

TINKER TOYS: AN ANALYSIS OF INSTRUCTOR'S AND COLLEGE STUDENTS' PERCEPTIONS OF LEARNING

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Abstract

The purpose of this article was to compare a college instructor's perceptions of students' prior knowledge, interests, and study habits to the students' self-perceptions. Surveys were administered to 14 college students enrolled in an Applied Clinical Physiology course to assess their perceptions of themselves as learners. The instructor also completed a survey assessing his perceptions of students' learning habits, interests, and subject matter background knowledge. Results suggested that teacher and student perceptions differed with respect to course difficulty, prior knowledge, listening skills, and interests. There was general agreement on note taking skills and study habits.

Remember tinker toys? The TINKER TOY construction set was invented by Charles Pajeau in 1914. While watching children play with pencils and empty thread spools, he noticed that they could spend hours mixing simple household items with lots of creativity. He noted the natural curiosity that children had about the world around them and how they enjoyed taking things apart to see how they work, and how they enjoyed disassembling and reassembling the parts and creating whatever could be imagined (Tinker Toys, n.d.).

The process of learning is analogous to the tinker toy. And schema theory explains how learning or comprehension occurs. Rumelhart (1980), best known for schema theory, argued that the information a reader acquires is organized in the brain via a framework or schema. Imagine a child's first attempt at creating a tinker toy. The framework grows to include more and more

information resulting in a larger and more intricate schema in a hierarchical fashion. Imagine now the child's completed tinker toy, all pieces linked together.

Psychologists refer to this place where learning occurs as a perceptual field, a fluid organization of meanings existing at any moment for an individual (Richardson & Morgan, 2003). In this perceptual field, the learner is trying to relate the new information to existing knowledge structures in order to comprehend and create meaning, as with the child playing with tinker toys disassembling and reassembling parts to create whatever he/she can dream to imagine.

Included in a student's schema is not just information gleaned from texts but all of that person's reactions to life's events. Therefore students' attitudes, interests, and perceptions—the affective domain—are directly related to their schema. Studies have shown that the affective domain does play a major role in learning (Lin, Zabrocky, & Moore, 1997; Schumm, Mangrum, Gordon, & Doucette, 1992; Wade & Adams, 1990).

As with giving meaning and form to tinker toy pieces, so it happens with learning and not just with beginning readers or disabled learners, but with older and fluent readers as well. The college classroom is no exception. At this level oftentimes professors provide information for students to “disassemble and reassemble” in order to learn and use it. Frequently, the instructor is met with frustration and disbelief about how students connect the pieces and the end result is an entirely different perception, frequently inaccurate or incomplete, of the concept. This tinker toy phenomenon as it occurs in learning was the impetus for this project.

The basic question studied, from a frustrated college professor's perspective, was “How on earth can I say and teach one thing, give them the same information on the test, and they still not get it?” The study compared the instructor's perceptions of the students' background knowledge, learning styles/habits, and interest in the material to the students' self-perceptions.

Methodology

Participants were 14 college students, 11 undergraduates, and 3 graduates, enrolled in a senior/graduate level Applied Clinical Physiology class. The instructor was also a participant in the study. The instructor completed a self-perception survey to determine his perceptions of students' level of background knowledge, study skills, and interest in the class. The students also completed the self-perception survey. Overall student means were compared to the instructor's perceptions his students.

Results and Discussion

Question 1: Circle the word that best describes how you feel about the difficulty level of the lecture material presented. Table 1 shows the results of Question 1. No students perceived the material as being difficult and 36% characterized it as easy. However, the instructor's perception of the level of difficulty of the material was much greater (42%).

Descriptor	Instructor's Prediction	Students' Response
Easy	14%	36%
About Average	43%	43%
Somewhat Difficult	21%	21%
Difficult	21%	0%

Table 1 Descriptor of Instructor's Prediction versus Students' Responses

Question 2: Circle the word that best describes how much prior knowledge you had about the topic before lecture. Again, perceptions were quite different between instructor and student. The instructor's perception of student background knowledge was that it is limited, with 57% having very little knowledge and only 21% with adequate knowledge. Students' perceptions indicated that they have adequate to above average prior knowledge (71%) (Table 2).

Descriptor	Instructor	Students
Very Little Knowledge	57%	29%
Adequate Knowledge	21%	57%
Above Average Knowledge	21%	14%

Table 2 Knowledge of Students' Prior to the Lecture

Responses to both Items 1 and 2 indicated that, as expected, the instructor perceived the material as being more difficult and less familiar to students than did the students. Teachers' perceptions are often based on years of experience and the understanding of the critical nature of the content material he/she is teaching. With students, it is somewhat like the cliché, "You can't see the forest for the trees." They view the class lectures as unrelated bits, covered once a week, and they do not have a large enough view of how the pieces of information all fit together at the end of the course. Also background knowledge and familiarity with a topic is a major predictor of how difficult comprehension will be. As noted by the students, they perceived themselves as being knowledgeable AND the difficulty level of the material within their ability to comprehend. However, these students' perceptions regarding prior knowledge and content difficulty are not exemplified by the quality of classwork or their grades. Being able to adequately judge comprehension of material is known as calibration of comprehension, and research has shown that readers do not fare well at calibrating their own comprehension (Lin, Zabrocky, & Moore, 1997) as supported by this data in which the perceptions vary greatly between instructor and students.

Question 3: Rate yourself as a note taker. Little variation is noted in perceptions on note taking skills. Apparently, both (Instructor 78%; Students 86%) believed that students are doing an adequate job in note taking during class, possibly due to the type of note taking required in the class (Table 3). The instructor provides PowerPoint slide handouts prior to each class meeting; note taking requiring only listening is not applicable. Students follow along with the handout and add notes and comments as they so choose during the lecture.

Descriptor	Instructor	Students
Poor	21%	14%
I Do Okay	57%	57%
Above Average	21%	29%

Table 3 Ratings of Students' Perceptions on Note Taking

Question 4: Rate yourself as a listener in class. As with Questions 1 and 2, there is much variation in perceptions in relation to listening skills; 29% of students perceived themselves as poor listeners as compared to 0% by the instructor (Table 4). Since the primary method of delivery in this class is lecture, listening skills are crucial for students. Compounding the problem of poor listening skills, in general, is that the course meets for a 3-hour block rather than 50-minute periods. Students with poor listening/concentration skills have more difficulty maintaining focus for long periods of time. Another interesting finding is that not only did the instructor perceive that none of the students are poor listeners, he also perceived six as being above average listeners.

Descriptor	Instructor	Students
Poor	0%	29%
I Do Okay	57%	50%
Above Average	43%	21%

Table 4 Rating of Students as Listener

Question 5: Rate your study habits for this class. Interestingly these perceptions were right on target. Listening and note taking would have been expected to show more variation between instructor and students. Generally, students who have good note taking skills and adequate background knowledge tend to exhibit more effort toward studying and preparing for class. Also, the instructor had a less than favorable perception of students' study habits. Table 5 shows another interesting point to note—that 86% of students indicated they took good notes, but only 14% indicated an above average effort in studying the notes and 36% described the effort as poor.

Descriptor	Instructor	Students
Poor	29%	36%
Good	57%	50%
Above Average	14%	14%

Table 5 Rating of Students' Study Habits

Question 6: Rate yourself as a procrastinator with school work. No major surprises were evident with perceptions being almost identical. The instructor truly had an understanding, almost certainly from teaching these students for 14 weeks, that procrastination was a major problem. See Table 6 for the results.

Descriptor	Instructor	Students
Never Procrastinate	0%	7%
Sometimes Procrastinate	57%	50%
Big Problem with Procrastination	43%	43%

Table 6 Procrastination of Students

Question 7: Rate yourself in terms of your interest in this subject matter. There is general agreement in interest in the subject matter. However, Table 7 shows that overall more students perceive themselves as very interested (43%) than does the instructor (29%). Interest in a topic is highly related to information likely being recalled (Wade & Adams, 1990). However, in follow-up interviews with the instructor, the material often recalled by the students was not necessarily what he considered to be the most important but rather what the students identified as interesting to them personally.

Descriptor	Instructor	Students
Not Very	0%	7%
Sometimes Interested	29%	21%
Average	43%	29%
Very Interested	29%	43%

Table 7 Students' Interest in a Subject Matter

The ability to comprehend is a complex process that involves, most importantly, the background knowledge of students. Other important factors influencing the comprehension process, especially in fluent readers and with expository information, are interest in the topic and study skills/habits. Taken as a whole, these factors will largely decide on whether or not students will approach or avoid a task and then how they engage in the task. Students' perceptions of themselves as learners as well as their perceptions of the demands of the course and reading task are often different from those of the instructor. Instructors in content areas, even at the college level, are often not aware of the impact the affective domain has on students' comprehension. Awareness of these factors and the role they play in learning in content areas should increase the likelihood of increased student comprehension and reduced frustration for the teacher.

References

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