

**A Triad of Disposition Instruments Used in Secondary Science Education to Help Teachers
Better Understand Self and Others**

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“Teachers are hired for their knowledge and skills, but many times are fired for the lack of communication abilities or other personal attributes.” rjb, 2003

Published in the March, 2003 issue of Science Education International

Cyprus

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Since 1984, the University of Nebraska Secondary Science Education program has been experimenting with the role of dispositions, or personal attributes, on teacher development, effectiveness, and retention. Because such data are historically not part of teacher preparation programs, or programs' assessment, please allow me to explain the behaviors, values and soft skill instruments and their potential value in teacher preparation and teacher effectiveness.

Teacher preparation has and continues to prepare teachers based on the “what” of teaching; what knowledge they must possess both subject oriented and pedagogical, and what skills and experiences they must have for certification. Business, on the other hand, recognizes that a competent employee also brings his/her own set of values, behaviors, and soft skills to the work place. Figure 1 shows graphically how we dwell on the “what,” and ignore the “how” and “why.” And yet, we all know that many job-related problems in teaching center on communication, and are greatly influenced by a teachers' behaviors, values, and soft skills. I believe that we, as teacher educators, must expand our view of teacher preparation and begin to investigate the role of personal attributes on teacher effectiveness.

Insert Figure 1 About Here

For many years, the secondary education committee in our institution would meet at the beginning of every new year and faculty would be always asked, “Is there any program component that we need to work on this year?” I would once again point out that we provide

nothing in our programs to help students understand themselves, as either learners or their behaviors in relation to teaching. We teach cognitive development, adolescent behavior, teaching skills, and provide a subject knowledge base, but nothing that directly helps them understand self, especially in terms of interactions with others.

Recently this missing link has been identified by the USA National Council for Accreditation of Teacher Education (NCATE) and included as a requirement in their teacher preparation standards. Teacher preparation institutions that now wish to gain accreditation from NCATE must show evidence of developing not only knowledge and skills but dispositions as well (NCATE, 2002; Taylor & Wascisko, 2000).

Dispositions are defined by NCATE as: the values, commitments, and professional ethics that influence behaviors toward students, families, colleagues, and communities and affect student learning, motivation, and development as well as the educator's own professional growth. Dispositions are guided by beliefs and attitudes related to values such as caring, fairness, honesty, responsibility, and social justice. For example, they might include a belief that all students can learn, a vision of high and challenging standards, or a commitment to a safe and supportive learning environment. It is this third dimension of teacher effectiveness that has led to my interest in dispositions and data collection using several instruments.

The first of three instruments is a behavior profile program used by business and known as DISC (Bonnstetter, 1996, 1998). DISC is intended to measure observable behaviors and emotions. It establishes the language of "how" we act and "how" we communicate. Participants in any of my workshops that exceed three hours, and all UN-L secondary science methods students, are asked to answer 24 questions. The use of the data depends on the setting, but for the

purposes of this paper, I will confine my comments to a teacher preparation setting. In this setting, the data serve two primary purposes. First, every student receives a 14-page printout, written specifically for him/her. This sets the stage for each student to better understand “self,” and, then, to better understand how others may view their qualities, including their future students. Figure 2 helps explain current program findings and resulting changes that have been brought about by better selective admission. Such data greatly informs teaching and is a form of action research that helps students better understand their own strengths and weaknesses as teachers.

Insert Figure 2 About Here

It is important to understand that individuals can fall into any of the 64 cells, including the outer rings of Figure 2. Using Figure 2, if you draw a line on the graphic from 11 o’clock to the center, and, then, to 7 o’clock, this left-hand portion historically contained 80 percent of the secondary teachers entering our old pre-selective admission programs. This instrument suggested that, as a group, these students were concerned with quality, self-disciplined, controlled emotion, and were slow to change. Since 1999, with our present selective admissions procedures in place, 80 percent of our students are now left of a line from 11 o’clock to the center and then to 5 o’clock. The data indicate that we have gained students with more people skills. Even though, these data simply correlate with selection procedures, it is reasonable to conclude that the added requirement of interviews and written self-reflections resulted in bringing us a group of students

who view teaching as a “people business” and not just students interested in the delivery of their favorite subject matter.

This information can also be useful in discussing what skills individuals bring to teaching and has enhanced classroom team-building and communication resulting in observable changes in the social constructivist program environment that is continuously attempted in our classes. But, the real power is seen when I, as the methods instructor, overlay my pattern with the class data. It is important to note that my profile is located at around 2 o’clock, just under the letter “r” in the word conductor. Remember that 80 percent are on the other half of the graph, and even those who are on the opposite half are rarely as strong a “D” as the instructor. My behavior, as defined by this instrument, provides a description that includes being competitive, results-oriented, and, yes, confrontational. However, students and this instructor quickly learned that what this instrument reveals is an explanation of behavior, but never an excuse.

Because of this difference between students and their instructor, I had to make two major modifications. First of all, I had to face the fact that “change” was a way of life for me, but was just downright scary for most of my students. This recognition resulted in the most notable change, the creation of a daily on-line course schedule to constantly provide my students with a road map of where they are going, and what goals have been accomplished. This degree of planning and communication was crucial to the types of students, who are showing up in my methods class. Secondly, a great deal of time had to be added to the program to help students deal with the stress of educational reform and change, because many had entered the field for reasons of consistency and continuity as a life style decision. As a result of these changes, the program has seen these students better able to define self as a teacher, better able to interface

with different learning styles of students, and better prepared to form teaching and learning teams with colleagues.

These data do not suggest that one behavior style is better than another in terms of teacher effectiveness, but strongly suggest that some styles can cope with students and with educational reform better than others. It has also helped explain why I have had some classes that as a team accomplish far more than others. Figure 3 graphically depicts a recent cohort that had tremendous difficulties setting goals and accomplishing “out of the box” activities. Research in business shows that diversity of members greatly enhances a team’s output potential. Please note that by placing a paper over the left half of the graph in Figure 3 (from around 10:00 o’clock to around 4:00), all but one person in the class is covered. The class, as a team, is missing half of the behavior styles.

Insert Figure 3 About Here

A comparison of a recent extremely productive cohort with individuals located in all four quadrants (see Figure 4) showed that when all styles were present in a cohort, the group was able to write a federal grant and receive funding, organize not one but two national convention trips, and present over 15 group lessons to sites all over the state. Might this data suggest that our next selective admission decision should consider seeking team balance based on these or some other criteria? Much more data must be collected, and much more discussion must take place among the teacher education faculty. The dots represent a student’s natural style, and the stars indicate the adapted style of a student. In other words, individuals receive information that explains their

preferred behaviors (natural) and also what behaviors they perceive that they must exhibit to function in their professional life (adapted).

Insert Figure 4 About Here

Part Two of the Puzzle: Attitudes and Values

All of the behavioral information is greatly influenced by the attitudes and values that each perspective teacher brings along with him/her. These values serve as filters through which individuals make discussions and life choices. An attitudes' and values' instrument created by Target Training International creates a hierarchical set of values for six categories. The six areas include Traditional, Theoretical, Utilitarian, Individualistic, Aesthetic, and Social. The instrument orders these values from the most dominant personal concerns to the least valued qualities. Figure 5 shows a recent "typical" secondary science education cohort. Please note that the stars represent their first or dominant value, and the dots signify their least valued quality. The dominant value of this Secondary Science Education Cohort, and the dominant value for the last 15 years, has been "Theoretical."

Insert Figure 5 About Here

The primary drive for people with Theoretical as their top value is the discovery of TRUTH. In pursuit of this value, an individual takes a "cognitive" attitude. Such an individual is nonjudgmental regarding the beauty or utility of objects and seeks only to observe and to reason.

Since the interests of the theoretical person are empirical, critical and rational, the person appears to be an intellectual. The chief aim in life is to order and systematize knowledge: knowledge for the sake of knowledge. Think how these values and the resulting attitudes could influence how a student views and conducts their role as a teacher. For a high aesthetic person, such as an artist, these are down right scary qualities. Now note that this class, and, again, all University of Nebraska secondary science education classes for the past 19 years, on average, place aesthetics as the lowest values among the six choices.

The value of this information is again two-fold. First, students must understand what influences are at work in formulating their own perceptions, and, secondly, they must learn to realize and appreciate that not all students, or colleagues, view the world through the same filters. I am also concerned with the major mismatch between the dominant value of secondary science education students in this program and the students that they must teach. What may actually make this problem worse is the fact that this graph is a perfect match with their present methods instructor. Think how this quality, left unchecked, could be demonstrated in how daily topics are handled, and how issues are presented. Should there be a mismatch with the instructor or is recognition and accommodations enough to overcome any concerns?

Soft Skills to Complete the Disposition Triad

This third component to the secondary science disposition picture is the newest and the least understood at present. Another instrument created by Target Training International is being used to collect data. The instrument quantifies 23 soft skills, creates an ordered listing and identifies skills that a person has mastered, those skills showing some mastery, and no mastery. In addition to giving this instrument to each of the last three years of students, science education

specialists were asked to identify the “best middle level and the best high school science teachers in the district.” Table 1 shows the results of the middle level survey, and Table 2 the results of the high school. Sadly, no meaningful pattern of agreement emerges between the two groups. In addition, it is now recognized that both a personal behavior type and, to some extent, their value patterns influence and predict how an individual views his/her mastery levels. In other words, certain behavior types under-rate their skill level, while others tend to overestimate their abilities. A process that employs three different views of a persons skills, referred to in business as a 360 instrument, may be necessary to gain greater accuracy and a more accurate description of soft skill abilities. A 360-instrument uses triangulation of data by asking others to also assess a person’s abilities.

At present, these data are being shared with pre-service teachers and possible implications are discussed. It is interesting that the middle level teachers appear to have mastered more soft skills than high school science teachers. Data being collected at the time of this publication has asked middle level and high school teachers to describe what soft skills are necessary to be effective in their job. The middle level teachers feel that more of these skills must be in place to be an effective middle level teacher. Again, we at least make our students aware of the skills required of them in these schools and also helping them identify their own skill levels and even setting up programs to build additional skills, if necessary.

Insert Tables 1 & 2 About Here

Conclusion

Is it possible that in the future, each pre-service science teacher will be assessed as to strengths and weaknesses related to these three categories of dispositions, or personal attributes, and matched to specific job expectations? Will students found to possess marginal matches be given help to upgrade those dispositions that are found to be modifiable and will students who fail to reach the cut scores for key dispositions be consulted out of our programs?

And what implications do dispositional attributes have for how we form cohorts of pre-service students. We all know that student classes at all levels are each unique and that some end up being far more productive than others. But do we really know what factors influence these differences? The preliminary data presented in this paper suggest that conscious decisions to have teams of students who represent different perspectives could lead to far more productive teams. Should we consider selecting our pre-service cohorts with dispositional diversity in mind? And if education is to reform, shouldn't we do all we can to recruit and keep our future change agents in our classrooms. The data also suggest that most of the students who have traditionally come to teaching within this program possess attributes that make them slow to change and even slower to lead a reform effort. Have we created educational mediocrity in our building by unknowingly recruiting, preparing and placing teachers whose primary value is maintaining traditions and are afraid of change? Maybe these people were the right faculty in the past, but the rapid changes in society today require teachers who can adjust and modify daily. Are we losing teachers because they no longer can cope with these changes and simply possess personal attributes or dispositions that are out of step

with these evolving classrooms? They may be coming to the realization that their skills no longer match the job. Shouldn't we be developing a vision of what the job dispositions require and helping create this match from the beginning.

We must also consider the implications for our present teaching faculty at all levels. Might this information help create better faculty teams who for the first time would understand the driving forces behind their colleagues behaviors? And more importantly, how might this information impact student learning, if teachers had insights on each of their students? We are not ready to make such drastic steps, but the ability to help our future and present teachers better understand self, and, therefore, better understand their students is a crucial first step.

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Table 1

Middle Level Survey of “Highly Effective Science Teacher’s Soft Skills

Mastered	Some Mastery	No Mastery
Goal Orientation	Empathy	Student Centeredness
Mentoring/Coaching	Diplomacy	Management
Continuous Learning	Team Work	Problem Solving
Leadership	Personal Effectiveness	Persuasion
Interpersonal Skills	Planning/Organizing	Conflict Management
Creativity/Innovation		Futuristic Thinking
Presenting		Written Communication
		Decision Making
		Flexibility
		Self Management
		Negotiation

Please note the number and specific soft skills stated as mastered by these middle level science teachers.

Table 2

High School Survey of “Highly Effective Science Teacher’s Soft Skills

Mastered	Some Mastery	No Mastery
Continuous Learning	Interpersonal Skills	Planning/Organizing
Diplomacy	Leadership	Empathy
Team Work	Self Management	Goal Orientation
Presenting	Mentoring/Coaching	Persuasion
	Student Centeredness	Flexibility
	Creativity/Innovation	Conflict Management
		Futuristic Thinking
		Written Communication
		Personal Effectiveness
		Problem Solving
	Management	
		Negotiation

Please note the number and specific soft skills stated as mastered by these high school science teachers.

Figure 1. Teacher attributes for holistic preparation.

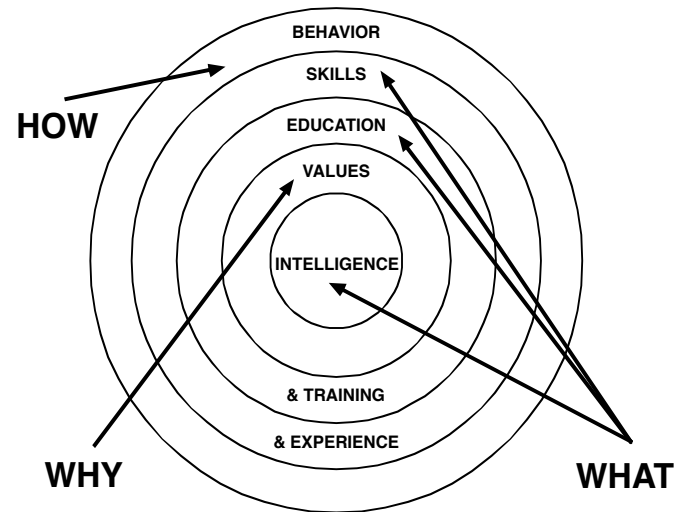


Figure 2. DISC instrument dimensions.

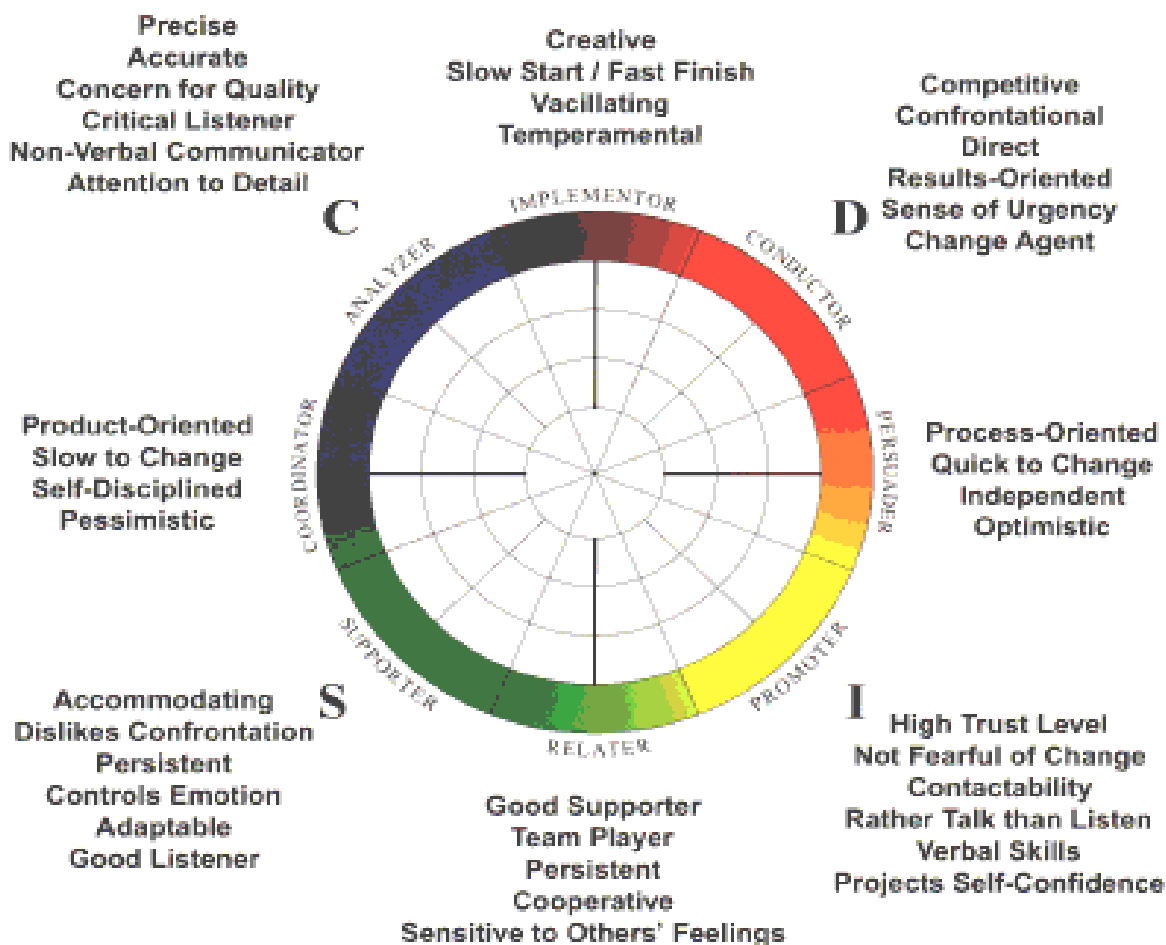


Figure 3. DISC for a typical secondary science pre-service class cohort.

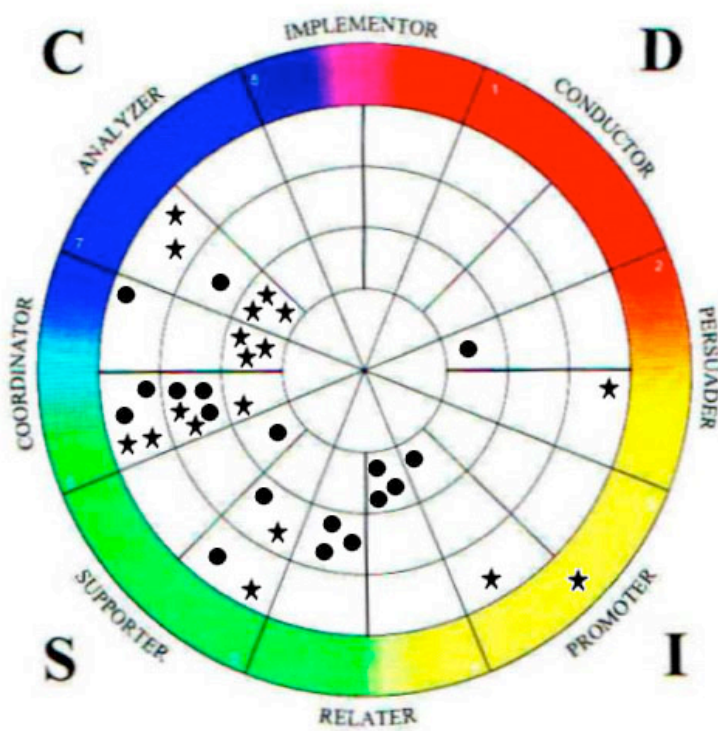


Figure 4. DISC for a pre-service class that more than tripled group accomplishments.

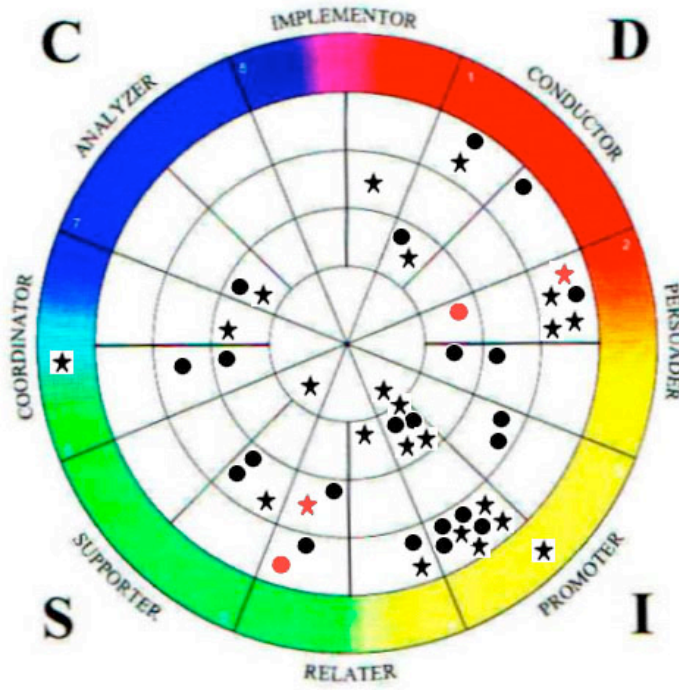


Figure 5. Values graph showing a standard concentration of theoretical values among a secondary science pre-service cohort. Stars represent their dominant value and the dots their least appreciated value.

