

Research on Strategies of English Writing from the Perspective of Gagne's Information Processing Learning Theory

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Abstract—The purpose of this paper is to investigate the usage of writing strategies among college English majors from the perspective of Gagne's Information Processing Learning Theory. Based upon the feedback of questionnaires, this study shows that English majors master only a few writing strategies and they are weak in applying them. Therefore, this thesis gives suggestions on the corresponding writing strategies based on the theory of Gagne, which can help to improve English majors' writing efficiency and cultivate the awareness of utilizing strategies.

Keywords—English writing strategies, information processing learning theory, writing process

I. INTRODUCTION

As an increasing number of people are learning English around the world, the significance of mastery in English has been put on a higher status. Therefore, the research on English writing strategies is of great necessity to help learners in promoting writing ability. However, there is an increasing concern that the observations have indicated a serious problem in English writing among Chinese students, that is, the low frequency in the usage of strategies during the writing process. It is advisable for students to cultivate the awareness of learning writing strategies, take advantage of writing strategies and integrate them into daily English writing activities.

Therefore, this study is intended to make a proposal about systematic strategies of English writing based on Gagne's Information Processing Learning Theory.

II. LITERATURE REVIEW

A. The Information Processing Theory

The Information Processing Theory, which was put forward by Gagne in 1974 in his book—*The Conditions of Learning*, stating that learning belongs to a process of receiving and processing the information, which is the result of interactive outcome of learners and environment. Information Processing Theory is the primitive theory of modern cognitive and psychological theory, which emphasizes the fact that the typical mode of study is the information processing model of learning and memorizing. Gagne proposes the specific process in the 1985 edition of *The Condition of Learning and Instruction Theory* [1].

Instruction Theory, in this kind of mode, the stimulus information from external environment gets through receptors, and then turns into nerve messages [1]. Among the whole information collected from the outside world, part of the recorded information will enter into short-term

memory, after encoding, that information is going to be restored in the long-term memory. The information that learners need can be extracted from the long-term memory by retrieving the corresponding memory. Ultimately, the extracted information accesses into the reaction directly or goes back to the short-term memory to be verified. In addition to this, the model also includes execution control and expectation, which exert a pivotal influence on the whole process. Among which, execution control and cognitive strategies display the role of coordinating and controlling.

Babadogan comes up with examples of instructional design for social studies according to meaningful learning and Information Processing Theory, widely putting Gagne's theory into social application [2] (Fig. 1).

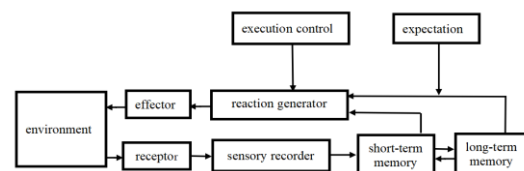


Fig. 1. Gagne's information processing model.

B. Writing Strategy

Owing to the truth that writing is one of the elementary skills of language learning, it can naturally be assumed that writing strategy is a sub-branch of language learning strategy.

Rubin highlights the relevance of learning strategy and writing strategy, signifying the writing strategies are several methods and means that second language learners adopt during the process of contextual writing [3]. Liu [4] points out that writing is qualified as an output learning process, meanwhile the writing strategies are recognized as tactics which are beneficial for achieving learning goals or creative objectives. Asmari sheds light on the concept that writing is the written expression of emotions, thoughts, desires and schemes, which requires skills rather than knowledge [5]. This thesis is designed principally according to the perspective of Czarl, taking the psychological aspects into consideration [6].

In addition to the definition of writing strategy, the classification of writing strategy is also a popular and critical research subject. Wenden draws a clear distinction between cognitive strategy and meta-cognitive strategy in 1991 [7]. The former one consists of goal setting, information conception, date search and revision checking,

while the latter one is comprised of planning, self-monitoring, self-evaluation and self-adjustment. Liu [4] establishes the specific classification that divides the writing strategies into two groups, learning strategies and production strategies. Within the learning strategies, there are meta-cognitive, cognitive and social-affective strategies. While the production strategies consist of formulating organization strategies and linguistic means. Overall, these studies outline a critical role for taking a comprehensive view on classification, though there are still many flaws and debates about the classifications of writing strategy. Based on Oxford’s classification of writing strategies in 1998 edition of the Language Learning Strategies, the writing strategies involved in this essay can be divided into six groups: meta-cognitive strategy, cognitive strategy, memory strategy, social strategy, affective strategy and compensation strategy [8].

With the development of learning strategy, the investigation on writing strategy has naturally appealed researchers at home and abroad. The research on writing strategies abroad can be traced back to the late 1980s. From the very beginning, the differences about strategy use between the skillful and unskillful learners was the subject of many systematic investigations. Raimes illustrates that unskilled L1 writers and ESL writers are similar to the lack of planning but more revision in vocabularies and phrases [9]. However, the unskilled ESL writers are more focused on putting their viewpoints down the paper instead of paying attention to the textual errors. Petric and Czarl develops a writing strategy questionnaire to mainly investigate the inconspicuous relation between writing anxiety and writing achievement [6]. After that, some scholars shifted the weight to the affective and meta-cognitive perspectives. From what has been presented above, we can naturally know that the scholars all underline the importance of combining the internal and external factors of learners and the writing strategies.

Table 1. Gagne’s learning and teaching procedures

Learning procedures	Teaching procedures	Writing strategies
Motivating	Gaining attention	Discussing topics
Comprehending	Informing learners of the objective	Introducing writing strategies
Acquisitioning	Stimulating recall of prior learning	Brainstorming topics
Maintaining	Presenting the stimulus	Repeating
Recalling	Providing learning guidance	Practicing
Generalizing	Eliciting performance and providing feedback	Enhancing retention and transferring
Operating		
Reinforcing		

The theory of Gagne about learning and his model of instructional design exert a profound impact on pedagogical design. It can be seen from Table 1 that the eight phases of Information processing and six procedures of teaching are corresponding to the six writing strategies. For example, the motivation of learning process is parallel to the discussion of writing strategies. Topic introduction in this stage can be employed to gain attention and motivate learners’ interest. The reinforcement of learning process is in accordance with the step of enhancing retention and transferring. From the

perspective of Gagne’s theory, the teaching-centered model is not keeping up with the trend of drastically developed information technology, but gradually transforming into the model of learning-centered. Therefore, the findings above provide sufficient theoretical basis for this research.

III. RESEARCH METHODS

A. Research Questions

- What are the frequencies of using writing strategies among English majors?
- What kind of writing strategies are usually utilized by English majors?
- What kind of writing strategies based on Gagne’s Information Processing Learning Theory can be systematically conducted within the process of writing?

B. Research Subjects

The 115 participants involved in this study are English majors of a medical university from freshmen to graduate students. All of them are required to take compulsory English writing course when completing their undergraduate curriculum and every student has at least nine-year English learning experiences. There are only 104 pieces of questionnaires finished, because some participants did not answer the questions as requested. The specific structure of the questionnaire is presented in Table 2.

Table 2. Participants of questionnaires

Grade	Number
Freshman	28
Sophomore	20
Junior student	18
Senior student	26
Graduated student	12
Total	104

C. Research instruments

This essay significantly demonstrates the writing strategies employed by English majors with the help of questionnaires. The distributed questionnaire is separated into two sections, in which the first section is related to the background of students’ grade and the second section elicits the strategies in the three concrete writing stages, including pre-writing, writing and post-writing stages. As is shown in the Table 3, the detailed description of the questionnaires is included in the following table.

Table 3. Description of writing strategies

Strategy	Strategies Groups	Items
Strategies in pre-writing stage	Meta-cognitive Strategies	Q1; Q2
	Cognitive Strategies	Q3; Q4
	Social Strategies	Q5; Q6
	Affective Strategies	Q7; Q8
Strategies in writing stage	Meta-cognitive Strategies	Q9; Q10
	Cognitive Strategies	Q11; Q12
	Memory Strategies	Q13; Q14
	Social Strategies	Q15
	Affective Strategies	Q16
	Compensation Strategies	Q17; Q18
Strategies in post-writing stage	Meta-cognitive Strategies	Q19; Q20
	Cognitive Strategies	Q21; Q22; Q23
	Memory Strategies	Q24
	Social Strategies	Q25
	Affective strategies	Q26

IV. RESULT AND DISCUSSION

From Table 4, we can see that the mean of the meta-cognitive strategies is generally lower than the medium level. Reading extracurricular materials and making efforts in summarizing and promoting enjoy a relatively low priority, which totally confirms the findings of Fan Jia. He discovers the phenomenon that the level of college students' application of meta-cognitive strategies to writing is low while the improvement in writing achievement after the course of meta-cognitive strategy instruction cannot be ignored, which means the fact that most students do not recognize the significance of meta-cognitive function or might not be aware of self-organization and self-promotion within the writing process. Especially in the post-writing stage, the problems can be obviously discovered.

In other words, meta-cognition, from the perspective of Gagne's theory, is deemed as a weak spot for learners. Without the meta-cognition in writing process, students may lose the intention and motivation in improving the writing ability.

As can be seen from Table 5, compared to the mega-cognitive strategies, the mean of cognitive strategies mostly

exceeds 3.00, meaning that most students hold a positive attitude towards English writing and make use of dictionary or sentence patterns during the pre-writing and writing process. However, it is apparent that the mean of cognitive strategies in post-writing is similarly lower than the medium level, which clearly shows the phenomenon that the significance of revising the composition after writing is not being taken seriously.

According to the last phase of Gagne's teaching design model, the relatively low proportion of revising after writing demonstrates that the majority of students do not pay enough attention to the phase of feedback and self-reinforcement.

Table 6 explicitly illustrates the phenomenon that only a small portion of students choose to employ social strategies. It can be inferred from the low mean of the social strategies in the three stages that students are not willing to have discussions or ask help from teachers and classmates. In other words, the cooperative learning among classmates is supposed to be further emphasized and improved. The reason of this phenomenon may be that Chinese students are introverted and the atmosphere of class is not active as some western countries.

Table 4. Meta-cognitive strategies

Option question	Always	Often	Sometimes	Seldom	Never	Mean
Q1	16.35%	27.88%	37.50%	12.50%	5.77%	3.37
Q2	3.85%	12.50%	41.35%	37.50%	4.81%	2.73
Q9	8.65%	21.15%	40.38%	23.08%	6.73%	3.02
Q10	6.73%	22.12%	44.23%	24.04%	2.88%	3.06
Q19	3.85%	10.58%	40.38%	36.54%	8.65%	2.64
Q20	3.85%	9.62%	47.12%	29.81%	9.62%	2.68

Table 5. Cognitive strategies

Option question	Always	Often	Sometimes	Seldom	Never	Mean
Q3	10.58%	26.92%	28.85%	28.85%	4.81%	3.10
Q4	32.69%	27.88%	32.69%	5.77%	0.96%	3.86
Q11	13.46%	26.92%	28.85%	24.04%	6.73%	3.16
Q12	21.15%	35.58%	31.73%	7.69%	3.85%	3.63
Q21	5.77%	17.31%	38.46%	31.73%	6.73%	2.84
Q22	5.77%	16.35%	42.31%	30.77%	4.81%	2.88

Table 6. Social strategies

Option question	Always	Often	Sometimes	Seldom	Never	Mean
Q5	2.88%	7.69%	35.58%	41.35%	12.50%	2.47
Q6	1.92%	9.62%	40.38%	37.50%	10.58%	2.55
Q15	5.77%	7.69%	44.23%	36.54%	5.77%	2.71
Q25	1.92%	9.62%	39.42%	33.65%	15.38%	2.49

The results of Table 7 clearly show the statistics about the usage of affective strategies in the three stages, notably, we can find that the mean scores of post-writing stage is much lower than the foregoing stages, showing the phenomenon that the affective strategies are usually emphasized before writing stage rather than post-writing stage.

As the first phase of Gagne's learning theory illustrates, the expectation and motivation of learning do exert long-term influence on the whole learning process. Therefore, teachers in this stage are supposed to design reasonable lesson plans from the perspective of learning motivation and teaching objectives.

Table 7. Affective strategies

Option question	Always	Often	Sometimes	Seldom	Never	Mean
Q7	31.73%	32.69%	21.15%	12.50%	1.92%	3.80
Q8	5.77%	22.12%	32.69%	25.00%	14.42%	3.20
Q16	5.77%	13.46%	33.65%	31.73%	15.38%	2.63
Q26	7.69%	11.54%	27.88%	31.73%	21.15%	2.53

Table 8. Memory strategies

Option question	Always	Often	Sometimes	Seldom	Never	Mean
Q13	9.62%	33.65%	39.42%	16.35%	0.96%	3.35
Q14	11.54%	20.19%	43.27%	6.73%	6.73%	3.12
Q24	4.81%	19.23%	41.35%	9.62%	9.62%	3.07

Table 9. Compensation strategies

Option question	Always	Often	Sometimes	Seldom	Never	Mean
Q17	28.85%	38.46%	27.88%	2.88%	1.92%	3.89
Q18	17.31%	27.88%	45.19%	7.69%	1.92%	3.51

As we can see from Table 8, it can be recognized that the mean of memory strategies is higher than the medium score of 3.00, which indicates that a large number of students do apply the memory strategies into the process of writing and post-writing.

This result is fully consistent with the findings of Duan Wen, who makes a conclusion that it is common for students to employ memory strategies according to the situations and different kinds of topics, besides, he discovers the positive relationship between memory strategies and writing achievement through empirical research [10].

Therefore, we can conclude that some students do come to realize the fact that writing involves not only outputting but also inputting, while there are still a small group of learners may be unaware of the pivotal function that memory strategy plays among the whole course of promoting the ability in writing.

As is shown in Table 9, the compensation strategies enjoy a relatively high priority in the process of writing stage, which means that most participants prefer employing compensation strategies as an effort to avoid making mistakes or express their ideas more concisely and straightforwardly. Hao Shuai argues that the compensation is the strategy which is usually used under the circumstances of limited knowledge or ability to achieve the fluency and integrity of the message [11].

V. CONCLUSION

This thesis has conducted questionnaires about the writing strategies used by English majors in a medical university, specifically exploring the problems and difficulties of writing process and then putting forward some suggestions on the writing strategies of teaching and learning.

The findings show that most participants involved in this research use writing strategies at a moderate frequency, indicating the phenomenon that students do not have a comprehensive knowledge of writing strategies and the efforts on building up the awareness and motivation of utilizing writing strategies still need to be significantly emphasized. Moreover, the findings of the interviews illustrate the specific results that students of both high-score and low score groups are anxious about different aspects of writing and do not pay much attention on the revision after writing. From the perspective of Gagne's theory, the primitive step and the last step of learning activity are not well implemented.

Therefore, the author believes that in order to improve the ability in writing, strategy instructions and applications are supposed to be integrated into the daily writing practices. Within the whole writing process, teachers, as a motivator, are supposed to firstly encourage students to begin writing compositions and then help students develop the habit of applying the writing strategies through multiple teaching methods. Besides, the specific and systematic instructions on writing strategies are required to be clearly illuminated

by teachers. As for students, they should firstly enlarge their knowledge horizon about English and then take comprehensive knowledge of writing strategies to better monitor the whole writing process. What's more, the most pivotal step is the repetition and generalization within the whole writing process of remaining the long-term information.

There are certain some limitations in this paper. The first one lies in the limited size of the samples, which just includes a small portion of English majors in a medical university. As a result, the conclusion may not be representative and generalized. Second, the essay does not involve empirical research on the application efficiency, which demonstrates the subjective purpose and factors. Third, the most critical drawback of the essay is that the judgement relies on the short-term feedback instead of long-term process.

CONFLICT OF INTEREST

The author declares no conflict of interest

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