

The effect of teaching note-taking strategies on the students' academic achievement

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Abstract

In the present study attempt has been made to investigate the effect of note-taking strategy instruction individually and its interaction with sex on the students' academic achievement. To double check the hypotheses a true experimental method and a survey have been used. The collected data related to the experiment part was fed into SPSS software to be analyzed using ANCOVA. The results revealed that note-taking strategy instruction, but not its interaction with sex, had significant effect on the student achievement. Using t-test, the data gathered via the questionnaire was analyzed. The result indicated that the Iranian professors and students had high positive attitudes toward the benefits of note-taking and the mean difference between the male and female respondents was not significant. The findings are both theoretically and practically useful for the teachers, students and future researchers.

Keywords: note-taking strategy instruction, academic achievement, sex, attitude

Introduction

Every job in the world needs its own specific tool. In the tool box of students, teachers and researchers the most important tool is note-taking.

In the present study attempt has been made to investigate the theoretical and practical aspects of note-taking as well as its relationship with sex. The undergraduate students are not experienced enough in using note-taking strategies. It is this problem which has given rise to debates among the scholars dealing with the idea.

Due to the fact that the study skills, including note-taking, are usually taught to the students theoretically in the form of advice not practically, the students' note-taking is not of high quality at the BA level. Thus, the

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most important problem which the present study is going to deal with is whether we can enhance the students' academic achievement through teaching note-taking strategies, and simultaneously we want to know what function the students' sex may perform.

Note-taking strategies have their root in cognitive and metacognitive theories. Therefore, it is important to scientifically investigate the extent of the effect of instructing the note-taking strategies on the students' academic achievement. Certainly, the information or findings obtained in this way will be significant for the authorities who are involved in teaching-learning programs.

Referring to Ladas (1980), Beecher (1988) reports that research on note-taking has generated debates since C.C. Crawford (1925) began his studies in 1920s. Initially the debates centered on whether note-taking resulted in improved student performance on tests. Over the years, researchers have tried to verify that note-taking helps students "encode" the information involved and that notes are valuable as materials for review.

Beecher (1988) claims that the research findings on whether note-taking promotes encoding have been mixed. Documenting some previous studies, Beecher supports the claim as follows: Hult et al. (1984), for example, found that note-taking does involve semantic encoding; but Henk and Stahl (1985) found that the process of note-taking in itself does little to enhance recall. They found, however, that reviewing notes clearly results in superior recall. Their conclusions were dramatically different from those of Barnett et al. (1981), who found "strong support" for the encoding function of note-taking but not for the value of using notes to review material.

Some experimental studies on student achievement have been inconclusive regarding the benefits of note-taking training. However, these studies have had serious methodological weaknesses and have not consistently involved meaningful training sessions that incorporate practice and evaluation of the note-taking skills. For example, a study by Bretzing et al (1987) involved 15 minute training sessions before the testing and provided only general note-taking tips.

Research hypotheses

1) Teaching note-taking(strategies) to the students mainly enhances their academic achievement.

2) The interaction of gender (male and female) and note-taking seems effective in the students' academic achievement.

Significance

Many reasons compel researchers, practitioners in education and students to further investigate note-taking. For example, it affects cognitive variables; acts as an external memory; causes the learners to learn, think and create; serves as an artifact; causes meaning to be encoded; is useful for review; extends attention span; causes the learner to focus on the subject; helps remembering; makes the learner active including those with learning disabilities; causes the learner to organize ideas; helps writing understanding and memory; facilitates attending to lecture, comprehending material and recall; increases learning via actively processing the material and relating it to previous knowledge; facilitates learning through its process of recording; is used for later review as an external storage; and facilitates the selection of important points (Nguyen, 2006; Bauer & Koedinger, 2004; Ward & Tatsukawa, 2003; Allen & Reeson, 2008; Cottrell, 1999; Peper & Mayer, 1986, 1987; Einstein, Morris & Smith, 1985; Weishaar & Boyle, 1999; Kiewra, 1985, 1987; Department of Lifelong Learning: Study skills series, 2009 and Learning Assistance Center, 2009).

The objectives of the study

1) *The primary objective:* knowing the effect of note-taking on academic achievement in general

2) *The secondary objectives:*

a. Determining whether teaching note-taking (strategies) to the translation students following the course units titled "*the theoretical principles and fundamentals of translation*," as part of the translation studies syllabus, significantly affects their achievement in the course (offered in Islamic Azad University of Hamedan);

b. Determining the interactive effect of teaching note-taking strategies and sex on the students' success in the course mentioned in (1) above;

c. Determining whether differences of opinion or general consensus exist among both teachers and students of study skills courses at BA level regarding the value of practicing note-taking.

Literature review

Many studies have been conducted concerning note-taking. They may be categorized based on the nature of their results although this demarcation is not an easy task and the results obtained by some studies may overlap and/or blur those obtained by some others.

Theoretically speaking, there is a strong relationship between note-taking and cognition and/or metacognition. Note-taking, as a cognitive strategy, implies comprehension and production. Making mnemonic and nonmnemonic notations by the children is another evidence for the relationship between cognition and note-taking. Metacognition helps learners become active participants in the learning process.

Metacognitive strategies are sequential processes to control cognitive activities and to ensure that a cognitive goal is achieved (Piolat et al., 2005; Ellis, 1994:37, 656; Bialystock & Codd, 1996; Eskritt & Lee, 2002; Eskritt & Mcleod, 2008; Stefannou, Hoffman & Vielee, 2008; White, 1996; Wang et al., 2009; Kiewra, 1988).

There are some educators (Kobayashi, 2005; Badger, 2001; Foos et al., 1994; Dunkel and Davy, 1989; Kiewra and Benton, 1988; DI Vesta and Gray, 1973 quoting from Crawford, 1925) who believe that *lecture notes* positively affect recall, the process of learning and retaining the information, academic success and higher grades.

Castello and Monereo (2005) refer to different *eras* when the topic, note-taking, has been dealt with. A dominant approach in the sixties and seventies focused on the effects of note-taking and note-writing on some cognitive variables, such as attention, memory, comprehension, and so on. In the eighties and nineties, interest was focused on the relationship between quality of notes and significance of learning. More specifically, these studies analyzed whether the use of different note-taking procedures improved the learning of some information. More recently, the interest of research has shifted to what really happens in the classrooms when teachers aim at prompting certain note-taking forms.

There are researchers who consider note-taking as a *strategy* or *tool*. Lee et al (2008) have taken note-taking into account as effective strategies to improve students' learning. Many students believe in the positive effect of note-taking process itself on the learning performance (Kobayashi, 2005). According to Van Meter, Yokoi, and Pressley (1994) college students shared beliefs that the act of taking notes facilitates attending to the lecture, comprehension of the material to be learned and the subsequent recall. Chularut and DeBacker's (2004) findings clearly

demonstrate that concept mapping, as a strategy, can benefit ESL students across a range of levels of English proficiency, including those who were most advanced in English acquisition. Note-taking is a valuable tool that can help increase the retention of information (Carrier & Titus, 1981, p. 385, cited in Meyer, 2002). Stahl et al. (1991) state that the Cornell Method, the Unified Notetaking System, and the Split Page Method are all effective and time-honored tactics (p. 615). Spires and Stone (1989) and Bakunas and Holley (2001) specifically recommend the Split Page Method.

Some commentators have emphasized the function of *reviewing* notes. The benefit of note taking appeared to be derived from the review rather than from the act of note-taking itself (Carter and Van Matre, 1975). Kiewra (1985) endorsed the value of review, but not of the student note. According to Mee (1991) note-taking serves as an external storage function, because its value is... the product that is externally stored and reviewed. Kiewra (1985) concluded that listening to a lecture and subsequently reviewing the instructor's notes prior to a delayed exam leads to relatively higher achievement. According to Slotte and Lonka (1999) reviewing the notes during essay-writing generally resulted in good performance in an exam calling for deep-level text comprehension.

Researchers have not ignored the effect of note-taking with another skill *accompaniment* on the students' performance. Peverly and Brobst (2003), for example, indicated that note taking and background knowledge were generally better predictors of test performance than self-regulation. Moreover, Kiewra et al. (1995) investigated how different note-taking formats in combination with review activities affect recall and relational learning.

Some others have geared their attention towards the *quality* of notes. Research on the qualitative dimension, based on the note completeness, indicates that the number of idea units in lecture notes is positively related to test performance (Kiewra et al., 1995). Benton et al. (1993) also presented data consistent with the conclusion that the length of lecture notes was related to both qualitative measures of essay writing. Slotte and Lonka (1999) also found that taking extensive and high-quality notes is related to success in tasks calling for deep-level discourse processing. Boyle and Weishaar (2001) concluded that improved note-taking skills contribute to increasing students' comprehension, short-term and long-term recall.

In some other studies attention has been paid to the *encoding* and the

external storage dimensions of note-taking. Rickards and Friedman (1978) concluded that note-taking seemed to serve as both an encoding device and as external storage mechanism, with latter being the more important function. The external storage function not only led to enhanced recall of the notes, but also facilitated the reconstruction of other parts of the passage. According to Kobayashi (2005) the proponent of the encoding hypothesis (e.g., Bretzing and Kulhavy, 1979, Di Vesta and Gray, 1972, Einstein et al , 1985, Peper and Mayer , 1979 and Peper and Mayer, 1986) state that note-taking enhances learning by stimulating the note-takers to actively process the material and to relate it to their existing knowledge.

Some other educators have come to the conclusion that note-taking strategies should be *taught*. According to Meyer (2002), being a crucial skill, note-taking is to be explicitly taught in school. Ornstein (1994) emphasizes note-taking as part of the curriculum. Bakunas and Holley (2001) argue that note-taking skills should be taught to students in the same manner that they are taught writing or computer skills.

Based on the literature reviewed we come to the conclusion that note-taking has been the common theme of many studies from long ago up to now and yet it can provide the fuel of further researches. Various studies, each using its own method, have focused on different dimensions of note-taking as discussed above.

Although the present study is on the same line of the previous ones, which in turn is a merit, its methodology makes it, in some ways, distinguished from the others. For instance, to double check the research hypotheses both an experiment and a survey were conducted. Moreover, the time duration (16 sessions each 90 minutes) of teaching note-taking strategies and the amount of guided practice done by the subjects in the experimental group may be taken into consideration as another peculiarity of the study. The detailed table of the course specifications based on which the pretest and the posttest were made can be added to the properties of the study.

Research method

Participants

a) in the experiment

To select the *sample subjects*, we considered our *statistical population* to be all those *undergraduate* students whose major was translation and had registered for the course “*theoretical principles and fundamentals of*

translation” in Islamic Azad University of Hamadan in the second semester of 2008-2009 academic year. Through systematic random sampling 60 male and female students, as our sample, were selected and randomly 30 subjects were assigned to each of the groups, experimental and control.

b) in the survey

The population for this part of the study consisted in instructors in Avehina (Abü -Ali - Cina) University, Islamic Azad University of Hamedan, Teacher Training Center in Hamedan and the students of Islamic Azad University of Hamedan majoring in translation, TEFL and English literature. Of total 193 respondents, as our sample, 72 were male and 121 were female.

Instruments

In the present study two types of instrument have been used to collect the data. One of them has been test— a pretest and a post-test—each containing 40 multiple-choice items. Another one has been a questionnaire containing 20 items. These instruments were piloted for their practicality, reliability and validity (see procedures). The tests we have made are of norm-referenced type, since they compare the performances of different groups. Another tool has been a questionnaire among a variety of means used in qualitative research to collect data. This instrument contains 20 closed-ended items. The choice of such a tool was theoretically motivated. That is to say, we had two purposes in mind: 1) to ensure that all subjects would have the same frame of reference in responding and 2) to code the responses directly as data and feed it/them into SPSS software for analysis.

Materials

Materials consisted of two parts. The first part of the materials taught to the subjects has been a book entitled "*the theoretical fundamentals and principles of translation*" which previously had been compiled by the researcher (Karimi, 2004) based on the syllabus designed by the ministry of higher education of Iran for translation field. The book contains an introduction and seven chapters. The introduction of the book includes some factors such as syllabus, teachers, seminars, extensive study of others' works etc, involved in training translation trainees; chapter 1 deals with the history of translation in Iran and in the West; chapter 2 is about different types of translation, say, literal or form-based, free, unduly free,

faithful, communicative, loan, including loan rendition and loan-blend etc.; chapter 3 investigates types of meaning such as conceptual/referential/ designative, collocative, stylistic, affective, reflective, connotative and thematic; chapter 4 examines equivalence in translation as far as phonological, morphological, syntactic, semantic, cultural and religious systems are concerned; chapter 5 is about discourse analysis (cohesion, coherence, top-down and bottom-up hypotheses, and theme versus rheme) and its pedagogical implications in translation; chapter 6 discusses different theories or models of translation such as Baker's approach, sociosemiotic approach, Vinay and Darbelent's model, Jacobson's notion, Nida and Taber's view, Catford's approach, Houses's model, Grice's maxims, skopos theory and poly system theory. Finally, chapter 7 includes translation criticism.

The second part of the materials has consisted of note-taking strategies such as Cornell's system, charting, outlining, highlighting, paraphrasing, abstract writing, underlining, sentence method, split page method, group notes, using color etc.

Procedures used

To the end a quantitative research, including experiment and survey, were used. To conduct the study, first its requirements were provided in phases.

In the first phase, 60 subjects including male and female were randomly selected among the students majoring in translation in Islamic Azad University of Hamedan and were randomly assigned to experimental and control group. As far as some extraneous variables, such as the range of age, background knowledge, situation of education and Hawthorne effect were concerned, the subjects were kept homogeneous as much as possible.

In the second phase, the table of the course — *theoretical principles and fundamentals of translation*- specifications was made (in 13 tables) according to which, in the third phase, a 40 item multiple-choice test was made. Each item of the test and that of the post-test were supposed to test a specific component of the intended course. To pilot this test it was administered to 87 students majoring in translation in Islamic Azad University Hamedan branch. Concerning the level of Knowledge about translation issues these students were other than but quite similar to the intended participants in the study. Practically, the test looked good to testees, they did not have any complaint concerning its instructions, and

the time it took (fifty minutes). Due to item analysis (Item Facility, Item Discrimination and Choice Distribution) some items were revised. Moreover, using Spearman-Brown prophecy formula the reliability of the test was estimated and it turned out to be 0.792/0.80 which according to Nunally's table (Cited in Sharifi, 2002) is acceptable. The test was also validated in two ways. First, it was made based on the table of specifications which in turn was developed based on the contents of the course book "*the fundamentals and principles of translation theory*" which the researcher had previously compiled following the contents of syllabus designed by the ministry of higher education regarding the field of translation. Second, observing the test and its table of specifications, some scholars, via endorsing, approved it to be on the line of the objectives of the study. Hence, the pretest was developed.

In the third phase, both groups were taught the course, *theoretical principles and fundamentals of translation* for 16 sessions. In a separate class, only the experimental group received the treatment. That is, they were taught note-taking strategies such as mapping, outlining, charting, paraphrasing, summarizing in one's own words, grouping main ideas together, quoting directly, writing in color, using abbreviation, underlining, highlighting, abbreviated note-taking format, Cornell or 6R method (Record, Reduce, Recite, Reflect, Review and Recapitulate), PARR method (Prepare, Abbreviate, Revise and Review) etc. for 16 sessions, each session for one hour and a half.

In each instructional session two or three strategies, accompanied by sample examples, were introduced to them. Then they were assigned some text(s) including their textbook to take notes through accordingly both in the class under the author's and at home. Their notes were checked for their quality and the subjects received feedback if it was felt.

In the fourth stage, a 40-item multiple-choice posttest, parallel to the pretest, was made, piloted for its practicality, reliability and validity, and was administered to both groups. To pilot the posttest we followed the same procedure as we used for the pretest. However, this time the test was administered to 39 students, again quite similar to those who were to take part in the revised posttest and the estimated reliability came to be 0.618. As a result of item analysis some items were deleted and some others were revised leading to the final posttest.

In the fifth stage, the collected data — the scores obtained from the pretest and posttest administrations — were fed into SPSS software to be analyzed using analysis of covariance (ANCOVA).

Parallel to the above stages, a 20-item attitude questionnaire was made. To estimate the reliability of the questionnaire, it was first administered to 30 participants, that is, 5 professors and 25 students in Islamic Azad University Hamedan Branch. These participants had dealt with study skills to some extent and/or in one way or another. Assuming the internal homogeneity of the items in the questionnaire, Cronbach's Alpha was used and the calculated reliability turned out to be 0.84. The result of Pearson's correlation coefficient showed that there is a positive meaningful correlation between the score of each item and the total score of the questionnaire, $P < 0.01$. Therefore, we may claim that all the items of the questionnaire measure a single trait, that is, the attitude about the effectiveness of note-taking strategies on the students' academic achievement (see appendix B).

The administration of the questionnaire did not take more than 20 minutes on the part of the respondents. Moreover, being written in the Persian language, its instruction as well as its items were easily and clearly understood by the respondents. Hence, the practicality of this instrument was not questioned.

To be sure about the validity of the questionnaire it was given to some scholars to see whether it suits the purposes of the study or not. Endorsing the questionnaire, they approved it. This piloted questionnaire was distributed among 193 respondents including just students of English and their professors. Again the data were fed into SPSS software for analysis.

Results

Table 1: The Levels of Between-Subjects Factors

		Value Label	N
Group	1	Experimental	30
	2	Control	30
Sex	1	Male	11
	2	female	49

Table 2: Descriptive Statistics (pre-test)

Group	Sex	Mean	Std. Deviation	N
Experimental	male	5.5000	.77460	6
	female	5.6875	1.85222	24
	Total	5.6500	1.68231	30
Control	male	6.0000	1.00000	5
	female	5.0600	1.19304	25
	Total	5.2167	1.20117	30
Total	male	5.7273	.87646	11
	female	5.3673	1.56716	49
	Total	5.4333	1.46561	60

Table 3: Descriptive Statistics (post-test)

Group	Sex	Mean	Std. Deviation	N
Experimental	male	17.5833	0.66458	6
	female	15.9479	1.70673	24
	Total	16.2750	1.68199	30
Control	male	11.7000	4.11704	5
	female	11.2600	2.54182	25
	Total	11.3333	2.77716	30
Total	male	14.9091	4.05474	11
	female	13.5561	3.19882	49
	Total	13.8042	3.37491	60

To run ANCOVA preliminary checks were conducted to ensure that there is no violation of the assumptions of the homogeneity of regression slopes, linearity, normality and reliable measurement of the covariate. One of the important assumptions to conduct ANCOVA is the homogeneity of the slope of regression lines. That is, the relationship between dependent and covariate variables should be the same for all the groups in the experiment, so that the regression lines are all (almost) parallel. Table 4 holds this assumption [$F(1, 54) = 2.493, P = 0.12$] and [$F(1, 54) = 2.587, P = 0.114$]. Table 5 indicates linearity [$F(1, 550) = 4.471, P = 0.039$]. Normality is evident in appendix C [$P = 0.323$] and the reliability of the pretest is 0.84 as reported above.

Table4: The slope homogeneity of regression lines

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected Model	416.329 ^a	5	83.266	17.586	0.000
Intercept	185.243	1	185.243	39.123	0.000
G	57.767	1	57.767	12.200	0.001
Pretest	0.152	1	0.152	0.032	0.859
G*pretest	11.802	1	11.802	2.493	0.120
Sex	14.478	1	14.478	3.058	0.086
Sex*pretest	12.248	1	12.248	2.587	0.114
Error	255.683	54	4.735		
Total	12105.313	60			
Corrected total	672.011	59			

a. R squared=0.620

Based on the data in table 5, null hypothesis is rejected [$F(1, 55) = 50.217$], $P < 0.0005$. In other words, the main effect of the between-subjects factor, group, on the dependent variable (academic achievement) is significant.

The same table also indicates that the main effect of the between-subjects factor, sex, on the dependent variable (academic achievement) is not significant, H_0 is not rejected [$F(1, 55) = 1.382$, $P = 0.245$]. This is a marginal finding in the study.

Again, referring to table 5 we see that H_0 is not rejected. That is, the effect of interaction of the between-subjects factor, *sex* and *note-taking instruction*, on the dependent variable, *academic achievement*, is not significant [$F(1, 55) = 1.249$, $P = 0.269$].

Table 5: Tests of between-subjects effects

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected model	401.902	4	100.476	20.459	0.000
Intercept	482.838	1	482.838	98.316	0.000
Pretest	21.957	1	21.957	4.471	0.039
Group	246.620	1	246.620	50.217	0.000
Sex	6.788	1	6.788	1.382	0.245
G*sex	6.132	1	6.132	1.249	0.269
Error	270.109	55	4.911		
Total	12105.313	60			
Corrected total	672.011	59			

The analysis of data in table 5 showed that the main effect of the between-subjects factor, *group*, is significant. Now the question “in which group is the academic achievement higher?” arises. To answer this question we have adjusted the means to statistically remove the effect of the covariate. Taking into account the data in table 5, we see that the adjusted mean score of subjects in the experimental group is 16.697 which is higher than that (11.439) of those in the control group. Therefore, generally, it is concluded that teaching note-taking strategies affects and improves academic achievement.

Table 6: The adjusted means of independent variable (group) levels

Group	Mean	Std error	95% Confidence Interval	
			Lower bound	Upper bound
Experimental	16.697	0.507	15.681	17.713
Control	11.439	0.543	10.350	12.527

Focusing on table 6, we see that the experimental group's mean confidence interval with 95% coefficient equals (15.68, 17.713) concerning achievement in *theoretical principles and fundamentals of translation*, while that of the control group equals (10.35, 12.527).

Table 6: Comparing the mean of the respondents' opinions with that of the questionnaire

Variable	\bar{X}	S	df	t	P
attitude	79.40	8.08	190	33.17	0.000

P<0.01, N=191

The results of one sample t-test show that a meaningful difference is observed between the mean of the respondents' opinions and that of the attitude questionnaire concerning the effect of note-taking on the students' academic achievement ($t_{190}=33.17$, $P<0.01$). The mean (79.40) of the respondents' opinions is higher than that (60) of the attitude questionnaire.

Table7: Comparing the mean of the male respondents' attitudes with that of the females'

Sex	N	\bar{X}	S	df	t	P
Male	71	78.37	9.27	120.802	-1.28	0.201
Female	120	80.02	7.27			

N=191

The results of t-test for independent groups show that a meaningful difference is not observed between the mean of males' attitudes and that of the females' as far as the effect of note-taking strategies on the students' academic achievement is concerned $t_{(120.802)} = -1.28$, N.S.

Discussion and conclusion

Using a randomized pre-test-posttest control group design and a survey, attempt was made to understand the effect of note-taking strategy instruction by itself and its interaction with sex on the students' academic achievement.

Average performance between groups differed on the posttest. That is, the experimental group outperformed the control one implying that the main effect of note-taking strategy instruction has been significant. However, the extension of our prediction, that the interaction of sex and *note-taking strategy instruction* would also provide achievement was not confirmed, [$F(1, 55) = 1.249$, $p = 0.269$].

As for our survey, the analysis of mean comparison between males and females, using t-test, confirmed that the difference was not significant. One explanation may be that both male and female subjects

have experienced the benefits of note-taking and the items of the questionnaire each has been able to elicit the respondents' judgment about a given aspect of note-taking. It is these similar beliefs of the male and female respondents that provide the foundation of a composite theory.

The findings clearly indicate that note taking can benefit the students. This may be explained in some ways. First, note-taking causes meaningful learning. Second, each note-taking strategy performs its own function in building the students' cognitive structure regarding the content of the subject matter they deal with. For instance, concept mapping causes the students to visually represent their understanding of what they hear or read. Third, reviewing the notes also plays a crucial role in recalling and fixing knowledge in one's long term memory (the author's emphasis). Finally, note-taking provides the learners with security which many practitioners in teaching advocate to be the facilitator of learning.

The results of the present study is also consistent with those of some previous ones (e.g., Crawford, 1925; Rickard and Friedman, 1978; Stahl et al., 1991; Kiewra and Benton, 1988; Dunkel and Davy, 1989; Spires and stone, 1989; Ornstein, 1994; Kiewra et al., 1995; Boyle and Weishar, 2001; Chularut and DeBacker, 2004; Cstello and Monereo, 2005; Lee et al., 2008). Concerning composite theory of note-taking beliefs held by participants traces of similarity exist between this study and those conducted by Van Meter et al. (1994) and Bonner and Halliday (2006).

Of course, disparity is also evident in the results of this study and those obtained by some others. For example, our quantitative data seem to indicate that note-taking strategy instruction improved student achievement; while Peck and Hannafin's (1983) did not. One reason for this may go back to the condition of instruction including the length of time devoted and the amount and quality of exercises done by the subjects.

Theoretical and practical implications

From a theoretical perspective there is place to claim a strong bound between note-taking strategy instruction and students' academic achievement. There are several explanations to support such a theory: (1) note-taking instruction plays an important role in recalling and/or learning ideas; (2) being practiced, note-taking strengthen our cognition power; (3) providing the learners with confidence and security, it

facilitates learning; While taking notes, both short and long term memories are involved, giving rise to learning; (5) extending our attention span, it causes us to concentrate on the subject under study and (6) it constitutes a stable external memory that is intended to learn and create.

The findings of this study are practically significant for *teachers*, *students* and *researcher*. For *teachers*, because they may raise the knowledge level of their ESL students and the students of other disciplines by both teaching various strategies unknown to them and deeply acquainting them with the wisdom underlying note-taking. Teachers may use it as a scaffold to assist their students to achieve a sound knowledge of what they are supposed to learn. To plan more successful note-taking training teachers are recommended to obtain information about the ways students take notes. For *students*, because it is a very strong learning strategy via which they may optimize their learning. When learned, note-taking strategies will be student-oriented ones and can be adopted readily without teacher's help. Moreover, the variety of these strategies requires the students to develop their metacognitive knowledge to be able to prefer one strategy over the other as the task, time and situation demand. For the *researchers*, because further investigations are recommended to deeply discover the how of the association between note-taking and cognition. Additionally, researcher may decide to compare the extent of the effect of different note-taking strategies on the students' academic achievement.

This study, like many others, suffers its own limitation. The number of female subjects in both experimental and control groups was quite higher than that of the male ones. Therefore, one cannot easily generalize the finding to argue that the interaction of note-taking strategies and sex does not affect student achievement. This should be investigated further under strictly controlled condition.

Conclusion

This study resulted in some findings and practical implications. Reconfirming the results of some previous studies, it showed that teaching various note-taking strategies improves students' academic achievement. We also found that Iranian professors and students have high positive attitudes towards note-taking. Finally, we need to further examine the effect of the interaction of sex and note-taking instruction on student achievement. Practically, teachers should enhance the quality of

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their teaching via notes being taken by them— instructor's notes – from different sources related to the theme they teach. Further, they should familiarize their students with various note-taking strategies. Students, in their turn, should be vigilant that note-taking is an inevitable part of their academic life and they should take notes from sources such as teachers' lectures, classmates' notes, books and journals using strategies which fit the task they are engaged in.

Recommendation for further research

The future researchers may further investigate 1) the relationship between the contents of notes and what is recalled by the note takers; 2) the effect of the quality of notes on the quality of mental representation; 3) the performance of note takers who review their note and that of those who do not; 4) the effect of note taking on cognitive load and 5) the test performance of trained and untrained note takers.

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Appendix A: Questionnaire used to collect data

Dear professors/ students:

This questionnaire has been developed to conduct a research concerning note-taking. Anonymously (not writing your name), please kindly read each of its items very carefully and mark only one of the ranks honestly.

No of items	Items	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	Taking notes, while studying, causes academic achievement.					
2	Taking notes from the important points causes academic achievement.					
3	Taking notes, while teacher is teaching, causes academic achievement.					
4	Comparing our class notes with the course contents causes academic achievement.					
5	Taking notes, using a specific method, causes academic achievement.					
6	Using abbreviations, while taking notes, causes academic achievement.					
7	In taking notes, separating the main points from the peripheral ones, causes academic achievement.					
8	Asking questions, while taking notes, increases academic achievement.					
9	Underlining the important points of notes causes academic achievement.					
10	Summarizing the concepts of the notes increases academic achievement.					
11	Revising the course notes does NOT result in academic achievement.					
12	Reviewing the class notes does NOT help academic achievement.					
13	Writing the class notes expressively does NOT affect academic achievement.					
14	The legibility of course notes					

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	is NOT necessary for academic achievement.					
15	Being expert/ skilled in note-taking does NOT affect desirably academic achievement.					
16	There is NO relationship between organizing notes and academic achievement.					
17	Taking notes and writing them on the white margin of the pages of book does NOT affect academic achievement.					
18	There is NO relationship between adapting note-taking methods to different courses and academic achievement.					
19	Creating enough space between notes does NOT affect academic achievement.					
20	Comparing one's own notes with those of the classmates has NO effect on academic achievement					

Appendix B: The relationship between the score of each item of the attitude questionnaire and its total score

Item	r	p
1	0.487	0.000**
2	0.427	0.000**
3	0.432	0.000**
4	0.525	0.000**
5	0.494	0.000**
6	0.484	0.000**
7	0.392	0.000**
8	0.403	0.000**
9	0.369	0.000**
10	0.358	0.000**
11	0.494	0.000**
12	0.431	0.000**
13	0.543	0.000**
14	0.510	0.000**
15	0.519	0.000**
16	0.584	0.000**
17	0.526	0.000**
18	0.512	0.000**
19	0.367	0.000**
20	0.500	0.000**

N=191

**P<0.01

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Appendix C: One-Sample Kolmogorov-Smirnov Test

		posttest
N		60
Normal Parameters ^{a,b}	Mean	13.8042
	Std. Deviation	3.37491
Most Extreme Differences	Absolute	.123
	Positive	.065
	Negative	-.123
Kolmogorov-Smirnov Z		.954
Asymp. Sig. (2-tailed)		.323

a. Test distribution is Normal

b. Calculated from data