Socratic Note Taking Technique

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INNOVATION AND APPLICATION

The innovation proffered for the committee's consideration is one that addresses a familiar problem: many students do not read or study the assigned materials before class. The Socratic Note Taking Technique (hereafter SNT), shows promise in mitigating this problem. In addition, SNT is preferred by most students to the most common solution to these problems: quizzing.

What is generally referred to as a unitary problem—the problem of students not engaging with assigned readings—is, in my view, best broken down into three sub-problems: the 'reading compliance problem', the 'study compliance problem', and the 'motivation problem'.[1] The 'reading compliance problem' refers to the fact that voluminous research across a wide array of disciplines shows that many students, often most, do not read the assigned texts on time. For example, Clump et al. found that only about 27% of psychology undergraduate students read the assigned material before class.[2] Professor Howard found that only 40% of his sociology students completed the assigned readings prior to class.[3] Similar findings are reported involving students studying philosophy, business, science, communication studies, and education.[4] Evidence suggests a long term trend for an increase in the severity of the reading compliance problem.[5]

The reading compliance problem is part of a larger problem, the 'study compliance problem'. Consider that in order to fully grasp the assigned readings it is necessary, but not sufficient, for students to read. As Roberts and Roberts describe it, when given a reading assignment " . . . some students feel they have met their obligation if they have forced their eyes to "touch" (in appropriate sequence) each word on the assigned pages."[6] The fact that mere reading is not sufficient is confirmed when we reflect on why we ask students to engage with materials before class. Perhaps the most commonly cited reason is that it is not possible to cover all of the necessary material during class.[7] Other reasons include fostering a deeper understanding of the course material and better class participation.[8] All of these goals are enhanced when students have seriously engaged with the material prior to class.

The fact that we recognize but often fail to motivate students to read and study leads to a familiar catch-22: since many of our students do not come to class prepared, we spend valuable class time covering the assigned readings. Consequently, students quickly learn to anticipate that the assigned readings will be covered in class and so are less likely to engage with the readings and are not motivated to study the assigned readings.[9]

Given that we hope students will study (as opposed to merely read) the assigned materials, the question naturally arises as to what study techniques students should use to improve learning. A recent meta-survey of literature on effective study techniques rated ten different techniques in terms of their overall utility.[10] Five techniques—rereading, highlighting/underlining, summarization, keyword mnemonic, and imagery for text—were rated low in utility. Three techniques—elaborative interrogation, self-explanation, and interleaved practice—earned a moderate rating in utility. Practice testing and distributed practice were the only two techniques to earn a high overall utility rating. As these researchers note, ample research indicates that the most common study techniques employed by students are highlighting texts and rereading. Unfortunately, research indicates that these are the least effective, hence their low utility scores.[11] So the study compliance problem encompasses both the fact that students may merely read, as opposed to study, the assigned materials, and if students study, they will often employ the least effective study techniques. Accordingly, what I shall refer to as 'the motivation

problem' is how to get students to read and use *proven and effective* study techniques with the assigned materials before class.

Although there are dozens, perhaps hundreds, of suggestions in the literature about how to address the reading, study, and motivation problems, quizzing appears to be the most popular technique employed by teachers.[12] Quizzing has a number of drawbacks; here I will mention three.

First, it is no secret that generally, students do not like frequent quizzing. Students often view quizzes as punitive.[13] For many professors, particularly non-tenured professors, this can lead to the worry of negative effects on teaching evaluations.[14]

Second, quizzing has been criticized for encouraging, or at least requiring, only "surface learning."[15] Merely quizzing students about the bold definitions in a textbook to see if they have read the textbook can encourage a false view about what we aim for in education. While it is possible to ask written or multiple-choice questions that go beyond mere surface learning, it is very difficult to write questions at the appropriate level.[16]

Third, there is scant evidence that quizzing helps with the study compliance problem as opposed to the reading compliance problem. Researchers typically examine the effect of quizzing where the baseline condition is that most students do not even read the text. As noted, much of the literature supports the claim that judicious use of frequent quizzing can improve at least reading compliance. To the best of my knowledge, the research has not systematically investigated whether quizzing can affect study compliance. Indeed, the previous complaint, that quizzing encourages only surface learning, can be seen as acknowledgement that faculty are concerned with quizzing encouraging mere reading, rather than serious study. Furthermore, a review of the literature confirms that students will revert to the least effective techniques, e.g., underlining and rereading, when they are not required to use techniques that are proven to be more effective.[17] So there is little evidence that quizzing helps with the motivation problem.

The SNT assignment requires students to take notes on the assigned reading using a three column format: page numbers, student-generated questions, and answers. The prompt provided to students for SNT includes a brief description of Socrates's pedagogy, which famously involved asking students a series of questions. Students are asked to formulate questions about the reading of the sort that they imagine a good teacher like Socrates would ask. (See the appendix for an example.) A typical SNT assignment by students is around 700 to 1,000 words, over 2 to 4 pages of questions and answers, in this three column format.

SNT was designed consistent with our knowledge about effective study techniques. Recall that Dunlosky et al. found that only practice testing and distributed testing earned a high utility ranking among the ten different study techniques they discovered. As they define it, practice testing involves self-testing or taking practice tests on material to be learned. Distributed practice involves engaging with the material to be learned over an interval of time. SNT is consistent with this research. SNT offers a ready format for students to self-test. Students are told that they can use this assignment to study by covering up the third column and seeing if they can recall the answers to their questions. SNT is consistent with distributed practice, since ideally, SNT would be submitted by students for grading a day or two before class, allowing students to revisit their notes before class.

SNT was designed with the goal of ease of mastery by students. It requires only approximately ten minutes of explanation during class time during the first week, along with a prompt that includes detailed instructions and an example.

SNT was designed with the aim of permitting students to see a strong correlation between effort and earned grade. I have had a number of conversations with low achieving students who cite their reason for not doing well on quizzes and exams as being due to the fact that they are "not good test-takers". When asked why they do not prepare for quizzes and exams, they often

say they expend minimal effort because it will have no effect: Since they are not good test-takers, there is no point in devoting time to studying. The implicit theory for many students seems to be of the entity (innate/fixed) versus incremental (improvement with practice) mindset about test-taking.[18] Part of the motivation problem associated with the entity mindset is circumvented by giving students credit simply for their study effort. It was emphasized in class several times that SNT was graded mostly on effort, and every student in the class, with sufficient effort, should be able to score in the A range on the assignment. Most students who turned in the assignment scored in the 80% to 100% range. The most common reason for scoring lower than 100% was because the assignments were incomplete, for example, when only part of the assigned reading was covered.

SNT was designed with ease-of-grading in mind. As noted, completed SNTs submitted by students average approximately 700 to 1,000 words in length. While this sounds relatively onerous in terms of grading effort, the consistency of the SNT format speeds up the grading. With the use of a rubric, the instructor and undergraduate teaching assistants were able to grade and record in Canvas most assignments for philosophy 101 classes in two to three minutes for each SNT. Having students include the page number is particularly helpful in this connection. If an important argument or concept is introduced on a certain page in the text, it is a relatively simple matter to find the corresponding part of the students' submission.

RELATIONSHIP WITH THE TEACHING ACADEMY

I have presented at the Teaching Academy four times. In 2011 I gave a talk entitled "Student Study Hours", which focused on the national trend for students to spend less time on studying outside of the classroom. A good discussion by participants in this session eventually led me to ask, "Why do we want students to study outside of classroom time?" This question helped formulate the distinction between the reading, study, and motivation problems noted above. In 2014 and 2015 I gave presentations entitled "Really Flipping the Classroom." In the discussion period of both sessions the question of how to address the reading and studying compliance problems arose. This provided a crucial impetus for the SNT innovation.

Another important point that emerged from these discussions at the Teaching Academy is the question of teaching load. Participants at these presentations pointed out that many professors at NMSU have been asked over the years to teach more students. (For example, two-thirds of the author's classes have been increased by 20% since coming to NMSU in 2008.) In this same period, there has been an effort to increase student writing ("Writing Across the Curriculum"). SNT was designed with the aim of increasing student writing while living with the reality of large class sizes. So for example, in the Fall of 2017, two large sections of Philosophy 101 (each with more than 80 students) were asked to complete 10 SNT assignments. This meant that students in these classes who completed the assignments wrote, on average, about 7,000 to 10,000 more words over the course of the semester; more words as compared with previous years' offerings with no SNT assignments. Most of the students in these two sections were freshmen. The additional practice at writing for these students was an added benefit of SNT.

In 2016 I was part of a panel presentation at the Teaching Academy, "What have we done for student writing and what remains to be done?" I presented evidence that the SNT improves student understanding of course material as compared with quizzing. (This evidence will be discussed further in the following section.) I noted as well that SNT has the advantage over quizzing in that it provides students more practice at writing—a theme of our panel discussion.

I am pleased to say also that I have been able to share what I have learned in developing SNT with an international community, and so by extension, I can confirm that the influence of the Teaching Academy has reached beyond NMSU.

EVIDENCE OF EFFECTIVENESS ON STUDENT LEARNING

An informal study and a pilot experiment in two sections of a history class provided data in support of SNT. Due to space restrictions, I will report here only on the main experiment. Half the students from two sections of a philosophy 101 course were assigned SNT on alternating weeks. All students in both sections took exactly the same quiz at the beginning of each week. However, quizzes each week alternated between the two classes as either high or low stakes in a counterbalanced format. The design was a 2 (Notes: SNT or not) x 2 (Stakes: high or low) x 2 (Replication: first or second replication of a Notes x Stakes cell) within-participants factorial. On ten-point quizzes, SNT made an average difference of 1.22 points (more than a letter grade) for the 80 students' scores we analyzed for the study. In effect size terms that take error variance into account, $\eta P2 = .43$. Furthermore, the results indicate that SNT is particularly effective with weaker students. For example, we found a nearly three-point increase on ten-point quizzes for the weakest students. This number was arrived at by calculating each individual student's scores. We found that a student who scored 2/10 in the no notes cells, scored (on average) 4.88 in the notes cells. So the weakest students more than doubled their quiz scores using SNT.

One of the most surprising findings from the main study was that there was no statistical difference between the high stakes and low stakes cells. In the high stakes condition, students' actual quiz scores were recorded as part of their term grade, while in the low stakes cells, students received 10/10 merely for taking the quiz (while their actual scores were used for analysis in the experiment). The surprising upshot is that a threat of a low quiz score in the high stakes cells made no difference to quiz performance. This calls into question much of the research on quizzing as a method to address the reading, studying, and motivation problems, since the default assumption is that the threat of a low quiz score is the primary motivator. Further research into this area is called for.

A questionnaire distributed near the end of the main study showed that students preferred SNT to quizzing. The following (anonymous) student comment in the written portion of the survey expressed a common sentiment: "I would rather do the [S]ocratic notes than take a quiz. Not because I felt unprepared but because I felt stressed out if I was going to pass it or not. I couldn't really enjoy the class because I was too worried about my quiz grade." To the proposition, "It would be good for future classes to take one or two quizzes per week and eliminate the Socratic note assignment completely," in a forced choice, 78.81 percent fell on the 'disagree' end of the continuum (Strongly disagree = 28, Disagree = 43, Somewhat Disagree = 22), while 21.19 percent sided with the 'agree' end of the continuum (Somewhat Agree = 13, Agree = 6, Strongly agree = 6). To the proposition, "It would be good for future classes to do more Socratic note assignments worth more of the final grade and eliminate or severely reduce the number of quizzes," in a forced choice, 14.28 percent sided with the disagree end of the continuum (Strongly Disagree = 5, Disagree = 5, Somewhat Disagree = 7), while 85.71 percent fell on the agree end (Somewhat Agree = 26, Agree = 36, Strongly Agree = 40). Thus the survey data strongly supports the idea that students prefer SNT to quizzing.

A final couple of observations about SNT, which were not included in the published study, are based on less rigorous data. My classes emphasize a lively student discussion of material. The quality of this discussion has increased dramatically since the introduction of SNT. Also, unfortunately, there tends to be a certain gender imbalance, which often I must actively work to address, with more males participating in discussions than females. Since introducing SNT into my classes, I have noticed a considerable redress of this imbalance. Of course I can't rule out the possibility that other factors might be responsible for a better gender balance in discussion, but the correlation is quite striking. If, as I suspect, SNT is at least partly responsible, these are other strong points in its favor.

[1] A more detailed consideration of these aspects of the problem can be found in Mark Walker, David Trafimow, and Jamie Bronstein, "The Socratic Note Taking Technique: Addressing the Problem of Students Not Engaging with Assigned Readings before Class," *Teaching Philosophy*, 2017, 341–65. Some of the application for this award is taken directly from this publication. As lead author, I was responsible for the content and writing of most of the paper. Professor Trafimow did the statistical analysis and wrote most of the results section. Professor Bronstein assisted with editing the references for final submission.

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[11] Dunlosky et al.

[12] Keith Starcher and Dennis Proffitt, "Encouraging Students to Read: What Professors Are (and Aren't) Doing about It.," *International Journal of Teaching and Learning in Higher Education* 23, no. 3 (2011): 396–407.

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Appendix

The following excerpt is from a former student of mine, David Vessel, who kindly gave me permission to cite this from his first Socratic Note submission for Philosophy 320: Social and Political Philosophy, fall 2017.

Page Numbers	Question	Answer
10-11	What are the two attractive features of utilitarianism that Kymlicka mentions?	• The first feature is that utilitarianism is metaphysically simple. It depends on human happiness rather than the existence of God, souls, or an afterlife. • The second is utilitarianism's consequentialism. Consequentialism provides a rationale for why a certain act token is right or wrong.