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The Acquisition of Learning Strategies in the General Classroom

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THE ACQUISITION OF LEARNING STRATEGIES IN THE GENERAL CLASSROOM

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We certify that we have read this thesis and that, in our opinion, it is satisfactory in scope and quality as a thesis for the degree of Master of Arts in Psychology.

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My deepest gratitude to those who guided my steps on this journey…

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ABSTRACT

Self-regulated learning strategies were taught in introductory psychology courses. Students who used the strategies frequently (*N*=9) and who did not use them (*N*=10) were interviewed about factors that influenced their use of strategies. Two models were developed: a) a model of contextual and motivational factors influencing study habits, and b) a model of the decision process for acquiring learning strategies. Salient factors influencing study efforts and use of strategies included implicit theories of intelligence, goals in college, interest in class, and valuing practice.

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CHAPTER 1
INTRODUCTION

A study at the University of Texas found that, on the average, only 55% of students who start college actually graduate (Weinstein, 1998). These results are paralleled at the University of Hawaii at Manoa. According to the US News and World Report (2001), the six-year graduation rate is 55%. It should be noted that these statistics may not be adjusted to account for students who transfer to different schools. However, they represent a large loss of time and money for the institutions and the students who do not graduate. Although American students have many opportunities to get an education, many are finding that completing an education is more difficult than expected.

Self-Regulated Learning

Researchers of learning have developed many theories, instructional methods, and cognitive strategies to address this problem of attrition (Weinstein, 1994). This developing field has been called Self-Regulated Learning (SRL). Researchers learned what successful students do to set themselves apart from the rest, and experimental programs such as the Cognitive Learning Strategies Project at the University of Texas (Weinstein, 1994) and Learning to Learn at the University of Michigan (McKeachie, 1994) have been established to teach strategies to low-achieving students. These strategies include metacognitive strategies for time management, note taking, knowledge acquisition strategies, test preparation, and dealing with stress. The emphasis is placed on the students as managers of their own learning (Weinstein, 1994).

The results for efforts to teach students how to learn have been mostly positive. Students in the University of Texas study have been shown to increase their chances of graduating from 55% to 71% (Weinstein, 1998). A five-year study on SRL found that students who use more deep processing, planning, and regulating strategies perform better on their class assignments and exams (Pintrich & Garcia, 1994). It should be noted that the students either volunteered for them or were required to take them. Watson, Hagihara, & Tenney (1999) found that students in an introductory course who used SRL strategies to learn material performed significantly better on a test of understanding eight weeks later. Lan (1998) showed that even graduate students benefited from learning SRL strategies.

Now that we know that teaching SRL helps, the factors that predict high or low use of SRL strategies should be identified and described to effectively take SRL from the laboratory into the rich university setting. SRL researchers recognize that there is a need for more descriptive research on this type of disciplinary thinking (Pintrich & Garcia, 1994) and that qualitative methods of inquiry can attend to the role of context and reveal facets of SRL that quantitative methods might not (Perry, 2002).

The Purpose of this Study

The purpose of this study was: (a) to identify which students benefit most from SRL training, and which benefit least; (b) to describe how different strategy characteristics, motivational factors, and contextual factors influence the acquisition of learning strategies; and (c) to suggest more effective designs for SRL interventions.

At the University of Hawaii, 232 Introduction to Psychology students who had been taught learning skills were surveyed to find out how often they actually use the skills. General demographics were collected to see if there is a difference across certain groups. After the survey, students were selected for interviews and focus groups according to whether they used the strategies or not. Their responses were analyzed for characteristics of the students, their context, and the strategies that influenced strategy use.

Qualitative research methods are useful for exploring the context of learning strategy acquisition (Perry, 2002) and discovering facets of SRL not considered in quantitative inquiries (Reed, Shallert, & Deithloff, 2002). In an essay on the importance of assessing student culture, George D. Kuh (1990) states:

> Qualitative methods, such as interviews and observations, are considered superior for identifying the complex relationships among institutional features…and the behavior of individual and groups of students…these methods are more likely to discover what students actually do, as opposed to what they say they do. (p.54)

Specific SRL Strategies Taught for this Study

The following skills were selected for their usefulness and the broad purposes they cover. (For a more thorough description of the skills, see Appendix A. For an example an assignment, see Appendix B.)

Time management includes metacognitive strategies for increasing self-awareness of the students' use of time. This was taught by having the students use schedules to record their behavior and make plans for change (Watson, 2001).

PQRSR (Preview, Question, Read, Strategies, Review) is a strategy for organizing study time (Watson, 2001). Students learned to preview material, use strategies for better understanding and memory, and review material, all to keep their minds active.

Self-explanation is a strategy in which students explain concepts to themselves using their own words to check their understanding as they read.

Elaboration is a strategy in which students connect the new information with something they already know. Students were instructed to think of examples of concepts, and think about relationships with other materials (Watson, 2001).

Predicting questions is a strategy to prepare for tests. Students learned to predict questions for upcoming tests and search for answers while studying (Watson, 2001).

PIRATES is a strategy for taking multiple choice tests (Hughes & Schumaker, 1991). Each letter of the acronym represents a step in the test-taking process, including eliminating wrong choices and abandoning difficult questions for later.

S-SNOW (Scruggs and Mastropierri, 1992; Watson, 2001) is an essay test-taking strategy to get organized, read questions carefully, and plan their answer.

Note taking was also a topic covered. The Cornell system of note taking and the outline system teach students to organize their class notes in a way that will be helpful to the encoding and retrieval of information in the future, as well as providing quick and useful study guides.

CHAPTER 2
METHOD

Participants

Students who were taught SRL strategies in the Introduction to Psychology lecture course (*N*=90) and the Introduction to Psychology unit mastery courses (*N*=142) were surveyed about how frequently they used the strategies. From the survey scores, students who had indicated frequent (high) use of strategies and students who had indicated infrequent (low) use of the strategies were selected. These students were invited to either a one-on-one interview (*N*=12) or one of two focus groups (*N*=7).

Materials

The School Skills Use Survey (see Appendix C), a simple 8-item survey assessing the frequency with which the students used the strategies, was administered along with a consent form (see Appendix D). The survey also asked for demographic information such as year in school, self-reported grade point average (GPA), gender, and ethnicity.

The School Skills Use Survey (SSUS) consists of questions about frequency of use for eight specific strategies: PQRSR, self-explanation, elaboration, predicting questions, PIRATES, S-SNOW, note taking, and time management. The questions used a five-point scale, asking students to rate how often they actually used the strategies, with 1 indicating not at all, and 5 indicating every time. For example:

3. When you are reading, do you relate new material to information you already know or think of examples from your own life?

1	2	3	4	5
I don't do that	Occasionally	Sometimes	A lot of my study times	Every time I study

Procedure

Toward the end of the semester, after the subjects had been taught self-regulated learning strategies, the SSUS surveys were handed out in their Introduction to Psychology courses. Students took about ten minutes to complete the surveys. Students who turned in the survey were given extra credit. If they chose not to fill out the survey, there were other opportunities to earn extra credit.

Students selected for interviews or focus groups were contacted and scheduled via phone or email. The interviews and focus groups were semi-structured, using a list of questions, but allowing new questions to arise and old questions to be reorganized to follow the flow of the conversation. The students were asked about their impressions of their class, and of the learning strategies. They were asked about what motivates them to study and to use the strategies, and what motivates them not to, and what contextual factors influenced their higher education experience. (For a list of questions used in the interviews, see Appendix E.)

Interviews lasted 45-60 minutes. Before each interview, the student was given a consent form (See Appendix F) to read and sign and was allowed to ask questions about the study. The interviews were conducted in a private office on campus.

The advantage of focus groups was that new information might be discovered as students have discussions with each other. For example, students in the low-use focus group were actually more candid about their impressions of the strategies when they heard the matching opinions of others. Focus groups lasted 50-60 minutes each and were conducted in classrooms on campus. Focus group participants were given consent forms

and an opportunity to ask questions about the study before beginning (see Appendix G). The interviews and focus groups were recorded.

The basic framework of the analysis followed the research questions: a) What characteristics of the strategies influenced how often students used them? b) What characteristics of the students influenced how often they used the strategies? c) What characteristics of the students' context influenced use of strategies? These questions were then applied to each point in the process of learning the strategies where students decided to continue practice or return to old habits.

Recordings of interviews and focus groups were transcribed word-for-word onto Microsoft Word files. QSR Nvivo software was used to organize and code the data. A code is a symbol used to identify categories and themes in the data (Miles & Huberman, 1984). Computer software is useful for qualitative analysis because the researcher can:

Mark the same passages with multiple codes.

Do searches of specific codes quickly, and print out passages specified for one or more codes. (For an example of a code report, see Appendix H.)

Link memos with the specific passages they refer to.

Draw models of the concepts and their relationships.

Analysis was conducted using an inductive approach (Miles & Huberman, 1984). The researcher started with broad concepts and themes, and then analyzed characteristics, subcategories, and relationships. Throughout the analysis process, codes were reviewed to eliminate duplicate codes and codes with insufficient data. By the end, there were 89 codes. (For a list of the codes and their description, see Appendix I.)

CHAPTER 3
RESULTS AND DISCUSSION

Survey Results

Of the surveys distributed, 232 were filled out, 142 from unit mastery labs and 90 from the lecture course. The sample included freshmen (*N*=118), sophomores (*N*=66), and upperclassmen (*N* ≤ 58). 69% were Asian (*N*=161), 14% were Caucasian (*N*=34). 6% were Polynesian, and 22% were "other". GPA is ranged from 1.0 to 4.0, with a mean of 3.09. (For survey participant demographics, see the table in Appendix J.)

Total scores on the SSUS ranged from 13-38, with a possible 40 maximum (*M*= 25.56, *SD*= 4.68). All the students used at least four of the strategies at least some of the time. Table 1 reports the frequency of answers for each strategy.

PIRATES was used the most, with over 65% of students reporting that they use the strategy most or all of the time. This is not surprising, since both unit mastery and lecture students took many multiple-choice tests in their classes. PQRSR was used the least. The total and mean score for PQRSR is lower than any of the other strategies, with less than 14% of students reporting that they use the strategy most or all of the time.

Some caveats about using this data to compare strategies: the main purpose of this survey was to get an idea of total strategy use for interview selection purposes. Therefore, it was not prepared to compare strategies. There is only one item per strategy. Additionally, a high score on one strategy does not mean the same thing on another. For example, a 5 (*every time*) for PQRSR suggests more effort than a 5 for S-SNOW.

Table 1. Frequency of Strategy Use for All Survey Participants[a]

Strategies	PQRSR	Self-Explanation	Elaboration	Predict Questions	PIRATES	S-SNOW	Note Taking	Time Management
Total	629	764	768	771	860	707	680	750
M	2.71	3.29	3.31	3.32	3.71	3.05	2.94	3.23
SD	0.89	0.99	0.97	1.14	1.15	1.16	0.96	1.24
				Frequency of Use				
Low	81	57	47	56	48	78	79	68
Percentage	34.9%	24.6%	20.3%	24.1%	20.6%	33.6%	34.1%	29.3%
Medium	119	70	79	65	31	70	92	64
Percentage	51.2%	30.1%	34.1%	28.0%	13.4%	30.2%	39.7%	27.6%
High	32	105	106	111	153	84	60	100
Percentage	13.8%	45.3%	45.7%	47.8%	65.9%	36.2%	25.9%	43.1%

Note. Low = students who selected 1 or 2. Medium = students who selected 3. High = students who selected 4 or 5. Where 1 = never use the strategy, and 5 = use the strategy every time.

[a]*N*=232.

There were no significant correlations between total score and GPA. ANOVA revealed no significant differences in total score for ethnicity, year in school, or course type. There was a significant difference in skills use for gender. Females ($M = 25.99$) had higher total scores than males ($M = 24.71$, $p = .049$). Of the strategies, this difference was only significant for time management.

Six students who had total scores at least one standard deviation above the mean (30.25), and six students who were at least one standard deviation below the mean (20.88) were selected for interviews. (Their survey answers are reported in Appendix K and demographic information in Appendix L.)

Two focus groups with five students each were arranged. However, misunderstandings resulted in seven students total. (The focus group participants' survey scores are reported in Appendix M and demographic information in Appendix N.) The balance of demographic characteristics between high-use and low-use groups was somewhat uneven due to students' schedule demands.

Interview and Focus Group Results

Outline

In this section, the results and discussion of theory are presented together to reduce repetition. The purposes of the study are used to provide a rational framework for the data presented (see Patton, 2002).

Results are presented first with a general overview of motivational and contextual factors influencing study habits. Next, the decision process of acquiring learning

strategies is discussed, from initial evaluation of the strategies to habit formation. Students' names have been changed for confidentiality.

Overview of Findings

Figure 1 represents the large picture of motivational and contextual factors influencing study habits. Figure 4 (page 29) represents the decision process that students exhibit as they learn strategies. Factors influencing each decision are discussed. The findings can be summarized as follows:

Factors influencing overall study habits (Figure 1):

1. Implicit theories. High-users tended to have more incremental beliefs about intelligence (that intelligence is malleable with effort), while low-users tended to have more entity beliefs about intelligence (that intelligence is a fixed ability).
2. Goals in college. High-users tended to have more learning (mastery) goals, while low-users tended to have more performance (grade-oriented) goals. Implicit theories seemed to influence achievement goals. High-users tended to be more certain of their career goals and more future-minded. Career goals influenced both learning and performance goals.
3. Interest in courses and course materials tended to increase learning goals and study effort. Interest in courses was affected by the teacher's style and the applicability of the information.
4. Social Goals. Low-users tended to express more social goals for college. Unhappiness resulting from unrealized social goals decreased desire to study

or use learning strategies. High-users tended to have social goals realized, (i.e., they were happy), and were more interested in classes and studying.

Factors influencing the decision process for acquiring strategies (Figure 4):

1. Initial evaluation. Previous experience with strategies affected students' openness to learning new strategies. Successful experiences increased openness to new strategies, while unsuccessful experiences decreased students' motivation to try. Perceived need to change study habits influenced students' motivation to practice new strategies.
2. Trial Period. Students were motivated to try the strategies either by curiosity or requirement. Strategies were perceived as successful if they a) improved grades, b) improved the process of studying, or c) managed anxiety. Students evaluated whether the strategies felt "natural" or not.
3. Extended Trial. Perceived success of strategies on the first trial influenced continued practice. The context for strategy learning influenced success. Students' beliefs about the costs and benefits of practicing strategies influenced students' motivation to continue.
4. Habit formation. If students perceived improvement in their use of strategies, they were more likely to continue practicing. Students' implicit theories and learning goals influenced motivation to continue practicing and eventual habit formation.

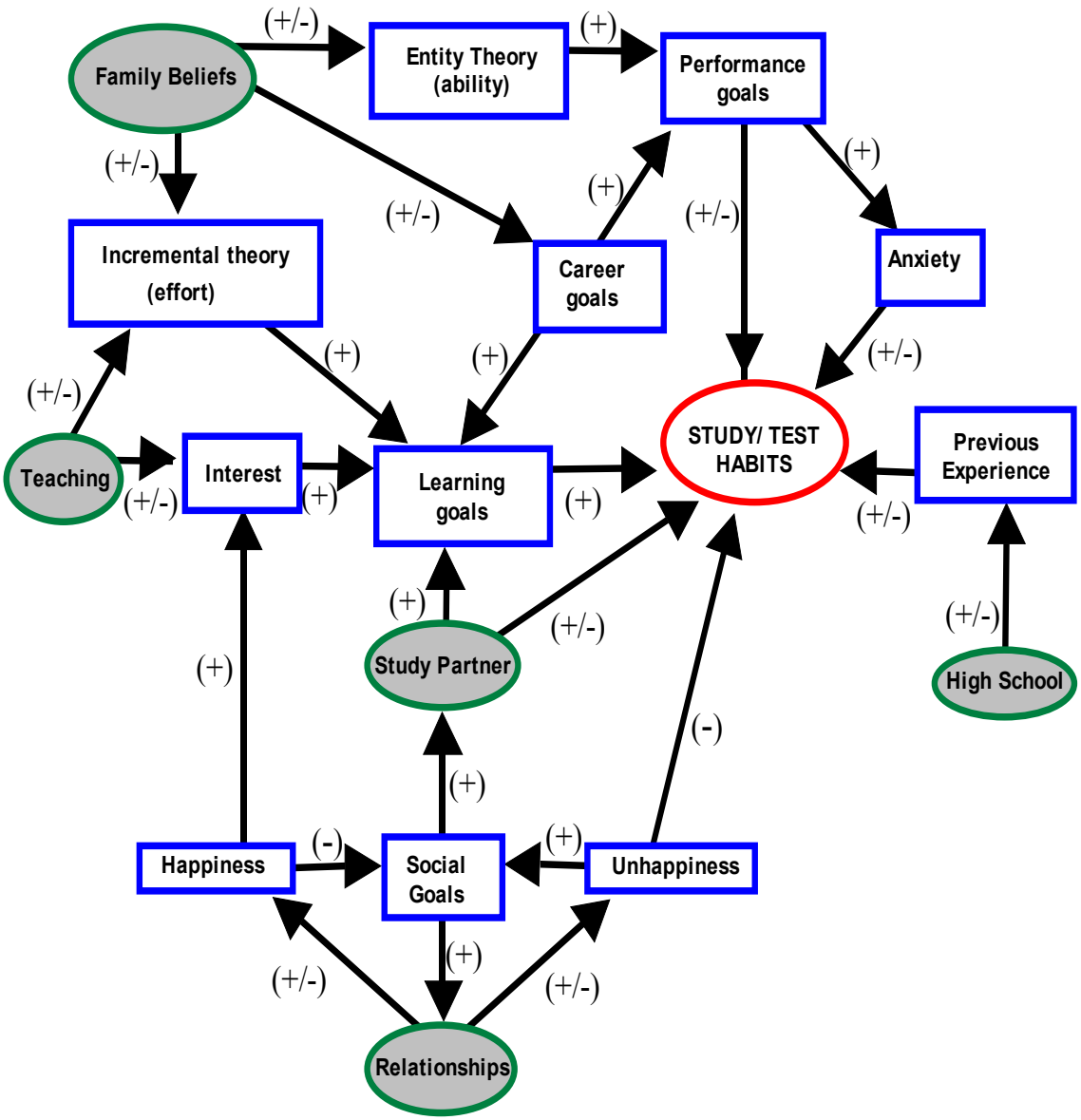

Figure 1. Contextual and Motivational Factors Influencing Study Habits

Note. Rectangles represent motivational factors and the gray ellipses represent contextual factors.

Beliefs About Effort: Entity Theory versus Incremental Theory

High-use students were willing to put effort into studying in order to obtain results. They often expressed the idea that if you want something, you have to work for it (*N*=6). They realize that mistakes are part of the process, and they were willing to practice to improve (*N*=6). Kanani discussed challenging herself: "That's your motivation, to get better. You have to push really really hard. And fail and just practice and fail and do it over again." Pua said, "Every time I improve a little bit, and I'm happy with myself."

In contrast, low-use students expressed a tendency to avoid effort (*N*=6). Gerald said that he tries to rush through things so that he doesn't have to think too much. Low-use students do not connect level of effort with consequences in class (*N*=6). Janice said, "A lot of my friends study really hard… I study last minute, and sometimes I get the same grade as them." All the low-use interviewees identified themselves as lazy (*N*=6). Janice said, "I've always been the lazy one." In contrast, the high-use students mentioned there were times when they were lazy (*N*=3), but not all the time.

These different beliefs about effort reflect different implicit theories of intelligence (Dweck, 1999). According to this theory, students with an entity theory of intelligence believe they have a fixed amount of intelligence. This belief leads to performance goals (the desire to look smart), because if intelligence is fixed, then the goal is to achieve the best evaluation of intelligence, not to improve it. These people seek easy tasks to avoid making mistakes. The entity theory of intelligence also leads to a tendency to equate effort with a lack of intelligence. If you had to work hard to understand it, you must not be very smart. Janice says, "I know some people who keep

studying, who just don't have the potential to get the grades they want." When asked how they study, the students in the low-use focus group responded with the amount of time they spend (*N*=4). The main complaint about the learning strategies was that they took too much time. Perhaps students assume that how much they understand from one straight read-through of course material reflects how smart they are. If they need to take the time to use strategies to understand better, then they probably aren't smart enough.

Because of the belief that effort is a sign of low intelligence, students with the entity theory tend to engage in behaviors that are self-handicapping (such as not studying, or getting drunk the night before a test) so that if they fail they can blame it on poor behavior, but if they succeed they can attribute it to high ability (Jones & Berglas, 1978; Dweck, 1999). For example, Gerald described the way he took his unit mastery quizzes:

> Sometimes I just go with my gut feeling…I don't want to spend too much time or think about it too much. I usually don't like to second-guess myself…if you change your answer, it's a letdown plus…it lowers your confidence a little bit…if you just choose an answer and it's not right, it doesn't lower your confidence as much.

Gerald didn't want to think too hard about the quiz questions, because if he got it wrong, it would mean that his best was not good enough.

In contrast to entity theorists, people who have an incremental theory of intelligence (Dweck, 1999) believe that intelligence is malleable, and can be improved upon with effort. These people seek challenges, because they believe mastering them would improve their intelligence. Effort is not a measure of intelligence, but a means: "If (you) don't practice, you don't learn." Incremental theorists understand that "even the

smartest person gets stumped by something." They respond to failure adaptively, in contrast to entity theorists, who see failure as a sign of low ability. High-users often talked about trying again and again (*N*=7).

To demonstrate the difference between high-users and low-users, Table 2 displays the number of characters coded for entity theories versus incremental theories for each of the interview participants. Number of characters coded represents how much students' conversations reflected these beliefs. These numbers are not meant to be used quantitatively for statistics, but only to highlight the point that high-users tended to express more of an incremental theory of intelligence, while low-users tended to express more of an entity theory.

Table 2. Volume of Text Coded for Implicit Theories of Intelligence, Comparing High-Users and Low-Users

Interview	Entity Theory (Intelligence as fixed ability)	Incremental Theory (Intelligence as malleable with effort)
High-Users		
Debbie	0	594
Kanani	489	1,679
Kim	323	1,258
Kristy	0	651
Peter	0	991
Pua	386	1,326
Total	1,198	6,499
Low-Users		
Ethan	327	107
Gerald	3,527	0
Janice	2,614	0
Larry	561	46
Leilani	465	0
Terence	3,172	243
Total	10,666	396

Contextual Factors Influencing Beliefs. Three contextual influences on theories of intelligence and beliefs about effort emerged in the interviews and focus groups: 1) family beliefs, 2) role models, and 3) teaching style.

Low-users mentioned parents who emphasized grades (*N*=2) or just getting into college (*N*=6), while high-users mentioned parents who emphasized effort (*N*=7). Kanani said, "My mom's the type of person that just has worked really hard to be smart…she's always telling me, 'Even though you have it, you have to work harder.'"

High-users mentioned role models that taught them about working hard (*N*=5). Pua said, "My dad works hard to let me study here, and sometimes (when I didn't do well on a test), I say, 'But now you have to try a bit more, because there's somebody who believes in you.'" Peter said, "I look up to my brother a lot…when I was little he'd be studying his book and I'd pull out my little book and I'd sit across and pretend I'm studying like he is."

Teaching style may influence theories of intelligence. Low-users' entity beliefs seemed to be reinforced by class results that do not reflect their effort. Many low-use students mentioned times when they did not study for a quiz and still managed to get acceptable grades (*N*=6). Low-use unit mastery students (*N*=3) mentioned that studying did not help with the unit mastery quizzes. Teaching style can also reinforce an incremental theory. Peter mentioned a time when the lecture professor taught about the importance of effort: "That's someone from the profession telling you it's okay to make mistakes, you're not perfect. That's a really important part in a strategy, teaching them to try it again and again until you get the hang of it."

Goals in College

Achievement Goals. The theory of achievement goals (Elliot & Dweck, 1988) defined the difference between learning goals and performance goals. Performance goals are concerned with obtaining positive judgments of ability (i.e., good grades), resulting in a preference for easy tasks that ensure success. Learning goals are concerned with increasing competence by taking on challenges and mastering new tasks, even at the risk of making mistakes.

Although most of the students mentioned that they are in college to learn, high-users often mentioned that their desire to learn motivated them to study (*N*=6). And although almost all the students mentioned that getting good grades was one of their goals, low-users wouldn't study something if it didn't directly affect their grade (*N*=8). For low-users, there was an expectation that just being in college would lead to learning, because "that's what college is for." While high-users studied to understand and master the material, low-users studied to do well on tests, and sometimes only if they had a test.

High-users sometimes expressed strong and active feelings about learning:

Dan: "I'm on like this life quest to learn as much as I can."

Lionel: "Knowledge, critical thinking skills: the two most important things."

Kanani: "I just like challenging my mind like that."

Pua: "I'm greedy. That's what I am…Greedy for learning."

Table 3 compares the amount of characters coded for learning goals and performance goals. Although high-users expressed more learning goals, and low-users expressed more performance goals, the difference is not as sharp as it was for implicit theories of intelligence. The two exceptions on this table may help to explain why.

Although Kristy expressed more performance goals than learning goals, she studied hard and used the learning strategies often. Due to a personal crisis, Kristy had failed a semester and was put on probation. She came back to school with a strong motivation to improve her grades. Now that her personal crisis was over, she believed she could improve. Kristy's extra motivation to bring her grades up helps to explain her high performance-goal orientation. Her belief that she could improve and her effort to do so (i.e., incremental theory of intelligence) help explain why she used strategies often.

Alternatively, Ethan expressed learning goals more often than other low-users, even though he did not use strategies often. Ethan often said he enjoyed learning, but while high-users expressed a desire for active, challenging learning, Ethan liked learning that "feels natural." He expressed an aversion to the learning strategies because "they weren't my style," and because he didn't want to put in the effort to change his habits. His entity theory of intelligence was stronger than his learning goals.

Kristy and Ethan's stories indicate that though achievement goals are an important indicator for strategy use, implicit theories may be more important. The difference revolves around effort. A desire to learn will not lead to frequent strategy use unless there exists a willingness to work at learning and a belief that work will make a difference. A desire to get good grades can lead to frequent strategy use if there exists with it the belief that hard work will make a difference.

Table 3. The Difference Between High-Users and Low-Users for Learning and Performance Goals

Interview	Learning Goals	Performance Goals
High-Users		
Debbie	4,774	0
Kanani	3,026	1,565
Kim	3,383	609
Kristy	1,726	1,964
Peter	2,444	60
Pua	3,100	0
Total	18,453	4,198
Low-Users		
Ethan	1,975	67
Gerald	316	1,496
Janice	937	1,294
Larry	792	1,391
Leilani	1,310	2,027
Terence	258	3,373
Total	5,588	9,648

Career Goals. All of the students (*N*=19) mentioned career as a primary reason for being in college. Career goals made a difference for strategy use. High-users tended to be more certain about what they wanted to do (*N*=8), and they were thinking about what they could do in the present to get there. When the high-use group was asked what motivates them to study, Renee answered, "I don't want to be an incompetent nurse. You are exposed to a lot of people…and you just have to be knowledgeable about everything." Renee's career goals influenced both her learning goals (to be competent) and her performance goals (to get the GPA she needs for the nursing program).

Low-users were less certain about what they wanted to do (*N*=6), and expressed a tendency to "put things off" (*N*=7). Gerald says, "Sometimes I don't want to really think about (the future) because I don't know what I want to do…so I kind of want to focus on the present." He had the same attitude toward learning strategies: "I could improve, it's just I'm lazy and I don't want to do it. Later on in college it will be tougher."

Contextual Factors Influencing Achievement Goals. Two kinds of contextual factors emerged: (a) Family beliefs influencing theories of intelligence and career goals, and (b) characteristics of the course influencing students' interest. The relationships between these factors are pictured in Figure 2, part of the larger model in Figure 1.

High-users' parents emphasized the value of learning (*N*=4), while low-users' parents emphasized grades (*N*=2) or getting a job (*N*=3). Family beliefs also influence achievement goals by teaching incremental or entity theories of intelligence.

Interest. Achievement goals are not necessarily constant across situations. Many times, students mention the importance of being interested in the class for studying (*N*=11). Even high-users with high learning goals described switching to performance

goals when they weren't interested in the class (*N*=4). Kanani explains, "I put it off more when I'm less interested in it …I don't really feel like doing it. But…last semester I had philosophy, and…I was interested in it, and I'd do extra things to finish my work."

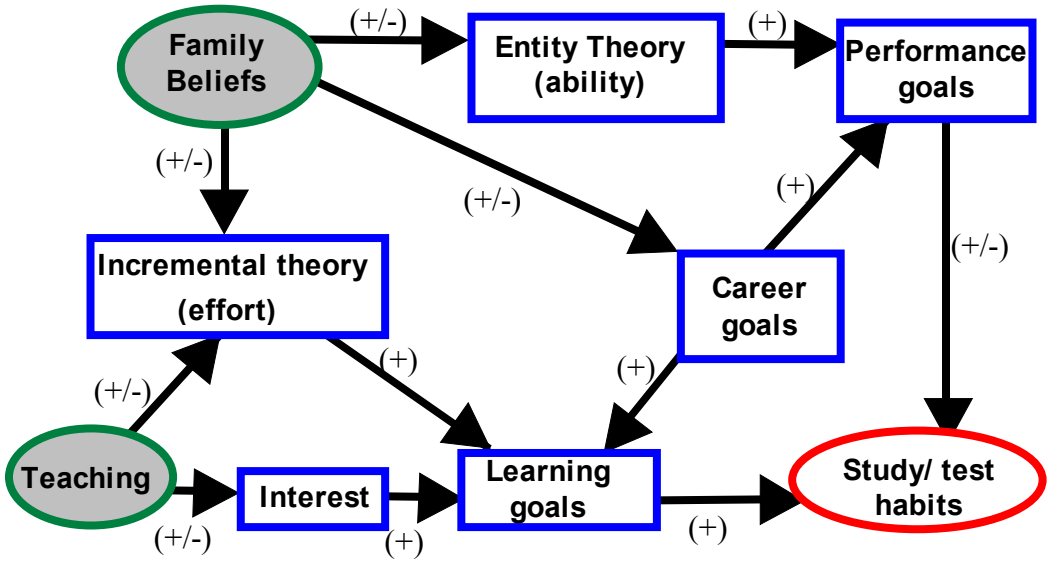

Figure 2. Influence of Implicit Theories, Achievement Goals, and Career Goals on Studying

Peter, who usually expressed high learning goals, explained that his chemistry class was boring, and so studying for it was harder and less active. In that case, he studied because it was a requirement for his major and perhaps useful for his future job.

Low-users did not put extra effort into a class unless they were interested in it. When asked what makes him put effort into a course, Terence said:

> I try, at any rate, for the courses I really like. The other ones, I'll try to an extent, but if it's kind of difficult for me to start really getting the concepts in about the first hour, I kind of give up.

The important thing about the concept of interest is that it seems to be the key for teachers to influence students' motivation. If a teacher can make the class interesting to the student, there can be an immediate effect on learning goals. Students gave credit for their interest in the subject to the teacher (*N*=5) or to a well-written book (*N*=4).

Characteristics that made material interesting to students were: a) if it applied to life (*N*=7); b) if it involved self-discovery (*N*=5); c) if it was new (*N*=3); and d) if it related to other things (*N*=3). Some interesting topics mentioned were activities like a phobia questionnaire in the unit mastery class, and relationships in the lecture course.

Students said their teachers made material interesting by being expressive and excited about the material, by showing how it applied to life, by facilitating discussion, and by showing concern for students' understanding and progress in the course. Pua explained how her interest affected her study habits:

> (The teacher) is very expressive, and he made me feel really interested in the class… And I think the topics we talked about, they're really practical. I start applying many things in my life…the PQRSR thing …I'm now more conscious of doing it…. Everything was very interesting, so I studied very willingly.

Students in the lecture course said that they enjoyed their book (*N*=4), mentioning the real-life stories that were given as examples of concepts, the questions after each section that helped students think about it, and the ease with which it could be read (Watson, 1996). Peter said it was the first book he read when he got home. Kim said, "I actually enjoyed reading the book, which is probably one of the first times I ever enjoyed reading a textbook…the way he explains things, you read it and then you know it."

Students also explained how teachers and textbooks could have a negative impact on interest and learning goals. Peter and Pua both talked about how instructors who didn't seem to care about their students made the courses less interesting and studying more difficult. Many students mentioned that the biggest adjustment they had to make to college was that teachers were less approachable than their high school teachers (*N*=6). That made it difficult for students to ask questions and become engaged in the material. Uninteresting classes and textbooks are full of abstract theory with no personal significance. Reading such textbooks was laborious and time consuming, and students expressed a desire to "get through it," rather than to learn.

Social Goals. When asked what they expected out of college, low-use students mentioned learning to get along with people, making friends, and learning how to be a nice person (*N=5*). When asked what his goals in college were, the first thing Larry said was, "To meet people… people who are nice and care." When asked about his priorities in college, he said, "My priorities are to be nice to people." For Larry, these things were more important than learning, getting good grades, or getting a job.

Happiness. Social goals influence study habits depending on whether or not students are happy with their social situation. Janice talked about breaking up with her boyfriend and having all her friends move away: "That was a hard time. I think that partly kind of influenced how I feel about school now. Like I really don't want to do anything." Larry said, "Sometimes I get down on life…just depressed about… I compare my life with others and wishing I had more friends and I could be part of a crowd." Larry said that his depression distracts him from studying more than half the time.

High-users also talked about the importance of having your social needs met and being happy. When Kristy broke up with her "first love," she didn't want to study, or do anything at all, so her grades dropped drastically. Now she has a new boyfriend and a new motivation. She uses the strategies often, but she says if they were taught to her back when she was depressed, she would not even have tried them. Both Pua and Kim talked about how difficult it was to make friends at the schools they transferred from. Even though they were both good students, when they couldn't make good friends they hated school, doubted their competence, and didn't want to study. Both girls said they were very unhappy there, and that when they transferred to Hawaii, they made friends, enjoyed their classes and teachers, and are happy now. Kim said:

> I don't see studying now as such a burden…kind of more acceptance now. Whereas before…I'd have to force myself to do it. But I think it's also my happiness. Like, I'm really happy at this school. At my old school I wasn't happy at all. So I think that has a lot to do with it as well.

Peter was happy. At the time of his interview, he was planning to get married in the summer. He mentioned his fiancé often. She was also his study partner. Peter not only learned and used the strategies, but he also taught them to his fiancé and they used them together. Happiness decreases social goals, not in the sense that students are less interested in social factors, but in the sense that they are not preoccupied with a need to change their social situation. Students who are unsatisfied with their social situation would be more interested in spending time on social change than on studying, or they would be depressed, and not interested in doing anything.

Many students mentioned the value of study groups, class discussion, or study partners (*N*=13). High-users mentioned having these (*N*=5) more than low-users. Unit mastery students mentioned that group activities in their active learning labs made the class more interesting. Study situations that meet social goals may increase studying.

The relationship of social goals to studying is pictured in Figure 3, part of the model in Figure 1. If students' social needs were being met and they were happy, then they were more interested in what they were studying and more likely to have learning goals. If students' social needs were not being met and they were unhappy, then they cared less about studying.

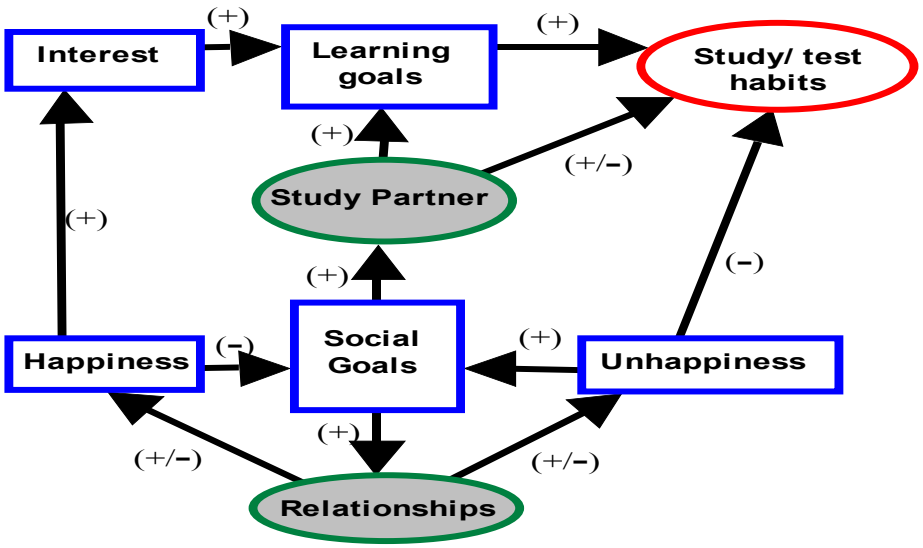

Figure 3. The Influence of Social Goals and Happiness on Studying

An analysis of males and females, especially regarding time management, did not reveal any salient differences. This may be because of the uneven distribution of gender across groups and because the groups were at extremes. Students who use the strategies

the most or who use them the least may have more similar attitudes toward strategies across gender than the rest of the survey sample.

Decision Process of Acquiring Strategies.

For the students in this sample, there were certain stages in which they made decisions about the strategies: 1) Initial Evaluation, 2) Trial Period, 3) Extended Trial, and 4) Habit Formation. The process of decision-making is illustrated in Figure 4. Students started by comparing the strategy to their current habits and assessing their need to change. If they did not want to change, they only tried the strategies as required assignments. If they did want to change, they tried the strategy with interest. If the first trial did not work, students did not continue to practice. If the strategy did work, then students assessed whether they were willing to put in the time and effort to practice. If they decided not to practice, they stopped or assimilated parts of the strategy. If they decided to practice, they continued to evaluate whether they were improving. If they positively evaluated the extended trial, then they continued until it became a habit.

Each of the four steps is examined in more detail below, with indications of contextual, motivational, and strategy characteristics that influenced each step.

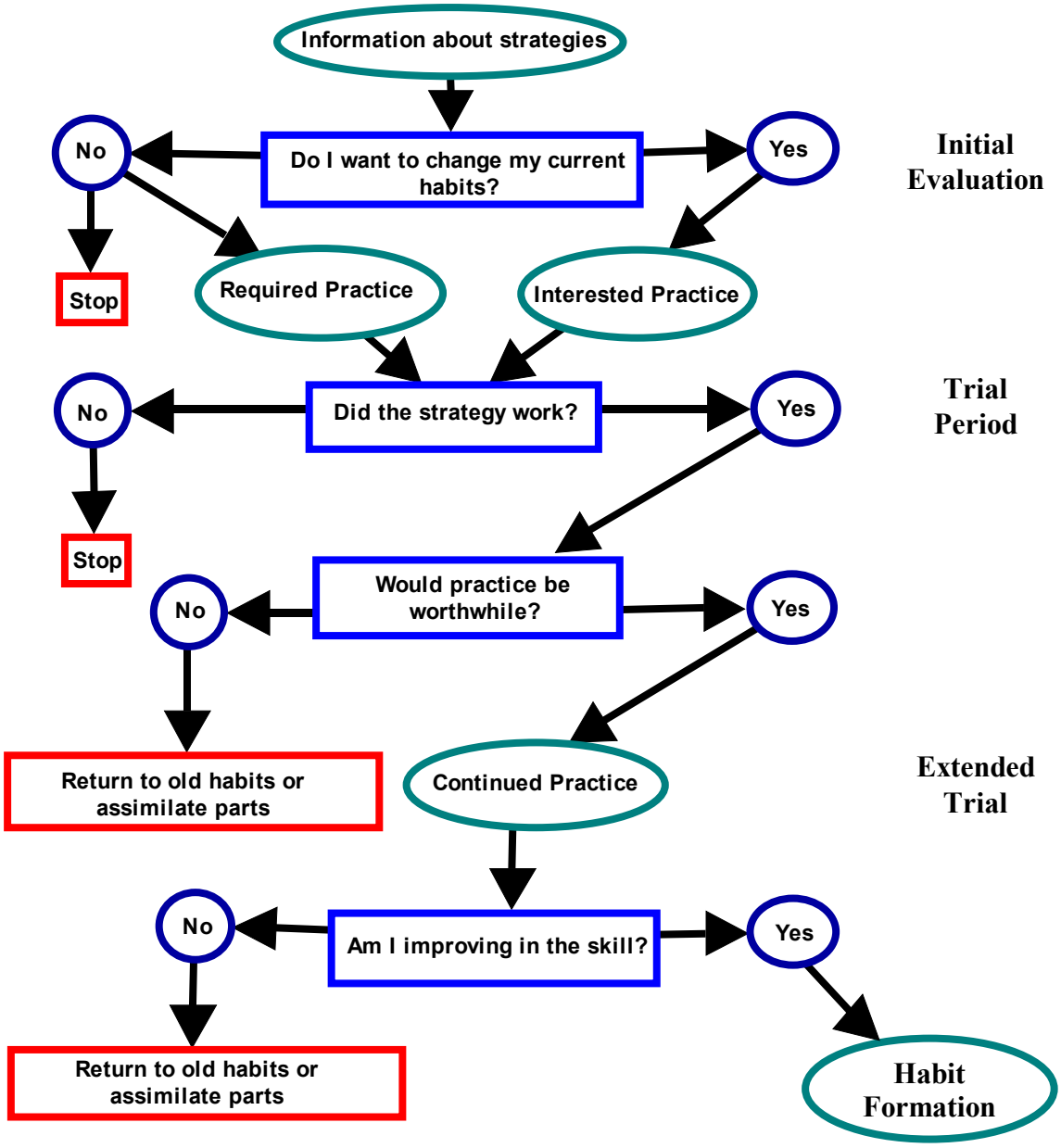

Figure 4. The Decision Process for Strategy Acquisition

Initial Evaluation: Do I want to change my current habits?

Upon first learning about the strategy, and before they tried it, students compared the strategy to their current habits (*N*=12). Ethan said, "I was kind of curious to see like what your strategies were and how it related to what I did, but…I didn't really see…both systems being similar." Similarity made a difference. If students saw the strategy as similar to what they already did, then they regarded it more positively. High-users mentioned recognizing some of the strategies. Kim said, "So I was kind of impressed with myself, because I didn't really realize I was doing anything that was actual method."

Previous Experience. Both high-users and low-users mentioned having previous experience with strategies in high school, at a college orientation program, or with a counselor. However, there were differences between the two groups in terms of how they perceived their previous experience. Some low-users said they learned them before, but forgot them, or didn't feel they were helpful (*N*=4). Sometimes they used some steps and not others, and therefore did not think of themselves as using the strategies at all. If students had tried strategies before but failed to change, they were less likely to try again.

High-users with previous experience, on the other hand, had learned the value of using strategies. Peter's mother used to teach him how to study. Then he went to a private high school that emphasized test-taking and essay-writing. He said that the teachers really instilled those skills in him so that they became routine. With this kind of background practicing strategies, learning and practicing new ones came naturally. High-users with previous experience used the new learning situation to make their strategy use more conscious and organized. Debbie had been using the basic principles of S-SNOW already, but when she heard there was a name and specific steps for it, she said it became

easier to remember. Pua said she used to do time management with her diary, but when she did the exercise in class, she began using it everyday, more consciously.

Low-users studied less than high-users. Some mentioned not even reading the book. Strategies for understanding material are a more intimidating change to students who don't read. Laura said:

> I wasn't even reading…So like the PQRS…R., I can't remember it (laughs)… If you just got it and you weren't really studying that good before, you can't really do the whole thing 'cause it seems overwhelming.

Realizing Need. Also in the initial evaluation, students consider how much they need to change. Some of the low-users said that they didn't see a need to change their habits (*N*=7), while the high-users reported realizing it would be good to change (*N*=6). Ethan, a low-user with a high GPA (3.5), said, "I thought what I was doing has been successful, so if it ain't broken, don't fix it." Other low-users mentioned that they could get good enough grades without trying hard (*N*=6).

There were two ways high-users became aware of a need to change. The first was simply by monitoring understanding and efficiency when studying. Since high-users tended to be more mastery-oriented, they wanted to make the most of the time they spend studying. Lionel said, "If I'm going to study 6 hours a day, I want to make it productive." They noticed when their study time could be improved. Peter said, "I used to think that my studying was really really organized, but I found out…I was just skimming through words, not getting absorbed…'I just read this, why don't I know it?'"

The second way high-users realized the need to change was academic failure. Three of the high-use interview participants mentioned crises in their lives involving low

grades. Kanani said that she procrastinated during her first semester and when she got her grades back, it shocked her: "Oh man, I really have to get moving." Pua said that getting lower grades than she was used to made her want to prove herself. Kristy described how she was motivated to change:

> Getting a letter that says I'm suspended for a semester. And then coming back from probation, and just hearing them tell me, "This is your last chance. If you don't do good, I'm sorry, this ain't your thing right now." …So that was a huge slap in the face...You've got to change your ways.

Students who had good enough grades without having to work hard were less likely to see a need for learning strategies, while students who got bad grades did see a need to use learning strategies. This explains why there was no significant relationship between GPA and SSUS total scores. GPA does not necessarily reflect how hard a person is studying, nor does it reflect changes in study habits during the semester this data was collected.

Trial Period: Did the strategy work?

After the initial evaluation, there is a trial period. All of the students in this sample had required assignments for each strategy they learned. For some of them, the first required try was all it took to accept or reject the strategies.

Motivation to Try: Curiosity vs. Requirement. High-users who had expressed learning goals tried the strategies out of curiosity (*N*=4). Some low-users mentioned that they only tried the strategies for as long as they were required (*N*=5). The importance of requiring students to try the strategy is highlighted in Kristy's story. She said, "It's all

methods that everyone told me, but I never tried until they gave me assignments …and then I started to see: 'Wow, it really does work.'" Because of her high performance orientation, getting the points for the assignments motivated Kristy to try the strategies. If they had not been required, she might not have learned them.

Success vs. Failure._

Kanani: "I had an essay test and I used it. And I got a hundred on the test."

Leilani: "The test-taking skills didn't really help me at all."

If the strategy helped with the first try, students were more likely to try it again after it was no longer required. Only one of the students, Leilani, said that none of the strategies worked when she tried them. She went back to what she was doing before. Other low-users said that it helped when they first tried it, but it was not that helpful.

Utility. There were three different ways students recognized that the strategies worked. The first was a difference in grades. Kristy said, "Passing those tests is the biggest thrill. When you find a method that works, even better." If the strategies didn't help with quizzes right away, low-users would stop using them. About PIRATES, Gerald said, "I tried it and I didn't do so good, so went back to my own ways." However, high-users understood that strategies help with grades in the long run. Debbie said if you train yourself, "then you'll definitely get better grades."

The second way strategies "worked" was by improving the process. Students said the strategies helped guide them when they took tests, made study time more efficient, and increased understanding (N=13). Kanani said, "I retain more information when I use study techniques." The improvement in process motivated high-use students to keep practicing the strategies, even if they did not see an immediate effect on grades.

Anxiety. The third way students recognized that the strategies worked was for managing anxiety. Peter and Renee both mentioned that PIRATES helped with their test anxiety. It helped them to focus and move on when they were tempted to panic and get stuck. Hofer, Yu, & Pintrich (1998) also found that students with test anxiety benefited most from SRL training. High-users used the strategies to manage anxiety. Low-users thought strategies increased anxiety because of all the steps and the time it took. Gerald and Ethan said that thinking too much made them anxious, so they didn't like strategies.

Natural vs. Unnatural. When students first tried the strategies, their level of comfort was an influential factor. Ethan said, "I tried it for a couple times but…I wasn't comfortable with it, so I just kept back to my old habit." And, "It didn't feel natural, I wasn't naturally learning. It was kind of too structured." When asked what the difference was between the "methods" and what felt natural, Gerald said, "I think method has steps you have to follow, natural is you kind of go with it…You don't have someone or something to tell you what to do step by step. It's just more free."

Almost all of the low-users complained that the strategies had too many steps (*N*=9). None of the students in the low-use focus group could remember "P.Q.R.S.R." It became a joke in the session. Although the high-users didn't complain about steps, Lionel did say that he got confused with all the acronyms.

Students also felt that the strategies took too much time and effort (*N*=10). Ethan said, "I just felt like it was taking way too long… I don't want to spend more than what I have to on homework." Jenny said she got tired of checking her understanding. Leilani said the twenty minutes it took to plan out the week was a waste of twenty minutes.

In contrast, high-use students saw the steps as helpful and common sense (*N*=7). About PQRSR, Kristy said, "It just makes sense to do it that way. It's like if I preview it first I know what I'm reading. Then, 'okay, now what about this? I know it's a main topic, but what is it?' And then you start reading it, and it makes more sense."

Context for Learning Strategies. The context in which students first learn and try the strategy had an effect on continued practice. Pua, a high-user, actually said that one of the strategies "pissed me off." So she decided not to use it. The assignment was to write some examples of elaboration for a study session. But Pua thought she had to write examples for every paragraph she read in one session. It took too long, so she rejected the strategy. Assignments should be clear and brief. Student comments highlighted other characteristics of the learning context that influence strategy acquisition:

Multiple sources: Hearing about the strategy from more than one source helped.

Sharing the learning experience: Class discussions about how to use the strategies helped students think about it more actively and sort out misconceptions.

Continuity: The unit mastery classes were "weird" because they were split up, half for psychology concepts and half for strategy training, with not enough time for either. When students saw how the strategies fit with psychology, it seemed more credible.

Immediate opportunity: If they had an opportunity to try the strategy right away, they were more likely to recognize how the strategy helped.

Reward for trying: Kristy tried the strategies because she got points for it.

Connection to reality: Leilani said she would have used the test-taking strategies if they helped her specifically with the unit mastery quizzes.

Teacher attitude: Kim said her teacher was warm and inviting, which made her want to try what he taught. Dan said his teacher shared how strategies worked for him. Peter said his teacher emphasized that mistakes were part of improving.

Extended Trial: Would practice be worthwhile?

After the first trial, students re-evaluate whether they want to change their habits to incorporate the new strategies. They may try the strategy again a few times, without being assigned, to make this decision.

Cost-Benefit Analysis. Students who knew the strategies worked, but who saw them as uncomfortable, decided whether they wanted to practice enough for it to feel more comfortable. Ethan said, "I guess if you practice a lot then it becomes natural. But… I didn't want to practice it." Low-users said it was easier not to change.

This is the point in the process of decision-making where low-users and high-users seemed to differ the most. High-users thought the benefit outweighed the cost (*N*=6). When asked if she thought the strategy took too much time, Pua said, "No, because in the end you have the advantage of remembering more things."

Value of Practice. High-users saw the value of practicing the strategies to make the most of them (*N*=5). Peter said, "It's easier to practice it with these easier courses, so you kind of get a niche for it... You have to take time to do it."

Regarding practice, low-users did not want to put in the effort, or they were not sure they could change. In the low-use focus group, a recurring theme was not finding out if a strategy works, but rather finding out if they could "stick to it." Low-users said they knew the strategies worked, but "the change" intimidated them (*N*=7).

Students' beliefs about the value of practicing strategies stemmed from their implicit beliefs about intelligence. High-users, with an incremental theory of intelligence, believed that with effort they could get better at using the strategies, so they were willing to take on the challenge and put in the effort. Low-users, with an entity theory of intelligence, tended to think that if they didn't get it right away, they didn't have the ability to do it. If ability to use the strategies was low, and ability is fixed, then to these students, practicing would not make much difference.

Assimilation or Return to Old Habits. Some students stopped trying to use the strategies all together and returned to their old habits. Others, if they could not accommodate to the new strategies, took parts and fit them into what they were used to doing. Larry said, "Some of the techniques I'd use, but I didn't really use it like step-by-step… I'd just do it my way." However, if they weren't doing exactly what was taught, they thought they weren't doing it at all. After talking about it, Ethan discovered that he did use the strategies more than he originally thought. He just did it "my way."

Habit Formation: Am I improving in the skill?

After extended trial, students who didn't feel that they were improving in the skill went back to their old ways. Jenny said, "When I tried to make my schedule and stick to it …stuff would come up and I would…procrastinate. It just didn't work for me." The other students in the low-use group had similar experiences. They tried time management, but when they encountered problems, they went back to "goofing off".

Once students decided to continue practicing, they practiced enough to internalize the strategies into habits and transfer them to other settings. High-users (N=8) mentioned

using the strategies for other classes. Peter best described the reward of practice and the process of making PQRSR a habit:

> In order to get really good at it, you have to spend a lot of time on it. Like the PQRSR—I did that so many times over and over. But after you get the hang of it, you can flip, skim, read this, go back and think about this, and it becomes routine…you do it subconsciously. So you're not even aware that you're doing it."

CHAPTER 4
IMPLICATIONS

The goal of this study was: (a) to identify which students benefit most from SRL training, and which benefit least; (b) to describe how different strategy characteristics, motivational factors, and contextual factors influence the acquisition of learning strategies; and (c) to suggest more effective designs for SRL interventions.

Individual Differences Influencing Strategy Acquisition

In general, the results of these interviews suggest that:

1. Students with incremental theories of intelligence and learning goals benefit most from SRL interventions, because they are willing to practice.
2. Students with entity theories of intelligence and more performance goals benefit least from SRL interventions, because they are reluctant to change.
3. Implicit theories of intelligence interact with achievement goals (i.e., incremental theorists expend more effort for their performance goals, while entity theorists expend less effort for their learning goals).
4. Career goals influence student motivation and study habits, depending on the students' approach/avoidance tendencies toward the future.
5. Social goals influence student motivation and study habits, depending on whether or not social needs are met.

The model of motivational and contextual factors influencing study efforts (Figure 1, page 13) is not complete or comprehensive. It highlights the factors and

relationships that seemed most salient in the data. The model also incorporates some contextual-motivational pathways through which study habits may be influenced. Future research should test and validate these relationships across contexts and cultures and use them to develop effective methods to facilitate the development of self-regulation.

The factors that appear to make the most salient difference between high-users and low-users are implicit theories of intelligence (see Dweck, 1999). These seem to be the beliefs on which self-efficacy (Bandura, 1982; Schunk, 1985), intrinsic motivation (Deci & Ryan, 1985; McCombs, 1984), attributions (Weiner, 1984), and learning goals (Ames, 1992; Heyman & Dweck, 1992) are based. The belief that intelligence can be improved would facilitate self-efficacy, more internal, dynamic attributions of success, higher intrinsic interest, and more learning goals (Dweck, 1999). These factors would not translate into behavior change unless a person believes that effort makes a difference.

One way to understand the relationships between goals and students' behavior is to assess them in the light of Abraham Maslow's hierarchy of needs (1987). According to this theory, when the most basic (or lower) needs are satisfied, attention can move on to higher needs. According to Maslow, social goals (belongingness and love needs) come first in importance before performance and career goals (esteem needs), or learning goals (self-actualization needs). If social goals aren't met, then career goals, performance goals and learning goals may seem insignificant to the student. SRL interventions that appeal only to students who are in the self-actualizing stage will not accomplish their purpose of helping those who need it most. The social and career goals of students should be considered and used as tools to facilitate learning goals, for example, by using discussion groups, study partners, and material that relates to career and social issues.

The Decision Process Model

The decision process model (Figure 4) depicts the conscious decisions of students in a real-life setting. There are many theories about the cognitive process of skill acquisition. Anderson's ACT (Adaptive Control of Thought) model, for example, describes how skill acquisition results from "proceduralization" of conscious knowledge. Anderson (1993) divides the process of skill acquisition into two stages. In the beginning, the subject gathers and acts on declarative knowledge (explicit knowledge about a task). Then, with practice, declarative knowledge becomes procedural knowledge (implicit and automatic). This theory could explain how learning strategies are internalized into habits. However, theories such as this address skill acquisition in controlled settings, without accounting for what makes students want to learn in the first place. When the goal is to convince students to use strategies in their everyday life, other stages such as initial evaluation, trial period, and extended trial should be assessed.

The decision process model of learning strategy acquisition both summarizes and elaborates on the experiences described by the participants in this study. Each student's reported experiences with the strategies could be traced along the paths in this process. Future research should analyze these stages to see if they are valid in other settings. The factors that influence each stage in the decision process, such as previous experience, implicit theories of intelligence, achievement goals, and class context, should be validated quantitatively. Interventions could be designed for each stage. For example, if a student has had unsuccessful experiences trying to learn study strategies before, how can he be disinhibited to try new strategies?

Future research should also explore the application of this decision process model to other areas of behavior modification, such as weight management and smoking cessation. James Prochaska (Prochaska, Norcross, & DiClemente, 1994) presented a descriptive model of change for behavior modification. To summarize his stages:

1. Precontemplation, in which people are not thinking of changing.
2. Contemplation, in which people consider changing in the next 6 months.
3. Preparation, in which people get ready to change
4. Action, in which people make efforts to change
5. Maintenance, in which people make efforts to continue change.
6. Termination, in which people are no longer tempted to return to old habits.

Though these stages are useful, they do not address the decisions that people make to move from one stage to the next, or the factors that influence them. The decision process model proposed in this study could fill in the spaces of Prochaska's theory.

Implications for Self-Regulated Learning Interventions

If the relationships in the contextual and motivational factors model and the decision process model are true, then what does this mean for SRL interventions, teaching, and the university?

The incremental process of learning strategies needs to be emphasized, for example, the value of practice; commonsense guidelines, rather than a rigid set of steps; and connections to current habits. Strategies like PQRSR and PIRATES may need to be re-framed so that instead of a set of hard-to-remember, rigid steps, students are taught the general guidelines of the strategies in an easy-to-remember format. For example, the

general guidelines for PQRSR are to plan out the study session and keep the mind active for understanding and better memory. If these guidelines are emphasized first, students may be more likely to feel that the strategies are natural and practice them. Methods should be developed that help students feel more comfortable and "natural" with the strategies. This idea of "natural learning" may be related to the concept of involvement, which Reed, Schallert, and Deithloff (2002) say is a consequence of SRL strategies.

Students should learn strategies in a context where they have immediate, rewarding opportunities to try the strategies; where the trial accurately reflects the effectiveness of the strategy; where extended trial is reinforced; and where students have an opportunity to practice strategies with other students.

Because of the importance of social goals, methods should be developed and tested for effectively using other-regulated learning to teach self-regulated learning strategies. If the goal of SRL interventions is to teach students who are not self-regulated to be self-regulated, then SRL interventions cannot depend on the students to use self-regulation to learn it. Possible social mediums between no self-regulation and learning self-regulation include study groups, study partners, class email lists and chat rooms, and class discussion. Social situations can be difficult to predict and control, but techniques for using these situations to facilitate learning SRL strategies can be developed and implemented. Vygotsky's (1978) theories about guided practice and the zone of proximal development could be useful for these purposes.

For a university to facilitate self-regulated learning, it should teach SRL in feeder schools so that students have a positive background in SRL when they arrive. It should have instructors who inspire interest in their classes by relating material to students'

needs and experiences. It should use assessments that accurately reflect effort and mastery of material. And it should help students meet all their goals (e.g., social and career), while at the same time facilitating learning goals.

The research of Self-Regulated Learning has promise. The strategies and skills extracted, developed and empirically tested in this field can be used to improve college student performance. Hattie, Biggs, & Purdie (1996) suggest that interventions be carried out in the general classroom (skills for science learning should be taught in science classes, etc.). Matching learning strategies with content for which they are most useful would facilitate the success of the first trial period in the decision process. If used across the curriculum, learning skills could save students and institutions a lot of money by lowering attrition rates and by helping students to graduate (Weinstein, 1998), as well as prepare students for a bright future of effective learning.

APPENDIX A
Description of Self-Regulated Learning Strategies

Time management (see Watson, 2001) includes metacognitive strategies for increasing self-awareness of the students' use of time. This is taught by having the students use schedules to record their behavior and make plans for change. Students are also asked to write essays to evaluate their time management, which helps them ascribe value to it, solve problems and concentrate on their goals.

Organizing study time is also taught, using the PQRSR method (Watson, 2001). PQRSR (Preview, Question, Read, Strategies, Review) is an updated version of SQ3R (Survey, Question, Read, Recite, Review) (Robinson, 1970). The main difference is that instead of rote memorization, the new method uses cognitive strategies, such as elaboration and self-explanation, for making the material meaningful. PQRSR helps students to organize the time they spend studying so that they can make sure they are actively involved in the material. Students follow this five-step process:

1. **P**review the material, looking at the main topics that will be covered in their selected reading.
2. Ask **Q**uestions about the material, to get actively involved in the reading.
3. **R**ead, looking for the answers to their questions as well as for main points.
4. Use **S**trategies (such as self-explanation and elaboration, discussed next) to help them understand and remember what they read.
5. **R**eview what they have just learned.

The next set of skills follow constructivist and connectionist models to connect the new information they are learning to information that they already know, thereby increasing their understanding and improving their memory of the material. One strategy for making the material meaningful is self-explanation, in which the student explains concepts to himself using his own words. Another strategy is elaboration, in which the student connects the new information with something he already knows. The five methods taught in this study (see Watson, 2001) are:

1. Thinking of examples from personal life,
2. Thinking of examples from daily life,
3. Restating the idea in your own words,
4. Relating two ideas together, and
5. Connecting the material with something learned before.

These strategies should be used often during reading to assess understanding and improve retention.

The strategy for test preparation emphasized is predicting questions that might be on the test and looking for the answers ahead of time. For this strategy, students were instructed to write test questions from their reading, and then write the answers to them.

A strategy for taking multiple choice tests called PIRATES (Hughes & Schumaker, 1991) follows these steps:

1. **P**repare to succeed. Get relaxed; look over the test, etc.
2. **I**nspect the instructions.
3. **R**ead, remember and remove. Read the question, remember what you learned from it, and remove wrong answers.

4. **A**nswer or abandon. Answer the question if you know the correct choice, abandon it if you're not sure. Repeat steps 3 and 4 for each question.
5. **T**urn back to answer the questions you skipped.
6. **E**stimate (guess) if you're not sure of the answer.
7. **S**urvey the test to make sure everything is marked correctly.

This strategy is used during the test rather than during study time and helps students to finish without missing important points. It also helps them to reduce anxiety by following the steps when they are stuck rather than focusing on what they don't know.

A strategy for taking an essay test is called S-SNOW (Watson, 2001), which is adapted from SNOW (Scruggs and Mastropierri, 1992). It follows these steps:

1. **S**tudy the test and allocate your time.
2. **S**tudy the individual questions.
3. **N**ote important points of each question, underlining command words (i.e., compare, explain, etc.).
4. **O**rganize your answer, outlining the important points you will cover.
5. **W**rite your answer.

This skill is also one that is used during a test rather than during study times. It helps students make sure they have covered everything they need to answer.

Note taking is also a topic covered. The Cornell system of note taking and the outline system teach students to organize their class notes in a way that will be helpful to the encoding and retrieval of information in the future, as well as providing quick and useful study guides.

APPENDIX B
Example of an Assignment in the Lecture Course

PQRSR/ Self-Explanation Worksheet

Preview: Read outlines, headings, subheadings, and summaries. Get a general idea of the important points in the material

Question: Ask yourself questions about the material. "What does this mean?" "How does this relate to…" This gets your mind active while you read.

Read: Read the text, looking for answers to your questions. Look for the main ideas and mark them down or write a note about them in the margins.

Strategies: Use strategies such as self-explanation, elaboration, summaries, or visual aids to learn the material. On this worksheet, use Self-explanation.

Review: Spend five-ten minutes reading over marks you have made of important points or any summaries available. This makes the information more likely to "stick" in your brain.

Schedule to Practice

Schedule five times this week to practice PQRSR. Check off each step of the plan and the number of times you used self-explanation

Date	**Time**	**Subject**	**P**	**Q**	**R**	**S**	**R**	**Self-Explanations**
2/15	4-5pm	Psychology						

Advantages and Disadvantages to using PQRSR

Advantages	**Disadvantages**

After thinking about this, what is your goal?

_____

PQRSR SAMPLES

From one of your readings, write an example of your thinking.
Date:

Time:

Subject:

Preview: (Write main ideas and topics)

Question: (Write three questions)

Read: (Write answers to your questions, and some main ideas)

Strategies: (Write three examples of explaining concepts in your own words)

Review: (Write a summary of the important information you need to remember)

APPENDIX C
School Skills Use Survey

In this Introduction to Psychology class, you learned several learning techniques. Please rate your use of them.

1. Do you use the PQRSR system to organize your study time? (Preview the material, ask Questions, Read, use Strategies, and Review.)

1	2	3	4	5
I don't do that	Occasionally	Sometimes	A lot of my study times	Every time I study

2. When you study, how often do you pause reading to explain the material to yourself using your own words?

1	2	3	4	5
I don't do that	Occasionally	Sometimes	A lot of my study times	Every time I study

3. When you are reading, do you relate new material to information you already know or think of examples from your own life?

1	2	3	4	5
I don't do that	Occasionally	Sometimes	A lot of my study times	Every time I study

4. When you are studying for a test, do you predict questions that might be on the test and look for the answers?

1	2	3	4	5
I don't do that	Occasionally	For some of my tests	For most of my tests	For every test

5. When you take multiple-choice tests, do you use the PIRATES method? (Prepare; Inspect Instructions; Read the question, Remember what you've learned, and Remove wrong choices; Answer the question or save it for later; Turn back to answer skipped questions; Estimate--guess; Survey the test to make sure you didn't miss anything.)

1	2	3	4	5
I don't do that	I do some of that	I do all that for some of my tests	For most of my tests	For every test

6. When you take an essay test, do you use the S-SNOW method? (Study the instructions and questions; Note important points in each question; Organize--outline your answer; Write.)

1	2	3	4	5
I don't do that	Occasionally	For some of my essay tests	For most of my essay tests	For every essay test

7. How often do you use the Cornell system or the outline system when you take notes in class?

1	2	3	4	5
I don't take notes	I don't use those systems	In some classes	In most classes	In every class

8. Time management: How often do you check your schedule to make sure you are using time well?

1	2	3	4	5
I don't have a schedule	Less than once a week	Once a week	More than once a week	Every day

9. Have you learned these skills before this class? Yes No

If yes, which ones? (Circle those that apply)

PQRSR (#1)	Self-explanation (#2)	Elaboration (#3)	Predict Questions (#4)	PIRATES (#5)
S-SNOW (#6)	Cornell System (#7)	Outline (#7)	Time Management (#8)	Other:

# of Years in college: GPA: Gender: Male Female Work, if any:

Chapter of the last completed quiz: Estimated grade in this class:

Ethnicity: _____

(Please write your ethnicity, and then circle the one below that best describes you.)

Caucasian Japanese Chinese Korean Filipino Polynesian Other

APPENDIX D
Survey Consent Form

Purpose

The purpose of this study is to evaluate the frequency with which students use specific study skills once they have learned them. Please take your time and answer the questions as carefully as possible. In addition to this survey, some participants will be contacted for interviews. Each interview or focus group (more than one person interviewed at a time) will last about an hour and will be audio-recorded.

Risk

Your participation in this study will not result in any adverse effects on you. However, although unlikely, the possibility exists that you may experience mild discomfort from thinking about these issues. Should you become uncomfortable, please contact:

Kelly Chang
(808) 956-6679
kellycha@hawaii.edu

Benefits

You will receive extra credit or a bonus point for filling out and turning in this survey. Also, your participation will help you to evaluate the skills you have learned and how effectively you are using them. In addition to the benefits you personally will experience, your participation will help us develop more effective skills training and help future students when they learn these skills.

Withdrawal

You may withdraw from this study at any time. Your withdrawal from this study will not result in any adverse effects to you.

Please sign here to indicate that you understand this form:

Name (please print): Signature: Date:

Course#: Section#: Phone #: Email:

Please fill out the above contact information. You may be contacted for an interview within the next month.
Thank you for your help.

APPENDIX E
Questions Used in the Interviews and Focus Groups

Topics:

Psychology Class

Impression of strategies

Motivation to study/not to

Study process

Feelings about college

Priorities

Culture

Influences in school

Questions:

- What has your psychology class been like?
- What do you like about it?
- What don't you like about it?
- What do you think of the study strategies you were taught?
- Do you use them?
- Why or why not?
- How do they help?
- Why wouldn't the strategies help you?
- What do you think would be the ideal way to learn study strategies?
- What motivates you to study?
- What motivates you not to study?
- In what situation would you be most likely to use the strategies?
- How many hours a week would you say that you study?
- Some people would say that you should only study as much as you have to in order to get the grade. What would you say to them?
- Think about a time that you studied in this last week. Describe what you did step-by-step.

- Suppose you were told that you had to teach a certain chapter in your psychology book to the rest of the class. How might you study differently from the way you study now?
- Describe the "ideal" study time. What should you get out of it?
- What are your reasons for coming to college?
- What do you expect to get out of college?
- How has college been different from what you expected?
- What are your priorities this year?
- Who has influenced you most in school? How?
- What have your parents taught you about college?
- How has your culture influenced the way you study?
- Do you have any suggestions for me as a researcher and teacher of learning strategies?

APPENDIX F
Consent Form for Interview

Project Title: A qualitative study of the acquisition of learning strategies

Purpose: The purpose of this research is to develop a better understanding of learning strategies such as the ones you learned in your Introduction to Psychology course, and what students think about them.

Procedure: This interview will be a half hour to an hour long. This interview is completely voluntary. Your answers to the questions will not affect your grade in your psychology course. You may choose not to answer any question at any time, and you may withdraw from participating in the study at any time.

The results of this interview will not be reported or published in a manner that would identify you. There will be an audio recording of the session. The recording will be available only to the research group. When the study is completed, the audio recording will be erased or destroyed.

Benefits: For participating in this interview, you will be able to make up a missed quiz if you are enrolled in PSY 100 section 001 (4 points toward your grade), or a missed active learning lab if you are enrolled in PSY 100 sections 002-029 (equivalent of 25 attendance points). Also, your participation will help you to evaluate the skills you have learned and how effectively you are using them. Your participation will help us develop more effective skills training and help future students when they learn these skills.

Risk: Your participation in this study will not result in any adverse effects on you. However, although unlikely, the possibility exists that you may experience mild discomfort from thinking about these issues.

Please sign here to indicate that you understand this form.

Name (please print) Signature Date

For questions about this study, please contact:
Kelly Chang
(808) 224-4369
kellycha@hawaii.edu

If you cannot obtain satisfactory answers or have comments or complaints about your treatment in this study, you may contact: Committee on Human Studies, University of Hawaii, Maile Way, Honolulu, Hawaii, 96822. Phone: 956-5007

APPENDIX G
Consent Form for Focus Group

Project Title: A qualitative study of the acquisition of learning strategies

Purpose: The purpose of this research is to develop a better understanding of learning strategies such as the ones you learned in your Introduction to Psychology course, and what students think about them.

Procedure: This focus group will be a half hour to an hour long. Please participate in the discussion. Although it is highly unlikely that the issues addressed in this session would be damaging, all members of this focus group will be expected to maintain confidentiality. This session is completely voluntary. Your answers to the questions will not affect your grade in your psychology course. You may choose not to answer any question at any time, and you may withdraw from participating in the study at any time. The results of this session will not be reported or published in a manner that would identify you. There will be an audio recording of the session. The recording will be available only to the research group. When the study is completed, the audio recording will be erased or destroyed.

Benefits: For participating in this focus group, you will be able to make up a missed quiz if you are enrolled in PSY 100 section 001 (4 points toward your grade), or a missed active learning lab if you are enrolled in PSY 100 section 002-029 (equivalent of 25 attendance points). Also, your participation will help you to evaluate the skills you have learned and how effectively you are using them. Your participation will help us develop more effective skills training and help future students when they learn these skills.

Risk: Your participation in this study will not result in any adverse effects on you. However, although unlikely, the possibility exists that you may experience mild discomfort from thinking about these issues.

Please sign here to indicate that you have read and understand this form.

Name (please print) Signature Date

For questions about this study, please contact:
Kelly Chang
(808) 224-4369
kellycha@hawaii.edu

If you cannot obtain satisfactory answers or have comments or complaints about your treatment in this study, you may contact: Committee on Human Studies, University of Hawaii, Maile Way, Honolulu, Hawaii, 96822. Phone: 956-5007

APPENDIX H
Sample Coding Report

NVivo revision 1.2.142 Licensee: 178
Project: Strategies User: Default Date: 4/16/02 - 5:34:40 PM

NODE CODING REPORT

Node: /Student Characteristics/Theories/Effort
Treenode address: (4 12 2)
Created: 2/13/02 - 10:42:17 PM
Modified: 4/14/02 - 1:23:34 AM
Documents in Set: All Documents
Document 1 of 39 Debbie
Passage 1 of 2 Section 0, Para 26, 88 chars.

26: So it's not like quantity, it's quality. So I think this just reinforces it a lot more.
Passage 2 of 2 Section 0, Paras 80 to 81, 506 chars.

80: [Q] How do you overcome that laziness?
81: [R] You're going to have to want it more, so that you can work for it. You know, work towards it? Like I have friends who, "Oh yea, this is what I want to do, I want to do this." But they just don't want to do work like, "Did you go to class?" "No." They make the effort to come to school but not go to class. And I'm like, why waste the effort and energy? You might as well go to the beach or something if you're not even going to go to your classes, you know?

Document 2 of 39 Ethan
Passage 1 of 1 Section 0, Para 62, 107 chars.

62: You know. That's how I see college, it's like a progression, like I learn something now…help me out later.

Document 3 of 39 Focus Group A
Passage 1 of 4 Section 0, Para 150, 84 chars.

150: I think I just think about the grades, like if I want to get an A, I have to study.
Passage 2 of 4 Section 0, Para 252, 26 chars.

252: I try and I try and I try,
Passage 3 of 4 Section 0, Para 285, 128 chars.

285: [Lionel] Yeah, especially those that are failing. There's got to be some reason they're failing. Not everyone is plain ignorant.
Passage 4 of 4 Section 0, Para 287, 217 chars.

287: I've been writing these papers and the T.A. grades them. I love philosophy, I'm certain that I have a good grasp of the information and I've been really discouraged by her grading techniques, almost demeaning my work.

Document 4 of 39 Kanani
Passage 1 of 4 Section 0, Para 97, 385 chars.

97: Sometimes I can just do it and be yes, I figured it out, and then I'm so happy because I figured it out on my own. But sometimes I'll just wait for the answer in class. And that's like stepping back and just being lazy about things. I guess that's kind of why I don't challenge myself sometimes, because I'm scared I'm going to fail. But the majority of the time I like challenges.

Passage 2 of 4 Section 0, Para 99, 532 chars.

99: You have to work hard. That's your motivation, to get better. You have to push really really hard. And fail and just practice and fail and do it over again. That's a challenge to me. Even just being in school is a challenge to me, like what my grades are going to be. I could get really good grades, or fail and get really bad grades. Or a challenge would be just a simple problem that I can't figure out. It's a challenge because I have to apply everything and find my own way to solve it rather than relying on the teacher.

Passage 3 of 4 Section 0, Para 103, 186 chars.

103: [R] It feels better when you rely on yourself. Because you know you worked hard to get what you got. It's more satisfying, knowing that you can do that, work hard enough to get a goal.

Passage 4 of 4 Section 0, Para 125, 576 chars.

125: And my mom's the type of person that just has worked really hard to be smart and all that kind of stuff. So she's always telling me even though you have it, you have to work harder, because just look at your potential…how much you could do if you really pushed yourself. So she helps. Sometimes my dad helps because he pretty much thinks that I'm not going to go to medical school because he thinks I'm too lazy and stuff like that, he's kind of negative, but… that's part of it. I so want to prove him wrong at the same time. I can make it. I can do what I want to do.

Document 5 of 39 Kim
Passage 1 of 5 Section 0, Paras 51 to 53, 289 chars.

51: I've always been a good student. My parents have always instilled those beliefs on me, so I think that's where it comes from.
52: [Q] What kind of beliefs?
53: [R] Just, do your homework. Study when you have tests. And do your best. So I've just always done that ever since I could remember.

Passage 2 of 5 Section 0, Paras 120 to 121, 266 chars.

120: [Q] If you're not given feedback about what grade you're getting, how can you tell?
121: [R] Well, just the amount of effort I put in. I think is a good indicator. And how much work I do. Obviously, if I'm not doing anything, then I know I'm not going to do very well.

Passage 3 of 5 Section 0, Para 145, 137 chars.

145: And me if I'm paying attention. How much attention I'm paying, and what I'm writing down, and if I'm really interested in the material.

Passage 4 of 5 Section 0, Paras 146 to 147, 251 chars.

146: [Q] What about outside of class? How much responsibility do you have to study?
147: [R] Oh a lot. If you don't study, I mean. I mean I guess there are people who can not study and do well. But I need to study to do well, so it's a major responsibility.

Passage 5 of 5 Section 0, Para 151, 315 chars.

151: Like, I'm not a very good drawer, but it's amazing, like if you just practice you get better. And I didn't believe when they told me that. I was like, oh no, it's a talent. If you can draw it, you have that ability in you. But it's really, if you practice you can get better, which just like really excited me.

Document 6 of 39 Kristy
Passage 1 of 1 Section 0, Para 129, 651 chars.

129: [R] If you're going to do something, I mean to me time is everything. Especially working at night and doing this day thing. Time is everything. If you're going to do something. If you're going to do a homework assignment. Maybe as simple as writing a little reaction. That reflects what you know. That reflects your work. Make it worth your time. If you're going to spend half an hour doing it, give it all that it needs. Don't just write something like okay, here it is, I turned it in, I'm done…My time is precious. Ha ha. I'm going to do the best that I can with whatever they give me. Just so that I can be proud to put my name on it.

Document 7 of 39 Larry
Passage 1 of 1 Section 0, Para 152, 46 chars.

152: if you want to do good, then gotta work at it…

Document 8 of 39 Peter
Passage 1 of 2 Section 1.1.1.1.1, Para 98, 58 chars.

98: Cause even the smartest person gets stumped by something.

Passage 2 of 2 Section 1.1.1.1.1, Para 108, 933 chars.

108: How each individual person takes into things. It takes a bit longer for certain people to latch onto things. There's a person that won't get things, but they really focused on it, so they get it after a while. And then there are people that are really focused, but once they can't get it once, they give up. And I think developing learning strategies, that's a good thing. That's good thing like (Dr. Watson) reiterating over and over, It's okay to make mistakes. That's someone from the profession telling you it's okay to make mistakes, you're not perfect. That's really important part in a strategy, teaching them to try it again and again and again until you get the hang of it. I used to do that. Once I can't figure something out…why am I trying to do this? But once you sit there and try to focus on it, and someone gives you a strategy that's not totally off the wall, you have a whole logical way of applying it.

Document 9 of 39 Pua
Passage 1 of 10 Section 0, Para 28, 62 chars.

28: Every time I improve a little bit, and I'm happy with myself.
Passage 2 of 10 Section 0, Para 36, 167 chars.

36: and sometimes when I'm a bit sad and I say, no, I didn't do well to this test, I say but now you have to try a bit more, because there's somebody who believes in you.
Passage 3 of 10 Section 0, Para 62, 134 chars.

62: I feel like I have so many things to learn. I am not perfect, I have so many faults to correct in myself. And I always try to improve.
Passage 4 of 10 Section 0, Para 62, 258 chars.

62: I said that maybe those were dumb and maybe you were of medium intelligence. That's how I evaluated it myself. So that's why I want to show to myself that I can and that I can make it work. So that's why I challenge myself. I really like challenging myself.
Passage 5 of 10 Section 0, Para 112, 97 chars.

112: And they know that to learn they have to practice it and if they don't practice, you don't learn.
Passage 6 of 10 Section 0, Para 140, 110 chars.

140: It's when you have to fight for something that you value it. When it's served on a plate, you don't value it.
Passage 7 of 10 Section 0, Para 140, 128 chars.

140: If something is very easy, I'm going to get lazy, so it has to be at the right point for me. I have to work and I have to learn.
Passage 8 of 10 Section 0, Para 140, 78 chars.

140: If you don't do well, you're the one who is going to have a problem later on.

Passage 9 of 10 Section 0, Para 140, 58 chars.

140: You have to study and you have to make time for yourself.

Passage 10 of 10 Section 0, Para 149, 234 chars.

149: I want to have everything scheduled and everything has to be well done. Because when you know it well, you can practice it well. You can apply it and people will appreciate what you do. If you do it so-so, people won't like your work.

Document 11 of 39 Terence

Passage 1 of 2 Section 0, Para 72, 189 chars.

72: So I usually, since I know I don't try as hard as most of them do, I expect them to have a better grade than I usually have, but I try to maintain a grade range that isn't that much lower.

Passage 2 of 2 Section 0, Para 108, 54 chars.

108: I guess I have to put more effort into what I'm doing.

This Node codes no other documents in this set.

APPENDIX I
Description of Codes

CODE	Category	Explanation	Examples
CC	**Context Character-istics**	**Aspects of students' lives that influence whether or not students use the strategies**	
CC: WRK	Work	Students works/the effect of work on study habits	"Usually I work on Saturday and Sunday, and I don't get off until 11, so it's kind of hard."
CC: FB	Family Beliefs	How family beliefs influence student's involvement in college/studying	"My dad definitely emphasizes education." "To tell you the truth, they don't really support me anything."
CC: SP	Study Partner	Student has someone with whom he or she discusses class material	"And they pull me along, go okay, we're having a study group, and drag me along kind of thing."
CC: LL	Love Life	Influence of romantic involvement or break-ups on student motivation	"The reason why my grades dramatically dropped… was because I broke up with my first love."
CC: Tch	Teacher/ Teaching Style	How the student's teacher (or textbook) influences other variables of studying	"I noticed too if you like a professor, it seems to be a lot easier to learn from them too"
CC: Tch: Strat	Class Context for Strategy Learning	How the teacher's style or class organization affects acquisition of strategies	"The T.A.s, they usually just go over the acronyms and what it is. Sometimes they give examples and that's about it."
CC: Tch: Book	Class Materials	How materials in the class (such as the textbook) influence student motivation and study habits	"Yeah, the 'Now That You've Read It' questions. So for the first part, I'll type out those questions, I'll read the answers and the summary …"
CC: Tch: Care+/-	Teacher Caring or Not	How students' perception of teacher concern affects motivation	"'Cause one professor I hated at UH, I got a really bad grade, 'cause I just hated the professor. It wasn't the class. He was cold-hearted. He wasn't friendly."
CC: Tch:	Teacher	How the teacher's	"He wanted to teach us the

At-Strat	Attitude Toward Strategies	attitude toward the strategies influences strategy acquisition	strategies. He had a pretty positive attitude."
CC: Strike	Faculty Strike	How the faculty strike toward the end of the semester influenced student motivation	"I think the only thing really that motivated me not to study this semester was the strike."
CC: FRNS	Influence of Friends	How friends distract from or encourage studying/use of strategies	"If I have the choice between going out with friends and doing my homework, of course I'm going to pick going out with my friends."
CC: Culture	Culture	How the students perceive their culture influences their attitude toward school and studying	"That's typical Chinese people, right? They want their children to be smart…" "I know I am kind of laid back because I've grown up in Hawaii."
CC: Dist	Distractions	Other factors that distract from college/studying	"I'll watch TV instead of doing my homework." "My roommate talks to me a lot when I study."
CC:RM	Role Model	Set an example about college/studying	"I look up to my brother a lot…his main thing to me is you should stay in school."
STRAT	**Strategies**	**Whenever mentioned**	
PIRATES	PIRATES	Whenever mentioned	"I use the skipping. The skipping a question."
PQRSR	PQRSR	Whenever mentioned	"Um…see that's when you need to learn the PQR thing…"
NT	Note Taking	Whenever mentioned	"I tried the methods for taking notes"
TM	Time Management	Whenever mentioned	"Emphasis on time management I would say is so important…"
Elab	Elaboration	Whenever mentioned	"So it's kind of nice how you can make all those connections."
SE	Self-explanation	Whenever mentioned	"I would try to reproduce the words, write in my own words…"

S-SNOW	S-SNOW	Whenever mentioned	"I have a lot of essays to write in class…so the S-SNOW actually helped a lot too."
PQ	Predict Questions	Whenever mentioned	"But if I've studied and…made up my own questions and answered them… then that's when I feel ready."
SC	**Student Character-istics**	**What characteristics of the students lead them to use or not use the strategies?**	
SC: INT	Interest in Class/ Material	How interest in the class or material affects studying/strategy use	"But some of the new ones were interesting and I tried a couple of them before and they worked pretty good."
SC: INT-	No Interest	Influence of lack of interest	"I'm not into psychology stuff."
SC: ANX	Anxiety	Students use or avoid strategies to manage anxiety	"I hate feeling confused or I don't know what to expect, on the test especially." "But the stress relief one… I remember that the best."
SC: Goals	Student Goals	The influence of student goals on studying and strategy use	
SC: Goals: Learn	Learning/ Mastery Goals	Students express a desire to learn, be challenged, and master material	"I think that motivates me a lot. To make sure that I understand the information so that I can actually apply it to real life."
SC: Goals: Perf	Performance Goals	Student's goals are aimed at good grades or appearing smart	"I think I just think about the grades." "Just learn for the exam, after that you just let it go…"
SC: Goals: Job	Job Goals	Getting a good job is a motivation for being in school	"Sometimes I'll be influenced to do well because I know I want to be a doctor."
SC: Goals: No Plan	No Plan	Students don't have plans for the future	"They're just kind of drifting, like 'Oh, I don't know what I want to do, ah I don't know.'"
SC: Goals: Social	Social Goals	How students' social goals influence study/ strategy use	"[Q] Goals in college? [R] To meet people…people who are real with themselves…"

SC: Goals: Future vs. Present	Future vs. Present	Students are future-minded, or future-avoidant	"And just want to have fun kind of thing and not really think about the future." "I think you can still be young and still know what you want and still be determined to get that."
SC: INV	Investment in College	Student "worked hard" to get here (money or effort)	"Since I was paying so much, I decided that it would be imperative that I buckle down and do everything it took to get the best grades possible and to know the material as well as I could."
SC: INV-	No Investment	Student did not work hard to get to college	"My parents are paying for me."
SC: INV: IND	Independence	Students see themselves as independent/adult	"Cause I'm a lot more independent now, and I made new friends too along the way. So I mean, this year's been a lot better than my freshman year, of course."
SC: PEx	Previous Experience	Students learned strategies before	"Probably half of them we learned before in high school." "First, I think in my FamR class, she told us about SQ3R first."
SC: PEx-	No Previous Experience	Student did not learn strategies before	"When I was growing up no one showed me how to study or how to prepare for a test."
SC: Rcol	Reaction to College	How students had to adjust to college	"And there's no homework now. So I have to focus everything towards the test…"
SC: UND+	Understand Strategies	Students understand proper use of strategies, reasons for using them, etc.	"And I realize you don't have to try to learn everything by heart, you just have to understand, and when you understand, the things remain in your head."
SC: UND-	Don't Understand	Students don't understand or don't remember strategies	"I'm not saying it right, it's the Q…[*PQRSR?*] Yeah, that's right. It's basically kind of the same thing as PIRATES, in a

			way, right?"
SC: CH	Current Habits	What students currently do to study	"Just read the text and try to remember the main points and that's about it." "Average, 35-40 hours/week, 5-8 hours a night."
SC: DnC	Don't Care	The level of concern students have about success in college and/or using strategies	"I just kind of went with it, and it wasn't like I don't want to go or I really want go. Kind of in between."
SC: DnC: LZY	Laziness	Students see themselves as lazy, or do not want to put effort into studying or strategies	"I mean I didn't want to practice it too. I was just like, oh screw it already, you know." "I'm a slacker, I'm lazy. I don't do anything."
SC: Happ +/-	Happiness	How students' level of happiness (whether social goals are met) affects motivation	"I broke up with my boyfriend and then…And that was a hard time. I think that partly kind of influenced how I feel about school now." "Like, I'm really happy at this school."
SC: Theory	Students' Theory of Intelligence	How students' theories about the malleability of intelligence affect studying/strategy use	
SC: Theory: Ability	Ability Theory	Student has an entity theory of intelligence: That his/her intellectual ability is fixed.	"Because I know some people who keep studying, who just don't have the potential to get the grades they want."
SC: Theory: Effort	Effort Theory	Student has an incremental theory of intelligence: that intellectual ability increases, especially with effort	"I didn't do well to this test, I say: but now you have to try a bit more…" "You have to work hard. That's your motivation, to get better."
SC: SH	Self-Handicapping	Students set themselves up to do poorly so that they can blame failure on something other than their ability	"I have a really bad habit of not challenging myself just so I won't find out the outcome. Because when you challenge yourself you can really win big or you can really fall hard."
SC: LOC	Locus of	Students believe that they have control over academic	

	Control	outcomes, or that the environment has more control	
SC: LOC: Int	Internal Locus of Control	Students believe they have control over their academic success	" I can make it. I can do what I want to do."
SC: LOC: Ext	External Locus of Control	Students believe that others (i.e., teachers) or forces (i.e., luck) have more control over their academic success	"You know, you can't just say, 'I'm going to study here', and it turns out something happens and you can't study at all."
SC: SE+/SE-	Self-Efficacy	Whether students believe they can accomplish the task (Strategies, or college)	"I can't do it so, because there's certain things I have to do during that period of time so kind of hard for me."
SC: Fresh	Freshman Mentality	Students express immaturity, or a desire to avoid adulthood. Students put improvement off until later.	"I could improve it's just I'm lazy and I don't want to do it. Later on in college it will be tougher." "I just feel like um, still a kid, and still think like a kid."
SC: S-C	Self-Concept	Labels students attach to themselves	"I'm sort of an extremist" "I'm lazy and kind of …hardheaded"
SC: S-C: Others	Comparison to Others	How students compare themselves to others or judge others	"Those who don't have motivation would rather drink, or do any other number of activities that don't involve learning strategies."
SC: S-Reg	Self-Regulation	Student regulates behavior, regardless of feelings	"I want to have everything scheduled and everything has to be well done."
SC: S-Reg-	No Self-Regulation	Student allows feelings to dictate behavior	"I do my homework when I feel like it."
SC: S-Reg: ST	Self-Talk	Students use self-instructions (or self-justification)	"Like it's so bad sometimes: 'Oh, I'll just clean my room before I study,'"
PS	**Perceptions of Strategies**	**What characteristics of the strategies influence students to use or not use them?**	
PS: UT+	Perceived Utility	Students think the strategies are useful	"I've been using, it really helps."
PS: UT+: Grades	Perceived Utility for Grades	Students think that using the strategies leads to better grades	"Yeah, and it's worked well. I think I'm getting a good grade."

PS: UT+: Process	Perceived Utility for the Process of Studying	Students think that using the strategy leads to more efficient study time and better memory	"If I don't use some sort of strategy to remember everything, then I have to go back and read it again a second and a third time, and that's no fun."
PS: UT+: Anx	Perceived Utility for Managing Anxiety	Students think that using the strategy helps manage anxiety	"You need some way of processing it all. It's really overwhelming if you just try and read it."
PS: UT-	No Perceived Utility	Students think the strategies are not useful	"The test-taking skills didn't really help me at all."
PS: TRNS	Transform-ation	Students' study habits transform (as a result of learning new strategies or of coming to college)	"I'm going to apply it because it's good, the planning, the scheduling. I'm now more conscious of doing it. Before I was doing it, but now I do it every day."
PS: TRNS-	No Transform-ation	Students' study habits did not change after learning the strategies	"I wasn't comfortable with it, so I just kept back to my old habit."
PS: TRNS: TS	Try and Succeed	Students had a successful experience trying the strategies	"I tried a couple of them before and they worked pretty good."
PS: TRNS: TS: Use	Continued Use	Successful trial of the strategy leads to continued use	"I thought it was good, I use it now."
PS: TRNS: TS: Habit	Habit Formation	Students keep using the strategies until they become more routine	"I guess it's kind of like a habit now, because that is the way I understand things, by connecting things and stuff like that."
PS: TRNS: TS: UT+	Comparative Utility	Realizing that not using the strategies doesn't work.	"Because sometimes, you know, I might not do it the PQRSR and then I remember nothing."
PS: TRNS: TF	Try and Fail	Students tried the strategy, but it didn't work	"Yeah, I tried to do everything, but it didn't help me."
PS: TRNS: TF:	Return to Old Habits	After trying, students return to their old habits	"But I tried it and I didn't do so good, so went back to my own ways."

Return			
PS: TRNS: Req	Requirement	Students tried the strategy only because it was a requirement	"I would never have tried it unless it was assigned."
PS: TRNS: Cur	Curiosity	Students tried the strategy because they were curious if it worked	"I just wanted to know if they work or not, for me. So I'll just try it"
PS: TRNS: Com	Compare to Previous Habits	Students compare the strategies to previous habits	"Most of them fit pretty well with what I'd already been doing."
PS: TRNS: Need	Realize Need for Change	Students realize that their previous habits could be improved	"And then when I got bad grades, I was just like, 'oh man, I really have to get moving.'"
PS: TRNS: Need-	Don't Realize Need	Student is satisfied with current habits, and sees no need to improve	"For me, I thought what I was doing has been successful, so if it ain't broken don't fix it, yeah."
PS: TRNS: Asm	Assimilation	Students use parts of the strategies that fit with previous habits	"I took part of the stuff and then disregarded because it would, or reorganized the way it would fit what I was doing or whatever."
PS: NAT+	Natural	Strategies are perceived as natural, comfortable, easy to acquire, or common sense	"If it's easy to understand, and if it makes a person feel comfortable when they read it…The two most important parts of a learning strategy."
PS: NAT+: Self-Created	Create and Use Strategies	How students created and used strategies previously affects their view of strategies as they're taught.	"Because I actually did some of the things already, and I didn't know they actually called it something."
PS: NAT-	Unnatural	Students perceive the strategies as unnatural, laborious, or "not me"	"To me I just didn't, like it didn't feel natural, I wasn't naturally learning. It was kind of too structured maybe."
PS:NAT-: STEPS	Too Many Steps	Students think strategies take too many steps, or can't remember them all	"The acronyms got a little confusing for me because there was a lot of them." "I just thought they required too many steps."

PS:NAT-: BURD	Perceived Burden	Strategies take too much time or effort	"I don't have time to preview, read, and then go back and…I don't have time for that."
PS: Labels	Labels for Strategies	Terms the students use to describe the strategies	"the whole process" "the techniques" "tool" "all the steps"
PS: REM	Perceived Remedial	Students think people should have learned this a long time ago, or that it's for people who are somehow lacking	"They could teach it earlier. If young kids learned about it more, maybe they might develop it through high school and through college."
PS: PRAC	Practice Required	Strategies seem to take practice to become useful/whether students are willing to practice	"I mean nobody wants to practice it, you know." "You've got to keep practicing it every time you read something or it's not going to get into your head."

Note. The latter parts of the codes were used for coding by hand. Complete category coding is presented here to demonstrate how the codes are organized.

APPENDIX J
Survey Participant Demographics

Table 4. Survey Participant Demographics

N=232	Sample Size	Percent
Gender		
Male	78	33.6
Female	153	65.9
Year		
Freshman	118	50.9
Sophomore	66	28.4
Junior	19	8.2
Senior	12	5.2
Other	8	3.4
Ethnicity		
Caucasian	34	14.7
Japanese	86	37.1
Chinese	32	13.8
Korean	16	6.9
Filipino	27	11.6
Polynesian	14	6.0
Other	22	9.5
Mixed Ethnicity	70	30.2
Course		
Lecture	90	38.8
Unit Mastery	142	61.2
Grade Point Average		
Minimum	1.00	
Maximum	4.00	
Mean	3.091	
Std. Deviation	.5777	
Variance	.334	

APPENDIX K
Survey Scores for Interview Participants

Table 5. Frequency of Strategy Use for High-Users

Interview	PQRSR	Self-Explanation	Elaboration	Predict Questions	PIRATES	S-SNOW	Note Taking	Time Management	Total	*M*	*SD*
Peter	5	4	3	5	5	4	4	5	35	4.375	0.74
Debbie	4	5	5	5	5	5	4	5	38	4.75	0.46
Kanani	2	5	4	5	5	5	5	5	36	4.5	1.07
Kim	4	5	5	5	5	4	5	5	38	4.75	0.46
Kristy	4	5	5	4	5	5	2	4	34	4.25	1.04
Pua	5	5	5	2	5	5	2	5	34	4.25	1.39

Note. 1= don't use, 2=use occasionally, 3=use sometimes, 4=use most of the time, and 5=use every time

Table 6. Frequency of Strategy Use for Low-Users

Interview	PQRSR	Self-Explanation	Elaboration	Predict Questions	PIRATES	S-SNOW	Note Taking	Time Management	Total	*M*	*SD*
Leilani	1	4	4	2	1	1	4	2	19	2.375	1.41
Larry	2	2	3	2	2	2	2	2	17	2.125	0.35
Ethan	1	5	2	1	2	4	2	1	18	2.25	1.49
Janice	2	1	3	3	4	2	2	3	20	2.5	0.93
Gerald	3	2	1	3	2	4	2	2	19	2.375	0.92
Terence	2	2	1	2	4	2	2	3	18	2.25	0.89

Note. 1= don't use, 2=use occasionally, 3=use sometimes, 4=use most of the time, and 5=use every time

APPENDIX L
Demographic Information For Interview Participants

Table 7. Demographic Information for Interview Participants

Interview	Year in school	GPA	Gender	Ethnicity
High-Users				
Peter	2	3.94	Male	7
Debbie	2	3	Female	2
Kanani	1	2	Female	2
Kim	3	3	Female	1
Kristy	2	1.71	Female	1
Pua	4		Female	1
Low-Users				
Leilani	1	2.6	Female	6
Larry	1	3	Male	2
Ethan	2	3.5	Male	2
Janice	1	3.25	Female	3
Gerald	1	4	Male	2
Terence	2	3	Male	2

Note. Ethnicity: 1=Caucasian, 2=Japanese, 3=Chinese, 6=Polynesian, 7=Other

APPENDIX M
Survey Scores for Focus Group Participants

Table 8. Frequency of Strategy Use for Focus Group Participants

	PQRSR	Self-Explanation	Elaboration	Predict Questions	PIRATES	S-SNOW	Note taking	Time Management	Total	*M*	*SD*
High-Users											
Lionel	5	5	4	3	5	5	4	5	36	4.5	0.76
Alex	3	5	5	3	4	5	3	5	33	4.1	0.99
Renee	4	3	4	3	5	3	5	4	31	3.9	0.83
Low-Users											
Laura	2	3	1	1	3	1	2	2	15	1.9	0.83
Sachi	1	2	2	1	3	1	2	2	14	1.8	0.71
Darlene	1	3	2	1	2	1	2	1	13	1.6	0.74
Jenny	1	3	1	3	4	1	2	2	17	2.1	1.13

Note. 1= don't use, 2=use occasionally, 3=use sometimes, 4=use most of the time, and 5=use every time

APPENDIX N

Demographic Information For Focus Group Participants

Table 9: Demographic Information for Focus Group Participants

	Year in school	GPA	Gender	Ethnicity
High-Users				
Lionel	4	3.7	Male	1
Alex	2	3	Male	1
Renee	2	2.82	Female	5
Low-Users				
Laura	5		Female	1
Sachi	3	2.75	Female	2
Darlene	1	3.4	Female	2
Jenny	1	2.6	Female	7

Note. Ethnicity: 1=Caucasian, 2=Japanese, 3=Chinese, 6=Polynesian, 7=Other

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