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Relationship of study approach and exam performance

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Abstract

This study considers the relationship between study approach and examination performance. The data show a significant relationship between performance on complex examination questions and the use of a deep study approach, ceteris paribus. No significant relationships occur between the use of a deep study approach and performance on questions that are less complex or between the use of a surface study approach and any examination results. The findings also show that prior academic achievement, as indicated by cumulative GPA, and motivation for taking the course, as indicated by students' plans to seek an accounting job, are the best predictors of examination performance. These findings imply that accounting educators should encourage students to develop and use a deep study approach to become more proficient with complex material. Examples of how this may be done are provided. © 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Study approach; Exam performance; Problem complexity; Deep study approach; Surface study approach; Study process questionnaire; Learning process questionnaire

1. Introduction

In 1989 the (then) Big 8 accounting firms issued their "White Paper" on accounting education. The paper contained the following statement: "Passing the CPA examination should not be the goal of accounting education. The focus should be on developing analytical and conceptual thinking - versus memorizing rapidly expanding professional standards." (Arthur Andersen, 1989, p. 8). Accounting academics accepted the suggestions of the accounting firms and established the Accounting Education Change Commission to foster changes in accounting education (Sundem, 1999).

The development of analytical and conceptual thinking requires a conceptual form of learning, which is very different from simply memorizing facts and procedures

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(Beattie, Collins, & McInnes, 1997; Biggs, 1987; Svensson, 1977). To help students achieve this deeper kind of learning, we must first learn more about how they study and learn. Gow, Kember, and Cooper (1994) describe our lack of knowledge in this area as attempts "to gain some insight into what happens in the black box between presenting the instruction and examining the product" (p. 118).

The purpose of this study is to provide empirical evidence on the relationship between students' study approach[1] and examination performance, building on findings reported by Svensson (1977). Using self-reported data, Svensson found a close association between learning outcomes, examination performance, and the study approach students use. The present study finds a significant relationship between the use of a "deep" study approach and grades received on complex examination questions which require more than responding with memorized facts and procedures. This finding suggests that encouraging accounting students to develop a deep study approach may help them improve their ability to work with more complex material.

The specific research questions addressed in this study are based on the findings reported by Svensson (1977) and the speculations based on these findings made by Gow, Kember, and Cooper (1994). Gow et al. state (p. 119) "A surface approach is effective for recalling unrelated detail but normally leads to unsatisfactory test performance." The first research question is more general because of the difficulty in testing for the cause-and-effect relationship implied by the words "leads to" and is worded as follows:

> Q1: Is the use of a "surface" study approach related to lower grades, either in total or for either complex or less complex questions, ceteris paribus?

The second statement made by Gow et al. (1994) "a deep approach leads to performance of high structural complexity, which leads to high grades, if the assessment tests these abilities" (p. 119) leads to the second research question. The second research question is again more general and is stated as follows:

> Q2: Is the use of a "deep" study approach related to higher grades, either in total or for either complex or less complex questions, ceteris paribus?

I include three *ceteris paribus* factors which have been found to be related to examination performance: prior academic performance as indicated by cumulative GPA, gender, and motivation for taking the course.

2. Study approach

Svensson (1977) found that the *process* of learning affects learning outcomes. In his study, Svensson asked 30 students to read and study a 1400-word newspaper

[1] Published articles in this area appear to use the terms "study" and "learning" interchangeably, even though "study" refers more to the method used to learn and "learning" more to the outcome.

article and then report everything they remembered about the article. After an interval of 5 weeks, subjects were again asked to recall what they remembered about the article. Svensson then gave them an expanded version of the article to study and again asked them to report everything they remembered about the expanded version. After another interval of 5 weeks, Svensson again asked students what they remembered of the expanded article. Svensson asked students how they studied the text and about their "normal" study activities.

Svensson classified students into two groups according to the predominant learning approach they used. One group made specific comparisons and concentrated on detailed parts of the text in sequence without regard to the importance of these passages. They also memorized specific facts and figures mentioned in the article. Svensson called this approach a "surface" study approach. The other group of students attempted to understand the meaning of the article and searched for the author's intentions. They attempted to identify the main parts of the author's argument with supporting facts and to understand the broader implications of the message contained in the text. Svensson called this approach a "deep" study approach.

Fourteen of the 15 students who used a deep study approach for the article were able to link the facts presented in the article to the author's conclusion. Only one of the 14 students who used a surface study approach could make this connection.

Svensson also asked the students about their success in examinations in general and their "normal" study approach (which was not always the same approach used to study the article used in the experiment). He found that 12 of the 19 students who normally used a surface study approach reported they failed "some" of their examinations. Only one of the 11 students who normally used a deep study approach reported failing "some" of his exams. Thus Svensson found relationships between study approach and both text comprehension and examination performance.

Svensson (1977) emphasized that study approach affects both the knowledge acquired and how that knowledge can be used. In fact, he states "the structural properties of an individual's conception of various phenomena are the most important aspects of his knowledge, because they also constitute fundamental characteristics which determine how he acquires and uses knowledge" (pp. 237–238). Thus Svensson argues that the acquisition of knowledge cannot be separated from the knowledge structures[2] in which knowledge is contained in memory. Use of a surface study approach results in students' memorizing facts that are contained in structures which cannot readily be applied to other contexts, while use of a deep study approach results in knowledge being contained in structures that enable students to use this knowledge in other contexts.

The view that the method used to acquire knowledge is critical to our ability to use that knowledge is consistent with Piaget's theories of cognitive development (Inhelder and Piaget, 1958). Piaget argues that the development of higher-level cognitive skills depends upon the development of knowledge structures that are essential for the processing of information. Booth, Luckett, and Mladenovic (1999, p. 279)

[2] For a review of the literature concerning the development of knowledge structures or "schemata," see Waller and Felix (1984).

report that research in education supports the view that the development of knowledge structures is necessary for the development of "higher order skills such as the ability to think critically and process data at a high level of generality." Duff (1999) also stresses the importance of study approach: "It is generally accepted that a deep approach is considered desirable in higher education" (p. 100). Sharma (1997, p. 128) linked these findings specifically to accounting: "In terms of competencies needed to become a successful professional accountant, fostering a deep approach is critical."

These arguments are extremely important for accounting academics as the development of higher-level cognitive skills such as analytical and conceptual thinking appears to depend on knowledge structures in memory which develop from the processing and storage of information, which in turn depend on the method used to learn the information. Thus the study approach used by students appears to influence, if not govern, their development of higher-order cognitive skills. There obviously are other factors which also have an effect, such as innate intellectual capacity and practice, but the approach used in learning appears to be an essential aspect. An empirical demonstration of the relationship between study approach and analytical ability is an important step in our being able to help students develop these critical cognitive skills.

3. Other factors affecting student learning

Previous research has related a number of factors to examination performance. Past academic performance as indicated by grades and cumulative grade point average is the factor most closely related to examination performance (Doran, Bouillon, & Smith, 1991; Eckel & Johnson, 1983; Gist, Goedde, & Ward, 1996; Hicks & Richardson, 1984; Ingram & Petersen, 1987).

Another factor considered in a number of accounting studies is gender, although the evidence is mixed. Several studies (Lipe, 1989; Mutchler, Turner, & Williams, 1987; Tyson, 1989) found that female students outperformed males in accounting examinations, while Doran et al. (1991) and Gist et al. (1996) found no significant gender effects. Buckless, Lipe, and Ravenscroft (1991) found that gender effects were reduced to insignificant levels when a factor proxying for general academic aptitude (SAT or ACT scores) was included as a covariate in the regression models.

Motivation also affects performance. Motivation, as indicated by students being accounting majors rather than other business majors, was significantly related to course grade in a principles of accounting course (Doran et al., 1991). Using expectancy theory to develop an instrument to measure motivation, Davidson, Gelardi, & Hart (1996) found performance in the Canadian final professional accounting examination (the Uniform Final Examination of the Canadian Institute of Chartered Accountants, or UFE) interacted with level of technical knowledge in a complex manner to affect overall performance.

Thus past academic performance, gender, and motivation have all been found to affect examination performance, although with somewhat mixed results for gender.

While there may be other variables which affect examination performance as well, this study uses these three variables as *ceteris paribus* covariates.

4. Problem complexity

Higher-order cognitive skills cannot be measured directly, so researchers normally use an indirect measure such as observing the ability to work with complex problems. This in turn requires that we be able to assess the relative complexity of problems so we can differentiate more complex problems from those that are less complex. The Big 8 White Paper assumes that complex problems require different problem-solving skills and abilities compared with problems of low complexity, which require only responding with memorized facts and methods. This assumption appears to be valid as several studies found significant differences in performance on problems of high and low complexity (Amernic & Beechy, 1984; Davidson, 1996; Davidson, Slotnick, & Waldman, 2000; Jones & Davidson, 1995). The White Paper argues that the problem-solving skills and abilities of accountants and auditors must be improved so they can work with the increasing complexity of business decisions (see also Adams, Pryor, & Adams, 1994; Baril, Cunningham, Fordham, Gardner, & Wolcott, 1998).

An underlying difficulty in this area is that "there is no well-accepted definition (either conceptually or at an operation level) of task complexity either in psychology or accounting" (Bonner and Pennington, 1991, p. 38). As used in relation to problems, "complexity"[3] describes the level of technical difficulty of the evaluation task, or the perceptions of difficulty, with technical difficulty increasing as the number of alternatives and the number of criteria increase (Nutt, 1998). Perceptions of difficulty reflect the decision-maker's knowledge of evaluation criteria or disagreements about the properties that a solution must have or whether a solution has the specified properties (Nutt, 1998). Thus "complexity" is a relative term which ranges from the simplest problem to the most complex. As used by Nutt, the concept of complexity has three aspects: the number of items in sets P (the problem) and S (the solution), agreement among interested parties about the components of these sets, and the knowledge and reasoning skills of the decision-maker. Thus the relative complexity of problems can be assessed by considering the type of reasoning or cognitive skill required for their solution. This is the approach used in this study.

5. Administration of the tests

I gathered data used in this study from two large sections of introductory financial accounting in one semester at a Canadian university. This is a required course for all business majors, including accounting majors, who normally take the course in their

[3] While the published literature uses the terms "structure" and "complexity" interchangeably, the definitions of the concept have not advanced far enough to determine if a "structured" problem could be "complex."

third semester. I administered the questionnaire package, including demographic information, to students during the first class session. Following university ethics requirements, I informed students that their participation was voluntary and non-participation would not affect their grades. Approximately 75% of the students registered in the class (227 out of the 305 students in the two sections) completed the questionnaire package. I obtained a comprehensive data set for 211 students, or 69% of the total class, by matching examination grades to participants after the end of the semester. Because of university ethics rules on privacy and missing information, it was not possible to make meaningful tests for non-response bias.

6. Measurement of variables

Examination performance was measured by calculating the mean grade received on the midterm and final examinations. Both examinations were 3 hours long, and the final was comprehensive. The overall mean grade was 53.1% (range 12–86.5%). This relatively low mean grade is not unusual and reflects the role of this first accounting course as a "gate" for entry into the business and accounting programs. The midterm examinations were different in the two sections but a common final examination was used. Different midterm examinations should not affect analyses as midterm grades were highly correlated with final examination grades for both sections ($r = 0.57$ and 0.59; $P < 0.0001$, respectively). All questions on these three examinations consisted of problems except for one midterm examination which had 20 multiple-choice questions worth 20 points out of a total of 100 points for the examination. I did all of the grading.

Three accounting faculty who were not otherwise associated with this study rated the complexity of all questions appearing on the midterm and final examinations using the classification system developed by Shute (1979). Shute used Piaget's theory of reasoning ability (Inhelder & Piaget, 1958) to develop a method for classifying examination questions into high and low levels of complexity by considering the type of reasoning needed to solve the questions. Under Shute's classification system, any problem involving only definitions, memorizing facts, formats, or concepts, classifications, or the use of algorithms, is classified as low complexity. Any problem involving proportional, combinatorial, probabilistic, hypothetico-deductive, or correlational reasoning is classified as highly complex. This classification method has been used in other accounting studies, including Jones and Davidson (1995) and Davidson (1996).

All three faculty members had prior experience with classifying questions using Shute's classifications. The three faculty rated each question independently, then met to resolve any disagreements. One question, the third question on the second midterm with a value of 25 points, could not be unanimously rated as either high or low complexity. This question was not included in the analyses. Results of this rating process are provided in Table 1.

As Table 1 indicates, 110 of the 200 points (55%) are for low complexity questions and 90 points (45%) are for complex questions for the first section. For the second

section, 100 points out of 175 (57%) were classified as low complexity and 75 out of 175 (43%) as complex (omitting the one question worth 25 points). The overall mean grade received for low complexity questions is 55.1% (range 13.2–96%) and 50.5% (range 6–85%) for complex questions.

The study approach variable was measured using Biggs' Study Process Questionnaire (SPQ Biggs, 1987). This instrument produces separate ordinal measures for surface and deep study approaches by summing the responses to the 14 questions for the appropriate strategy and motive subscales. The SPQ contains 42 statements[4] with a five-point response scale anchored "1: This item is never or rarely true of me" and "5: This item is always or almost always true of me." Biggs (1987) established the validity and reliability of the SPQ.[5]

The registrar provided cumulative GPA for all participants.[6] Specific accounting academic ability could not be included as this is the first accounting course for most students. Students indicated their gender in the questionnaire. I assessed motivation for taking this course by an indirect measure following Doran et al. (1991). The questionnaire included a question asking students if they planned to seek an accounting job after graduating.

Table 1
Classification of examination questions

	Question	Maximum points	Complexity classification
Midterm, Section 1	Q.1	20	Low
	Q.2	25	High
	Q.3	18	Low
	Q.4	22	Low
	Q.5	15	High
Midterm, Section 2	Q.1	25	Low
	Q.2	25	Low
	Q.3	25	Mixed
	Q.4	25	High
Common Final	Q.1	25	Low
	Q.2	25	Low
	Q.3	25	High
	Q.4	25	High

[4] The SPQ also produces a measure for the "achieving" approach, which is characterized by students striving to compete for the highest possible grades by studying in a very organized manner. The achieving approach does not appear to be discussed much in the literature and is not used in this study.

[5] For more explanation of this instrument, see Gow et al. (1994) and Biggs (1987).

[6] Although students were asked for their cumulative GPA in the questionnaire, it was not used. The ACT or SAT scores could not be used in this study as they are not used in Canada.

Table 2 provides descriptive and demographic data. As Table 2 indicates, the mean cumulative GPA is 2.61 (range 1.00–4.00). The surface study approach measure has a mean of 50.6 (range 26–67) and the deep study approach measure has a mean of 48.7 (range 22–64). As indicated in Table 4, the surface and deep study approaches are not significantly correlated ($r = -0.06$; $P = 0.36$). The surface and deep approach mean scores may be compared to those reported by Booth et al. (1999). The mean surface approach score in their combined sample is 51.2, compared with 50.6 in this study. The mean deep approach scores in their combined

Table 2
Descriptive and demographic data

	Mean	S.D.	Range	*n*
Age	20.5	3.5	17–52	226
Total credit hours earned	33.2	21.9	0–157	221
Cumulative GPA	2.61	0.58	1.0–4.0	212
Deep study approach	48.7	6.8	22–64	225
Surface study approach	50.6	6.7	26–67	226
Total grade	53.1%	13.9	12–86%	227
Grade on structured questions	55.1%	16.7	13–96%	227
Grade on complex questions	50.5%	14.5	6–85%	227
Percentages of participants:				
Male	58.1%			
Plan to seek an accounting job	27.8%			

Table 3
Results regression models coefficients ($n = 211$)

	Model 1	Model 2	Model 3
Dependent variable	Total grade	Grades on less complex questions	Grades on more complex questions
Intercept	29.41***	0.319	0.220**
Deep study approach score	0.151	0.001	0.003*
Surface study approach score	0.106	0.001	0.001
Gender	2.416	0.042	0.007
Cumulative GPA	0.105***	0.001***	0.001***
Plan to seek an accounting job	4.097***	0.012***	0.036**
Overall *F*-test	13.68***	12.25***	8.24***
Unadjusted R^2	0.251	0.231	0.168
Adjusted R^2	0.233	0.212	0.148

*Significant at $\alpha = 0.05$ (one-tailed test). **Significant at $\alpha = 0.05$ (two-tailed test). ***Significant at $\alpha = 0.01$ (two-tailed test).

sample is 42.2, compared with 48.7 in this study. Thus the mean surface approach score is quite similar to Booth's, but deep approach scores are higher. There is no obvious reason for this higher deep approach score in this study. It may result from differences in the students included in the studies, as Booth et al. includes Australian students and the present study includes Canadian students.

7. Results

I used regression analyses to analyze the data, as indicated in Table 3. Three models were computed, using mean total grade, mean grades on less complex questions, and mean grades on more complex questions as the dependent variables, respectively. The independent variables were the scores for the deep study approach and the surface study approach plus the three covariates, gender, GPA, and the motivation measure.[7] As indicated in Table 3, the explanatory power of these models are all highly significant at the 0.001 level, with adjusted R^2 measures of 0.233, 0.212, and 0.148 respectively.

As Table 3 indicates, neither study approach adds significant explanatory power to either the mean total grades or to the mean grades on less complex questions after considering the effects of the three covariates. Gender is not significant for either of the models, but GPA and motivation are significant for both models.

However, for the model with the mean grades for more complex questions as the dependent variable, the deep study approach measure is significant ($t = 1.92$; $P = 0.028$, one-tailed), and the surface study approach measure is not significant ($t = 1.05$; $P = 0.148$, one-tailed). Results for the three covariates are similar to the first two models, with gender not being significant but both GPA and motivation are significant. This finding indicates that the deep study approach measure is significantly related to mean grades received on more complex examination questions after considering the effects of the three covariates.

Table 4
Correlation matrix of variables

	1.	2.	3.	4.	5.	6.
1. Mean total grade	1.00	0.928***	0.804***	−0.008	0.027	0.429***
2. Mean grade on less complex questions		1.00	0.551***	−0.025	0.020	0.405***
3. Mean grade on more complex questions			1.00	0.049	0.045	0.345***
4. Deep study approach				1.00	−0.062	−0.070
5. Surface study approach					1.00	0.044
6. Cumulative GPA						1.00

***Significant at $\alpha = 0.01$ (two-tailed test).

[7] Intercorrelations among the independent variables were not significant as no Variance Inflation Factor (not shown) exceeded 1.05 for any of the three regression models.

Correlations among the continuous variables were computed and are shown in Table 4. As Table 4 indicates, the three grade scores and cumulative GPA are all highly correlated at the 0.001 level. No other variables are significantly correlated.

8. Summary and conclusions

The purpose of this paper is to provide empirical evidence on the relationship between study approach and performance in examinations, considering both mean total grades and mean grades received on questions when they are categorized into high and low complexity. The tests used a sample of 211 students enrolled in an introductory financial accounting class. Regression models were used to analyze the empirical data collected, using three covariates found in previous studies to be associated with examination performance.

This study finds that the deep study approach, as measured by the Study Process Questionnaire, is related to performance on complex examination questions when complex questions were classified using the classification system developed by Shute (1979). This finding is consistent with that reported by Svensson (1977), even though very different experimental methods were used. The deep study approach is not related to mean grades received on either the total examinations or for mean grades received on less complex questions. The surface study approach was not related to any of the grade performance measures. This finding is not consistent with that reported by Svensson, who found that use of the surface study approach appeared to be detrimental to examination performance. As Svensson did not use the Biggs' SPQ in his study, this inconsistency may result from the different methods used in the two studies.

The finding that the deep study approach is related to performance on complex questions supports the contention that a deep study approach is necessary for the achievement of a more conceptual form of learning (Beattie et al., 1997; Sharma, 1997) and the subsequent development of higher-order cognitive skills. However, it must be recognized that use of a deep study approach may not be sufficient for developing the skills needed to learn how to solve complex problems or to think analytically or conceptually. Material is learned, but skills and abilities must be developed.[8] The detailed relationships in this area should be considered in future studies.

Other interesting findings relate to the covariates included in this study. Consistent with previous studies, the best predictor of grades is previous grades, as measured by cumulative GPA. Consistent with Doran et al. (1991) and Davidson et al. (1996), motivation is significantly related to grades. The strength of the relationship of the motivation factor to examination performance suggests motivation should be considered in future studies of academic performance.

The implications of these findings are potentially very important to accounting instructors. We should help students learn to use a deep study approach as it

[8] I appreciate the Editor for making this point very clear.

appears to help them become better at solving complex problems. Accounting instructors can encourage students to develop a deep study approach in at least three practicable ways. The first way is to include discussions of underlying concepts and theory in all our lectures, rather than merely explaining current practice and demonstrating current practice by means of simple problems. These discussions should reinforce students' perceptions of the importance of learning concepts rather than relying on their ability to solve simple problems. As an example of this, when we discuss depreciation methods, we should not restrict our lectures to the methods that are commonly used to calculate depreciation, such as straight-line and accelerated. We should also include a discussion of the underlying concepts of patterns of benefits received, including the less commonly used method of decelerated depreciation. Such discussions will encourage students to relate depreciation concepts to depreciation calculations.

The second method we should use is to include problems with a range of complexity in our demonstrations and not rely solely on simple problems. For example, continuing with depreciation, rather than demonstrating only simple problems involving the calculation of depreciation expense, we should extend such examples into the implications of the choice of depreciation method that management may select. We could show the effects of different depreciation methods on Return on Assets, with both Net Income and Total Assets being affected by the choice.

The third method may be the most effective. Sharma (1997) points out that students respond to examination practice. Thus, if examinations consist mainly of questions taken directly from text material which require only that students respond with memorized material ("memory dumps"), then students will tend to memorize facts and simple calculations in their studies. This encourages the use of a surface study approach. To encourage the use of a deep study approach, examinations should include questions requiring students to explain concepts and more complex problem material which requires students to study the problem, to identify relevant facts and possible alternatives. Continuing with the depreciation example, rather than including only multiple-choice questions and simple calculation problems, we should include complex analysis questions that require students to analyze the effects of different depreciation methods on management bonuses when the bonuses are based on combinations of Net Income, Return on Assets, and Earnings per share.

It may also be useful to offer training sessions on the best ways to study using the deep study approach. This would require students to become more actively engaged in accounting, perhaps by encouraging business simulations or complex business games that include accounting issues. However, this last suggestion is not as easy to implement by individual instructors as the first three suggestions.

8.1. Limitations

Of course these findings must be considered in light of possible weaknesses. This study used students in only two sections of one introductory financial accounting course at one university taught by one instructor. Thus it is possible that the results occurred because of some specific function of this limited sample. It is also possible

that introductory financial accounting students are not the proper subjects for the consideration of these questions and that different results might be found with more senior accounting students. In addition, the SPQ does not appear to have been used in a large number of studies,[9] so it may yet prove to be an unacceptable measure. This study also assumes grades assigned by instructors are suitable measures of performance. It is possible that different grades may have been awarded by other instructors. Future studies might consider using multiple graders to assure the validity of the performance measure.

Another potential problem is the linkage between study approach and the development of higher-order cognitive skills, in spite of the findings cited in the paper. Study approach certainly appears to affect the learning of specific material, but does the method used to learn material affect the ability to use this material is other contexts? Material is *learned*, but skills and abilities are *developed*. Svensson and others argue that these happen together, but it seems learning should come first, then the ability to use the material develops after, perhaps with practice or thoughtful consideration. More study on this question is certainly warranted.

In spite of the limited findings in this study, the statement made by Gow et al. (1994) when they describe student learning as a "black box" existing between the presentation of material to students and the examination of the product (p. 118) still appears to be accurate. More study in this area is needed.

Acknowledgements

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Appendix. Research instrument

Student Number _____

Gender _____

Cumulative GPA to date _____

Do you plan to seek an accounting job after graduating? Yes __ No __ Undecided ___

(*continued on next page*)

[9] A fairly comprehensive database search revealed only 22 studies that included the phrase "learning

Appendix (*continued*)

	This item is always or almost always true of me				This item is never or rarely true of me
1. I chose my present courses largely with a view to the job situation when I graduated rather than out of their intrinsic interest to me.	1	2	3	4	5
2. I find that at times studying gives me a deep personal satisfaction.	1	2	3	4	5
3. I wanted top grades in most or all my courses so that I would be able to select from among the best positions available when I graduated.	1	2	3	4	5
4. I think browsing around is a waste of time, so I only studied seriously what was given out in class or in the course outlines.	1	2	3	4	5
5. While I am studying, I often think of real life situations to which the material that I am learning would be useful.	1	2	3	4	5
6. I summarize suggested readings and include these as part of my notes on a topic.	1	2	3	4	5
7. I am discouraged by a poor mark on a test and worry about how I will do on the next test.	1	2	3	4	5
8. While I realize that truth is forever changing as knowledge is increasing, I feel compelled to discover what appears to me to be the truth at this time.	1	2	3	4	5
9. I have a strong desire to excel in all my studies.	1	2	3	4	5
10. I learn some things by rote, going over and over them until I know them by heart.	1	2	3	4	5
11. In reading new material I often find that I'm continually reminded of material I already know and see the latter in a new light.	1	2	3	4	5
12. I try to work consistently throughout a course and review regularly when the exams are close.	1	2	3	4	5
13. Whether I liked it or not, I could see that further education was for me a good way to get a well-paid secure job.	1	2	3	4	5
14. I feel that virtually any topic can be highly interesting once I get into it.	1	2	3	4	5
15. I would see myself basically as an ambitious person and want to get to the top, whatever I do.	1	2	3	4	5
16. I tend to choose subjects with a total of factual content rather than theoretical kinds of subjects.	1	2	3	4	5
17. I find that I have to do enough work on a topic so that I can form my own point of view before I am satisfied.	1	2	3	4	5
18. I try to do all my assignments as soon as possible after they are given out.	1	2	3	4	5
19. Even when I have studied hard for a test, I worry that I may not be able to do well in it.	1	2	3	4	5
20. I find that studying academic topics can at times be as exciting as a good novel or movie.	1	2	3	4	5

(*continued on next page*)

21. If it came to the point, I would be prepared to sacrifice immediate popularity with my fellow students for success in my studies and subsequent career.	1	2	3	4	5
22. I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra.	1	2	3	4	5
23. I try to relate what I have learned in one subject to that in another.	1	2	3	4	5
24. After a lecture or lab I re-read my notes to make sure that they are legible and that I understand them.	1	2	3	4	5
25. Lecturers shouldn't expect students to spend significant amounts of time studying material everyone knows won't be examined.	1	2	3	4	5
26. I usually become increasingly absorbed in my work the more I do.	1	2	3	4	5
27. One of the most important considerations in choosing a course is whether or not I will be able to get top marks in it.	1	2	3	4	5
28. I learn best from lecturers who work from carefully prepared notes and outline major points neatly on the blackboard.	1	2	3	4	5
29. I find most new topics interesting and often spend extra time trying to obtain more information about them.	1	2	3	4	5
30. I test myself on important topics until I understand them completely.	1	2	3	4	5
31. I almost resent having to spend a further three or four years studying after leaving school, but feel that the end results will make it worthwhile.	1	2	3	4	5
32. I believe strongly that my main aim in life is to discover my own philosophy and belief system and to act strictly in accordance with it.	1	2	3	4	5
33. I see getting high grades as a kind of competitive game, and I play to win.	1	2	3	4	5
34. I find it best to accept that statements and ideas of my lecturers and question them only under special circumstances.	1	2	3	4	5
35. I spend a lot of my free time find out more about interesting topics which have been discussed in different classes.	1	2	3	4	5
36. I make a point of looking at most of the suggested readings that go with the lectures.	1	2	3	4	5
37. I am at university mainly because I feel that I will be able to obtain a better job if I have a tertiary qualification.	1	2	3	4	5
38. My studies have changed my views about such things as politics, my religion, and my philosophy of life.	1	2	3	4	5
39. I believe that society is based on competition and schools and universities should reflect this.	1	2	3	4	5
40. I am very aware that lecturers know a lot more than I do and so I concentrate on what they say is important rather than rely on my own judgment.	1	2	3	4	5
41. I try to relate new material, as I am reading it, to what I already know on that topic.	1	2	3	4	5
42. I keep neat, well-organized notes for most subjects.	1	2	3	4	5

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