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Attributional Beliefs, Goal Orientations, Strategic Learning and Achievement of Primary 6 Singaporean Students

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Abstract

This paper reports on a study which examinedthe relationship of two motivational constructs, namely attributional beliefs and goal orientations, strategic learning and school achievement of Primary 6 students in Singapore. A total sample of 6494 Primary 6 students from 53 primary schools participated in the study. These students came from three ability streams, including classes for high achieving (EM1), average (EM2) and low achieving (EM3) students. Students' attributional beliefs were assessed using the Causal Attribution Scale (Chan, 1994) and their goal orientations were assessed using the Goal Orientation Questionnaire (adapted from Nicholls, Patashnick & Nolen, 1985). The Self©Regulated Learning Strategies Scale (Youlden & Chan, 1992) provided measures of students' knowledge and reported use of strategies for learning and studying. School achievement was calculated from the English and Mathematics scores in the Primary School Leaving Examination conducted by the Ministry of Education, Singapore.

Students from the three ability streams were compared on attributional beliefs, goal orientations, as well as knowledge and reported use of self©regulated learning strategies, using separate MANOVAs. Further, the patterns of influence of motivation and strategic learning on achievement for students in the three ability streams were compared, using hierarchical regression analyses and path analyses. Results are discussed in relation to findings from Australian studies and implications for instruction.

Attributional Beliefs, Goal Orientations, Strategic Learning and Achievement of Primary 6 Singaporean Students

In recent years, strategic learning is considered critical for effective learning and scholastic achievement (Borkowski, Carr, Rellinger & Pressley, 1990). Strategic learning can be conceptualised as conscious awareness of one's repertoire of cognitive strategies and processes and the ability to monitor and regulate the use of these strategies and processes to enhance one's thinking and learning (Baker & Brown, 1984; Zimmerman, 1989). Thus, strategic learning emphasizes two essential components of metacognition: self™ appraisal andself©management of cognition (Paris & Winograd, 1990). This involves the awareness and executive management of the learning situation as one plans, organises, predicts, checks, monitors and adapts the learning experience and takes responsibility for one's own learning. Thus, regardless of the term that is used, be it self©regulated, self©directed or active learning, the emphasis is on how to think, how to learn and taking active control over one's own thinking and learning.

Research findings support a close relationship between strategic learning and students' academic achievements. In an empirical study by Chan (1994), strategic learning in the form of knowledge and usage of reading and learning strategies were found to have significant correlations with achievement measures, to make significant contributions in explaining achievement variance and to mediate between the effects of motivation on achievement in Grade 9 students; though such effects were not as prominent in the junior grades, possibly because of the lack of emphasis on strategy instruction in schools until recently. Furthermore, high achieving students were found to have greater knowledge of strategies and subsequently, use more strategies and achieve higher levels of achievement as compared to their average peers (Chan, in

press); while low achievers were found to have significantly less knowledge of strategies as compared to their peers (Chan, 1994). Finally, strategy instruction in the various subject areas, such as reading comprehension (e.g., Chan, 1991) and mathematics and science (e.g., Montague, 1992) was found to be effective in increasing the learning performance of students in those subject areas.

Strategic learning by itself is not sufficient to promote student achievement. It is critical that students be motivated to use the strategies and to regulate their learning activities because knowledge of useful strategies does not necessarily improve one's performance if one does not believe that one's own efforts and use of strategies can contribute to successful outcomes (Paris, Lipson & Wixson, 1983; Pintrich, 1988). In the most recent extension of strategic learning theory, Borkowski and Muthukrishna (1992) emphasizes the need to have appropriate motivational orientations in promoting strategic learning.

Two essential motivational components in understanding students' motivation in learning are implicit in Feather's (1982) expectancy x value theory. In the present study two motivational constructs are employed to reflect the expectancy and the value component of student motivation. These include Weiner's (1986) causal attributions which refer to what

students perceive as the causes of their successes and failures in school learning and Nicholls, Patashnick & Nolen's (1985) personal goal orientations which refer to students' perceptions of the importance of different types of goals for performing a task.

According to Weiner (1986), CausalAttributions can be classified along three dimensions: locus of control, consistency and controllability. One's reasoning about the causes of success and failure can affect one's motivation in future performance. For example, if one attributes failure to a stable cause such as low ability, one would expect to continue to fail in future tasks of a similar kind as one perceives ability as not within one's own personal control. Research findings (Chan, 1994; Youlden & Chan, 1994) indicate that high achievers are more likely than low achievers to attribute their success and failure to factors within their personal control (e.g. effort and use of strategies). These high achievers are found to have high expectations of success, are highly motivated and persist in the face of difficulty because they believe that their performance depends on their effort and use of strategies (Kistner, Osborne & LeVerrier,

1988; Licht & Kistner, 1986). On the other hand, low achievers are more likely than their peers to attribute their success and failure to factors beyond their personal control (e.g. attributing success to luck and failure to lack of ability). They have low expectations of success, are overtly dependent learners who lack motivation and perseverence; and give up easily when faced with difficulties (Kistner, Osborne & LeVerrier, 1988; Licht & Kistner, 1986). These students do not feel that they are in control of their learning outcome and may not attempt to improve in their future endeavours, leading to learned helplessness (Kistner, Osborne & LeVerrier, 1988; Licht & Kistner, 1986; Paris & Winograd, 1990) which may be detrimental to their expectations about their future performance.

Goal Orientations arecritical for learning because they direct the learner's energy towards achieving the goal (Dweck, 1986; Dweck & Legget, 1988; Nicholls, 1984). Goal theory researchers suggest that these goals are orthogonal and not simply opposite ends of a continuum (Maehr & Pintrich, 1991; Nicholls & Thorkildsen, 1989). Individually and in combination these goals can have qualitatively different effects on students' choice of tasks, definitions and attributions for academic success and strategic learning (Nicholls, Patashnick & Nolen, 1985). Nicholls (1984) identified three major personal goals: a task (or learning) orientation, an ego (or achieving) orientation and an academic alienation orientation. Students with task orientations value learning for its own sake. They prefer acquiring new skills and knowledge and place greater priority on effort and strategy use to further enhance their performance. Students with ego orientations are more likely to be ego©involved or achievement©oriented. They are more concerned with being judged by others as being able. They place high values on goals that will allow them to show off and be seen as more able than others in terms of their ability or obtaining high grades, thus enhancing their ego. Students with academic alienation orientation attempt to do the least amount of school work necessary to "get by" and try to avoid school work as much as possible.

There has been much literature that shows that task orientation results in more cognitive engagement, including use of "deeper" learning strategies and self©regulated learning strategies (Graham & Golen, 1991; Pintrich & De Groot, 1990). The kind of orientation toward a goal is presumed to be a function of individual differences or to be induced by situational constraints (e.g. teachers' classroom goal structures). Under success situations, students have the incentive to extend effort, regardless of whether the

orientation focuses on increasing knowledge or skill (task orientation), demonstrating ability (ego orientation), or accomplishing a task with minimum effort (academic alienation). It is under failure situations that these goal orientations produce vastly different responses. Task©oriented students would respond to impending failure by remaining task™focused, believing that effort and strategy, rather than ability, is the key to success (Dweck & Legget, 1988). In contrast, ego©oriented students would choose simpler tasks or inefficient strategies or adopt academic alienation orientation by avoiding tasks to preserve their self image (Dweck and Legget, 1988). Basically, academic alienated students lack persistence when encountering difficulty (Elliott & Dweck, 1988) as they do not perceive that they are in control of their learning (Diener & Dweck, 1980). In contrast to the task orientation, the adoption of an excessive ego orientation or academic alienation may not be conducive to learning.

If students' motivation and strategic learning are to assist our understanding of individual differences, it is critical to find out if students' attributional beliefs, goal orientations and knowledge and use of strategies differ for different achievement levels. Further, with the recent focus on the close relationship between motivation, cognition and learning (Borkowski et al., 1990; Chan, in press), the relationship among these constructs needs to be examined. To summarize, this study aims 1) to examine differences in the motivational orientations and knowledge and usage of self™regulated learning strategies of students of different achievement levels and 2) to examine the relationship among motivation (attributional beliefs and goal orientations), knowledge and usage of self©regulated learning and achievement.

Method

Subjects

Primary six students from 383 classes (3492 boys and 3002 girls) taken from 53 schools in Singapore participated in the study. The sample consisted of 59 EM1 classes, 235 EM2 classes and 89 EM3 classes. Streaming was based on students' performance on their Primary Four Streaming Examination taken at the end of Primary Four. EM1 classes consist of students in the top 10% of the total population, whereas, EM3 classes consist of the bottom 20% of the total population.

Assessment Instruments

Three different scales were used to obtainmeasures of motivation and strategic learning. The measure of academic achievement was obtained from the Primary School Leaving

Examination (PSLE) results. These are described in the following.

Causal Attribution Scale. The CausalAttribution Scale (Chan, 1994) was used to assess students' tendency of attributing their school success and failure experiences to the four likely reasons of effort, ability, strategy use and luck. The scale consists of 10 statements, five statements describing success incidents (e.g. doing well in a test) and the other five, failure incidents (e.g. getting a poor mark for a test). For each statement, the four reasons are listed and students are required to rate each reason on a four©point scale to indicate how true they consider that particular reason to be for them. A sample item is presented in Table 1. A factor analysis of the 40 items produced eight factors as intended. Four items which had unacceptable cross©loadings on the other factors were dropped. Eight sub©scales were then formed with four or five items each, and the ratings are averaged across the items in each sub©scale. For example, a high score on the Success©Luck sub©scale indicates greater tendency to attribute school success experiences to luck or chance. Cronbach Coefficient Alphas were then computed on the 8 sub©scale scores separately for the subject sample in the present study. The reliability estimates obtained ranged from 0.55 to 0.77.

Personal Goals Scale. A Personal Goals Scale adapted from Nicholls, Patashnick & Nolen (1985) was used to assess students' task, ego and academic alienation orientations in school situations. The scale consists of 24 items grouped into three sub©scales. The stem for each item was "I feel most successful if ...". A sample item is presented in Table 1. A factor analysis of the items produced 3 factors as intended. Three items which had unacceptable cross©loadings on the other factors were dropped. Three sub©scales were then formed with the task orientation sub©scale consisting of 6 items (e.g. "something I learned makes me want to find out more"), the ego orientation sub©scale consisting of 8 items (e.g. "I do the work better than other pupils"), and the academic alienation orientation sub©scale consisting of 7 items (e.g. "I can get away without doing homework"). Respondents are requested to rate each item on a four©point scale and the ratings are averaged across the items in each subscale. For example, a high score on the academic alienation orientation sub©scale indicates that the student is more academically alienated, that is, more concerned with avoiding work and doing well with

minimum effort. Cronbach Coefficient Alphas for the task, ego and academic alienation orientation sub©scales computed on the present sample of students were 0.62, 0.85 and 0.70, respectively.

Self©Regulated LearningScale. A Self©Regulated Learning Scale (Youlden and Chan, 1994) was used to assess students' knowledge and reported use of self©regulated learning strategies. There are 24 items. Each item consists of a description of a learning strategy (e.g. "thinking up questions that might be asked and then trying to answer them when studying for a test"), followed by two questions which requires students to rate on a four©point scale how helpful that way of learning and studying would be for them and to what extent they would learn and study in that manner. A sample item is presented in Table 1. The ratings for each question are averaged across the 24 items separately,

providing a knowledge score and a usage score. The reliability estimates obtained for the present sample were 0.84 on the knowledge sub©scale and 0.81 on the usage sub©scale.

Academic Achievement Measure. The Academic Achievement Measure was the total T©score on the standardized PrimarySchool Leaving Examination (PSLE) conducted annually for all Primary Six students by the Ministry of Education, Singapore. For the EM1 and EM2 students, the total T©score was the sum of the T™scores for four subjects, namely, English, Second Language, Mathematics and Science. For the EM3 students, the total T™score was the sum of the T©scores for three subjects, namely, English, Mathematics and Oral Second Language. Only the total T©scores, but not individual subject T©scores, were made available to the researcher, hence necessitating the analysis of achievement data for the three streams to be conducted separately.

Procedure

All subjects completed the three rating scalesin one session in their class. The scales were administered by the class teacher, following standardized procedures. The administration of these assessment instruments took place in August, 1993. For EM3 classes, the items were orally read out one by one by the teacher in case some students might have reading problems.

Results

Data were obtained on eight causal attribution variables,

three goal orientation variables, two strategic learning variables and an achievement measure. The means and standard deviations of these variables are depicted in Table 2. All statistical analyses were conducted on SPSSx, Release 4.1.

Comparison of EM1, EM2 and EM3 students

Separate Gender x Stream multivariate analysesof variance (MANOVAs) were run on the motivation and strategic learning variables. Two simple contrasts were set up for the three streams, the first comparing EM1 students with EM2 students; and the second comparing EM3 students with EM2 students.

Causal Attributions
Two separate 2 x 3 x 4 (Gender xStream x Attribution Type) repeated measures ANOVAs were run on the success and failure attribution measures. A significant Gender x Stream x Attribution Type interaction was obtained for the failure measures, $F(6,12414) = 2.26$, $p<.04$. Further, all Gender x Stream, Gender x Attribution Type and Stream x Attribution Type interactions as well as gender, stream and attribution type main effects were significant.

The significant Gender by Stream by Attribution Type interaction for failure is graphed in Figure 1. Results indicate that gender differences depended on stream and attribution type and that the relative likelihood of attributing failures to the four reasons depended on stream level and gender. From one perspective, while EM1 and EM2 students were more likely to attribute their failure to lack of effort and ineffective strategy use than to lack of ability or bad luck, EM3 students rated all four attribution types similarly highly as their reasons for failure. Then while there were few gender differences among EM1 students, in the case of the EM2 students, boys were more likely than girls to attribute failures to lack of effort and bad luck; and for EM3 students, there were greater gender differences on the effort and strategy attributions, with the boys being more likely than girls to attribute their failure to lack of effort and ineffective strategy use.

For success attributions, there was no significant Gender x Stream x Attribution Type interaction. However, significant Stream x Attribution Type and Gender x Attribution Type interactions were obtained, $F(6,37152) = 115.92$, $p<.00$ and $F(3,18576) = 37.29$, $p<.00$, respectively. The significant Stream x Attribution Type interaction for success is illustrated in

Figure 2. The interaction indicated that while EM1 and EM2 students rated effort the highest, then ability and strategy, and luck the lowest as reasons for their success; EM3 students, while also rating effort the highest, gave similar ratings to ability, strategy and luck. That is, EM3 students, compared to EM1 and EM2 students, were more likely to attribute their success to luck. The significant Gender x Attribution Type interaction for success is illustrated in Figure 3. Results indicated that the gender difference was observed only for strategy attribution, with boys being more likely to attribute their success to strategy than girls. Taken together, these findings suggest that EM3 students were more likely than EM1 and EM2 students to attribute their successes to luck and failures to bad luck or lack of ability, that is, external or uncontrollable factors.

Goal Orientation

Results of a 2 x 3 (Gender x Stream) MANOVA onthe three goal orientation variables indicated no significant interaction but only significant gender and stream main effects, multivariate F (3,5602) = 35.68, p<.01 and F(6,11204) = 157.04, p<.01, respectively. Univariate results for the gender main effect revealed that regardless of stream type, the boys scored higher than the girls on ego and academic alienation orientations, F (3,5602) = 16.53, p<.01 and F (3,5602) = 102.39, p<.01, respectively, but that there were no gender differences on the task orientation measure. For the stream main effect univariate results indicated that regardless of gender, EM1 students were more task and ego oriented and less academic alienated as compared to EM2 students, whilst EM2 students were more task and ego oriented and less academic alienated as compared to EM3 students. Examination of the means (Table 2) further revealed that regardless of stream and gender, all subjects scored higher on task and ego orientations than on academic alienation.

Self©Regulated Learning

Results of a 2 x 3 (Gender x Stream) MANOVA on thetwo self©regulated learning variables revealed a significant interaction, F(4,11798) = 3.26, p<.01. The univariateresults indicated that the significant interaction was located in the knowledge measure, F (2,5900) = 5.81, p<.01. The significant interaction is depicted in Figure 4. Results indicated that while girls scored higher in their knowledge of self©regulated learning strategies than the boys in both the EM2 and EM3

streams, and that EM1 and EM2 students had greater knowledge of self©regulated learning strategies than EM3 students, it was the EM3 boys who had the lowest score.

Role of Motivation and Self©Regulated Learning inExplaining Achievement Variance

Several hierarchical regression analyses were run to calculate the relative contribution of each set of motivation and strategic learning variables in explaining variations in achievement in the three streams. The total percentage of variance explained by each set (including the common variance it shared with the other sets) and the unique contribution of each set (that is, additional variance explained by each set over and above that explained by the other sets) are reported in Table 3. Results indicate that the total achievement variances explained by all motivation and self©regulated learning variables for EM1, EM2 and EM3 students were 14.00%, 24.65% and 12.10%, respectively. It must be noted that the EM1 and EM3 streams were more homogenous groups with less individual differences in achievement as compared to the EM2 group.

The relative contribution of the motivation and self™regulated learning variables differed across the three streams. For EM1 and EM2 students all three sets of motivation variables made greater contribution than the self©regulated learning variables in explaining achievement. Among the motivation variables, failure attributions made greater contribution than the other motivation variables for EM1 students, explaining 6.46% of total achievement variance and 4.96% of unique variance, respectively. For EM2 students, the personal goals measure made the most contributions, explaining 17.70% of total variance and 11.12% of unique variance, respectively. For EM3, the self©regulated learning strategies measures contributed as much as the motivation variables in explaining achievement variance. These results suggest that whilst motivation variables played a greater role than the self©regulated learning variables in explaining achievement variance for EM1 and EM2 streams, the roles of motivation and self©regulated learning variables were similar for EM3 students.

Relationship among Motivation, Strategic Learning and Achievement

Correlational and path analyses wereconducted to examine the relationship among all variables. On the basis of the MANOVA results and to minimise the number of variables to be included as well as to facilitate interpretation of the results, the eight attribution subscale scores were combined to form three attributional belief variables: a "belief in personal control over success" variable which is the mean of

ability, effort and strategy attributions for success, a "belief in personal responsibility for failure" variable which is the mean of effort and strategy attributions for failure; and a "learned helplessness" variable which is the mean of luck attribution for success and ability and luck attribution for failure.

The pairwise correlations of the motivation, self™regulated learning and achievement variables for EM1, EM2 and

EM3 students are reported in Table 4. Overall results indicate some similar and some differential relationships across the three streams. Achievement was moderately and positively correlated with ego orientation and belief in personal control over success for EM1 students (r=.20 and r=.20, respectively), for EM2 students, achievement was positively correlated with task as well as ego orientation and negatively correlated with learned helplessness (r=.25, r=.37 and r=©.28, respectively). However, for EM3 students, achievement was positively correlated with knowledge of self©regulated learning but negatively correlated with academic alienation and learned helplessness (r=.22, r=©.25 and r=©.27, respectively).

For all streams, both knowledge and usage of self™regulated learning were positively correlated with task orientation. Furthermore, usage of self©regulated learning was also correlated with belief in personal control over success for all streams. Belief in personal control over success was also positively correlated with task and ego orientations, while learned helplessness was negatively correlated with academic alienation in all streams. Further, for EM3 students, belief in personal responsibility for failure was also positively correlated with academic alienation.

The correlations between knowledge and usage of self™regulated learning were higher for EM1 and EM2 students (r=.41 and r=.41, respectively) as compared to EM3 students (r=.27). The intercorrelations within the attributional belief variables revealed that while belief in personal reponsibility for failure was correlated with learned helplessness for all streams, the correlation was higher for EM3 students. Further, belief in personal control for success was positively correlated with belief in personal responsibility for failure for EM1 and EM2 students but not for EM3 students. Finally, the intercorrelation within the goal orientation variables revealed that ego orientation was positively correlated with task orientation and with academic alienation for all three streams.

Separate path analyses were then conducted for EM1, EM2 and EM3 students in order to examine the patterns of relationships among the motivation variables (goal orientations, belief in personal control over success, belief in personal responsibility for failure and learned helplessness), self©regulated learning (knowledge and usage) and academic achievement for the three streams. Figure 5 presents the path diagrams depicting paths with beta weights above + 0.15.

In all three path diagrams, two different sets of paths can be clearly distinguished. One set involves functional motivational orientations (task orientation, ego orientation, belief in personal control over success) and knowledge and use of strategies. The other set involves dysfunctional motivational orientations (academic alienation and learned helplessness) and achievement. But no path from knowledge nor use of strategies to achievement was observed. For all three streams, both task and ego orientations in conjunction with belief in personal control lead to use of strategies through knowledge of strategies. This set of paths common to all three streams reflects the influence of functional motivational orientations on use of strategies. Results indicate that both

task©oriented and ego©oriented students are likely to believe in personal control over success and subsequently are more likely to use strategies. Further, task©oriented students who have greater knowledge of strategies, regardless of their belief in personal control over success, are also more likely to use strategies.

For all three streams, academic alienation is linked with learned helplessness. Such dysfunctional motivational orientations have a direct negative influence on achievement for both the EM2 and EM3 students, though not for the EM1 group. In the case of the EM3 group, academic alienation by itself is sufficient to have a direct negative influence on achievement. A direct path from ego orientation to achievement was also observed in the EM2 group, indicating that for the majority of students in the normal achievement range, ego orientation is likely to have a positive direct influence on their achievement.

Discussion

Comparisons of the three streams revealed thatthe motivational orientations and strategic learning of the students in the three streams differed according to achievement level. Although all three streams were similar in

their belief in personal control for success and failure, of the two personal control measures, the students seemed to have greater belief in personal control over their success than for their failure. Students were more likely to nominate internal controllable factors for explanation of their successes than for their failures. Further, the EM3 students were more inclined to have learned helplessness and work avoidance tendencies than the EM1 and EM2 students. EM1 students were more task© and ego©oriented than EM2 students, whilst EM2 students were more task and ego©oriented than the EM3 students. The findings in general support the dysfunctional motivational orientations of low achievers as observed in earlier research. On the strategies measures, the findings indicate that EM1 and EM2 boys and girls and EM3 girls were very similar in their knowledge of strategies and that it was only the EM3 boys who had less knowledge of strategies. Furthermore, EM1 and EM2 students reported greater use of strategies than EM3 students. The findings revealed that the EM3 students, particularly the EM3 boys, were more inferior in their knowledge and use of strategies.

Regarding the relationship between motivational orientations and achievement, correlational results indicate that achievement was positively associated with functional motivational orientations for EM1 and EM2 students, but negatively associated with dysfunctional motivational orientations for EM2 and EM3 students. The findings revealed that the achievement of high achieving students were related to functional motivational orientations whilst low achievers' achievement were negatively associated with dysfunctional motivational orientations. For the average EM2 students, achievement was positively related to functional motivational orientations and negatively related to dysfunctional motivational orientations. The ego orientation of EM2 students was also observed to have a positive influence on their achievement.

As for the relationship between learning strategies and achievement, correlational results indicated significant correlations the two for the EM3 students only. It was further supported by results of the hierarchical regression analyses which revealed that knowledge and use of strategies made as much contribution in explaining student achievement as the motivation variables amongst the EM3 students. However, for EM1 and EM2 students neither correlational results nor the hierarchical analyses indicated any relationship between knowledge and use of strategies and achievement. The lack of empirical support for a close relationship between knowledge and use of strategies and achievement in this case may be due

to the nature of the examination which is based more on multiple choice questions. Success in the examination depends more on rote learning than on the effective use of cognitive and learning strategies.

Knowledge and use of strategies variables were found to be associated with functional motivational orientation variables but not with dysfunctional motivational orientations. This finding is evident in the correlational and path analyses results for all three streams. It can be seen in all three path diagrams that task and ego orientations in conjunction with belief in personal control over success lead to the use strategies through knowledge of strategies. Furthermore, task©oriented students were found to have greater knowledge of strategies, regardless of their personal control belief over success and were also more likely to use strategies.

When all the variables were considered in combination, two sets of relationships emerged. Dysfunctional motivational orientations have a direct negative influence on achievement for both EM2 and EM3 students, though not for EM1 students. In the case of EM3 students, their work avoidance tendencies by itself is sufficient to exert a direct negative influence on achievement. On the other hand, knowledge and use of strategies were associated with functional motivational orientations and not associated with dysfunctional motivational orientations. Students with higher functional motivational orientations were more predisposed to greater knowledge and use of strategies. The findings of the present study have highlighted the direct detrimental effect that dysfunctional motivational orientations have on achievement. At the same time, the findings reveal that functional motivational orientations are not sufficient to lead to higher levels of achievement on their own. In the case of the Primary Six Singaporean students, functional motivational orientations are associated with greater knowledge and use of learning strategies.

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