.	MS	F
Academic performance				
Between groups	2912.04	3	970.68	5.07**
Within groups	18175.71	95	191.32	
Total	21087.75	98		
Motivational beliefs				
Between groups	4.30	3	1.02	3.05*
Within groups	43.27	92	0.47	
Total	47.57	95		

* $P < 0.05$, ** $P < 0.01$. SS; sum of square, MS; mean square.

Table 3. T-test between control group and experimental group on academic performance and motivational beliefs.

	N	M (SD)	d.f.	t
Academic performance				
Control	52	59.67(12.61)	97	3.61***
Experimental	47	69.73(14.87)		
Motivational beliefs				
Control	52	3.31(0.43)	94	2.87**
Experimental	44	3.71(0.84)		

** $P < 0.01$, *** $P < 0.001$.

group, the higher English level control (HC) group, the lower English level with treatment (LT) group, and the lower English level control (LC) group. Group HT obtained the highest score on academic performance and Group LT received the highest score on motivational beliefs. Results revealed that for both academic performance and motivational beliefs, the differences among four groups were statistically significant (as shown in Table 2).

When comparing means by treatments, the experimental group mean of 69.73 was higher than the control group mean of 59.67 in terms of academic performance; the difference was significant (as shown in Table 3). Regardless of different levels of English proficiency, students who applied the self-monitoring strategy obtained higher scores on the comprehension test than students who did not apply the self-monitoring strategy. In terms of motivational beliefs, the experimental group mean of 3.71 was higher than the control group mean of 3.31; there was a significant difference between the two groups (as shown in Table 3). Regardless of different levels of English pro-

Table 4. Multiple comparisons among four groups.

	Group	Mean difference	SE
Academic performance	HTvs. LT	2.14	4.06
	HTvs.HC	7.69	4.11
	HTvs. LC	13.10**	3.65
	LTvs.HC	5.55	4.32
Motivational beliefs	LTvs. LC	10.95**	3.88
	HTvs. LT	0.030	0.208
	HTvs.HC	0.271	0.205
	HTvs. LC	0.462*	0.183
	LTvs.HC	0.302	0.220
	LTvs. LC	0.492*	0.198

* $P < 0.05$, ** $P < 0.01$.

ficiency, students who applied the self-monitoring strategy obtained higher scores on the motivational beliefs measure than students who did not apply the self-monitoring strategy.

Table 4 presents the results of the multiple comparisons among all four groups on academic performance and motivational beliefs. It shows that the differences on the comprehension test means between pair HT and LC and pair LT and LC were significant. The results also show that the mean differences on academic performance and motivational beliefs between pair HT and LC and pair LT and LC were significant (as shown in Table 4).

Discussion

The findings are discussed in terms of the general research questions and their implications for foreign-language teaching instruction. One research question concerned the main effect of the self-monitoring strategy on the academic performance and motivational beliefs of web-based learners. Results indicate that students who employed the self-monitoring strategy obtained higher scores on their course material comprehension tests and the measure of motivational beliefs than those who did not employ the self-monitoring strategy regardless of their English proficiency level. Within the higher-level English proficiency group, students who employed the self-monitoring strategy obtained higher scores than those who did not on both academic performance and motivational beliefs, but the difference did not reach a statistically significant level. Within

the lower-level English proficiency group, on the other hand, students who employed the self-monitoring strategy outperformed those who did not on both academic performance and motivational beliefs to a statistically significant degree.

This result suggests that the self-monitoring treatment compensated for a lack of use of metacognitive strategies among the lower-level English proficiency group. Sheorey and Mokhtari (2001) found that high-reading-ability students use more cognitive and metacognitive reading strategies than lower-reading-ability students. So, lower-ability readers need more assistance in applying self-monitoring strategies. This suggests a need for the explicit teaching of metacognitive strategies and the use of self-monitoring during reading instruction, especially for weaker readers.

When comparing all four groups, the HT group received the highest score on academic performance while the LC group received the lowest score. On the measure of motivational beliefs, the LT group received the highest score while the LC group received the lowest score. Students in the higher-level English proficiency group who employed the self-monitoring strategy outperformed those in the lower-level English proficiency group who did not employ the self-monitoring strategy on both academic performance and motivational beliefs. Students in lower-level English proficiency group who used the self-monitoring strategy performed better academically and motivationally than those in the higher-level English proficiency group who did not employ the self-monitoring strategy. This clearly indicates that students in the lower-level English proficiency group benefited more from the self-monitoring strategy than students in the higher-level group.

The results of the study revealed a significant main effect of the self-monitoring strategy. Self-monitoring helps students through self-awareness, which can lead to better control of intervention strategies and contribute to the success of task completion during learning activities. In this study, students in the treatment group were taught to self-monitor by observing and recording their own learning behaviour. As a result, they comprehended the material more thoroughly and performed academically better. The findings are in line with previous studies which have shown that students benefit from being taught self-monitoring skills (e.g. Schunk 1983; Delclos & Harrington 1991; Maag *et al.* 1992; Malone & Mastropieri 1992).

Online instructional designers and teachers may draw implications from the findings. The positive findings related to the embedded self-monitoring strategy suggest the value of external embedded instructional strategies in web-based instruction. The findings also imply that encouraging students to develop self-regulation through self-monitoring could help to increase the success of online learning. The self-monitoring strategy employed in this study is relatively simple and therefore should be relatively easy for instructors and learners to implement in online courses.

Conclusion and suggestions

The results of the study showed that there was a significant main effect of the self-monitoring strategy on students' academic performance and the motivational beliefs. Students who applied the self-monitoring strategy outperformed students who did not apply the self-monitoring strategy both academically and motivationally. The findings support previous studies indicating that self-monitoring strategies benefit academic learning and motivational beliefs (Coleman & Webber 2002). Self-monitoring, the process of having individuals record data regarding their own behaviour for the purpose of changing their original learning rates (Coleman & Webber 2002), functions through self-awareness, leads to better and more appropriate control of intervention strategies, and, in turn, leads to successful task completion during learning activities. The findings of this study suggest that students' monitoring of their study time and the learning environment helped them complete the academic task and alerted them to any breakdown in attention or comprehension; the test-predicting strategy provided students with opportunities to evaluate their own learning; and, all of these, resulted in better performance.

With respect to academic achievement, the HT group performed the best, but with respect to motivational beliefs, it was the LT group that had the highest scores. The LT group performed better than the HC group on both academic achievement and motivational beliefs, which suggests that the treatment overcame any advantage that the higher English proficiency students may have possessed. In addition, the influence of self-monitoring was greater on the lower English level students than on the higher English level students. Students in the lower English level group became more confident

about their learning and more likely to believe that their efforts make a difference in their learning through self-monitoring than those in the higher English-level group. This suggests that the lower English level students had more room for improvement and so showed the greatest benefits from the treatment.

Both students' academic performance and motivational beliefs were improved for those who employed the self-monitoring strategy. Thus, applying a self-monitoring strategy is strongly recommended for web-based instruction. Further studies that investigate the effect of individual differences, such as personality factors and different learning styles, are recommended. Different learning strategies on learning a foreign language through web-based instruction would also be interesting to examine.

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