Who Will You Teach?
Consideration of Learning Styles in Teaching a Core Course
PL300: Military Leadership

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Abstract
This paper discusses Learning Styles of students in PL300: Military Leadership, a core course on leadership theories and applications that is taught primarily to college juniors at the United States Military Academy. Through administering the Inventory of Learning Styles Questionnaire and two follow up surveys, results show that students are overwhelmingly visual learners and each section has its own learning style profile. Additionally, engineering students are stronger sensing learners and stronger sequential learners as compared to students majoring in other disciplines. There is no striking difference in active to reflective learning between engineering students and others. Having an awareness of student learning styles may be helpful in explaining not only individual student performance, but the dynamics of each section that one teaches; adapting teaching methods to each section’s learning style profile is something to contemplate. Consideration of the instructor’s learning style is also discussed.

Introduction
In my very first semester here as a junior rotating faculty member teaching the core course PL300: Military Leadership, two things about students intrigued me. First, students enjoyed watching videos in order to apply concepts and they asked for more. I was pleasantly surprised they wanted more than I originally planned. Second, an engineering student who participated well in class and demonstrated excellent understanding of course theories and concepts - in the classroom and on assignments - received a D on a midterm, one of the lowest grades on a midterm in the four sections that I teach. I was surprised he did so poorly on the midterm considering he did well on assignments and quizzes. Because of these two things, I wanted to find out why – why did students want to see more videos and why did the engineering student do so poorly on a midterm that consisted primarily of short answer and essay questions?
Thus, I wanted to be able to teach better by using a variety of activities and videos to engage student interest and provide guidance so as to not ever be surprised by a student - doing so well in the classroom and assignments - do so poorly on an exam. I call this intelligence preparation of the classroom – not the battlefield.

**Theory/Literature Review**

Created in 1991 by chemical engineering professor Dr. Richard Felder and advising coordinator Barbara Solomon, The Index of Learning Styles was adapted from a model originally developed in 1987 by Dr. Felder and Linda Silverman and posted to the web in 1996 (Felder a; Felder b). The ILS has 44 questions with “a” or “b” answers which correspond to the learning style dimension being measured (Felder and Solomon n.d.a). Originally having five, the four learning style dimensions are described as (Felder and Solomon n.d.b):

1. **Active/Reflective** – Active learners prefer to do something active with information such as discussing and trying things out or group work, while reflective learners prefer to think about it first and work alone.
2. **Sensing/Intuitive** – Sensing learners prefer to learn facts, solve problems by established methods, tend to be more careful and practical, don’t like surprises nor be tested on things not covered in class, are patient with details and hands-on work, are practical and like connections to the real world. Intuitors like innovation, prefer to discover possibilities and relationships, dislike repetition and courses that involve memorization, may be better at understanding new concepts and mathematical formulations, and tend to work faster.
3. **Visual/Verbal** – Visual learners remember best what they see, such as films, demonstrations, pictures, diagrams, charts and timelines. Verbal learners get more out of written explanations and spoken explanations. Presenting information both visually and verbally helps everyone learn more.
4. **Sequential/Global** – Sequential learners prefer understanding information in logical steps, and follow these steps or paths to find solutions. Global learners tend to learn information in large jumps as when they “get it” suddenly after absorbing seemingly random material, may solve complex problems or put things together quickly once they get the big picture, and may have hard time explaining how they got there.
The dimensions are measured as a spectrum of extremes, ranging from 11 to 1 on the left side and 1 to 11 on the right side with only odd number results possible. Scores at either end ranging from 9-11 indicate a strong learning preference, scores of 5-7 at either end indicate a moderate learning preference, and scores of 1-3 indicate that a person is fairly balanced in the dimension. For ease of graphing, this paper uses the letters “a” and “b” to denote sides of the dimension as seen in results later (11a-1a, 1b-11b) (Mills, Ayre, Hands and Carden 2005).

Previous literature indicates that college engineering students are active, visual, and sensing learners (Felder and Silverman 1988; Kolmos and Holgaard 2008) with sequential and global learners as relatively equal (Kolmos and Holgaard 2008). More recent research focused on making engineering students and professors more aware of different learning styles through education (Mills et al. 2005). They found that both the students and faculty were stronger visual learners, while the sensory/intuitive and sequential/global dimensions were balanced. Interestingly, they found that the one dimension where students differed from faculty was that engineering students were stronger active learners whereas faculty and staff were stronger reflective learners.

Other research seeks to understand college student differences through not only learning styles but in intellectual development levels and approaches to learning whether it is on the surface, deep or strategic (Felder and Brent 2005). Additionally, learning styles is of great interest in teaching at the high school level and below (Harr, Hall, Schoepp and Smith 2002; Burke and Dunn 2002). The most recent research combines learning styles with cognitive styles in order to develop an adaptive learning system for a computerized personalized presentation module for computer science students (Yang, Hwang, and Yang 2013).
In considering learning styles of students and teachers, previous research suggests that when students' learning styles are compatible with teachers' learning styles, students have more positive post-course attitudes toward the course subject that do their counterparts who experience mismatches with learning/teaching styles (Felder 1993). When teachers favor their own learning style, this may put students who have incompatible learning styles at a disadvantage. As teachers, it is important to help students develop strategies and skills for effective learning, particularly when students’ and teachers’ styles do not match (McKeatchie 1995).

Suggestions to cater to learning styles include using handouts to capture materially normally written on boards and go through the handouts quickly, use the class time to engage in a variety of classroom activities that specifically encompass multiple learning styles, and talk with students about their learning styles (Felder 1993). Very recent West Point Master Teacher Program research indicates that it is important for teachers to vary their teaching methods in order to meet students’ learning style preferences while considering student attentiveness (Adamshick 2012), and educators should take the lead in adapting courses and lessons to today’s learners, Millenials (Redding 2011).

Millenials – those born after 1980 and pass into adulthood in the new millennium – are described as confident, expressive, optimistic, trustful of authority, global, open to change and tolerant (Pew 2010; Ender, Rohall and Matthews 2014). Millenials are always connected in digital technology and social media, embrace multiple forms of self-expression such as through online videos and social networking, and are on pace to become the most educated generation in U.S. history (Pew 2010). Additionally, just 2% of Millenials are military veterans, as compared to 6% of Generation X men (born 1965-1980), 13% of Baby Boomer men (born 1946-1964) and 24% of Silent men (born 1928-1945) (Pew 2010). Cadets at the United States Military Academy
are even described as “a bit more global” as compared to their civilian counterparts (Ender 2014). Furthermore, teaching literature advocates cadet-centered approaches to learning and training such as active problem solving, flexible leadership, time for reflection, and approaches that are relevant, supportive and provide feedback (Ender 2014).

**Research Question**

How can we teach to learning styles in a core course at the United States Military Academy?

**Population/Sample/Methods**

I teach PL300: Military Leadership, a core leadership course required of all students, normally taken in their junior year at the United States Military Academy. Generally, classes are kept small at approximately 18 students per section. During Fall Semester 2013, I taught four sections of PL300 (n=62). During that semester, 49 students completed the Inventory of Learning Styles and submitted their results to me. These were compiled for each section (see Appendix A for a blank copy of the ILS dimensions), resulting in a learning style profile for each section or hour. Of note, 23 of 62 students were engineering majors (37%).

A paper survey administered mid semester (Appendix B) asked students to identify what activities helped them learn the best, what classroom activities they liked or disliked, and suggestions to improve learning. These were read by the instructor, and adjustments to teaching methods and activities were made, as discussed later in the results. A second survey at the end of the semester (Appendix C) asked students to identify what helped them learn through case studies, other students and the instructor. Students indicated their learning styles on both anonymous surveys, and matching of student responses and styles occurred after the semester.
Results

In response to the question asking how the instructor helped students learn, reflective learners were the only students that mentioned preferring assignment feedback from the instructor. Overwhelmingly, regardless of learning style, students liked when the instructor shared personal experiences in the military to help illustrate leadership concepts and theories. In response to the question on what classroom activities helped learning and what classroom activities the students liked, overwhelmingly regardless of learning style, students preferred activities that had a multifaceted approach which included being visual, involved interaction such as whole class discussions (primarily) or groups, and that applied course concepts to videos or movie clips. In one section, students strongly indicated on the mid semester survey that they did not like partnered conversations, so that activity was discontinued. In a separate survey on course content - not intentionally related to their learning styles, students were asked to list sustains and improvements for their instructor. For sustains, the majority of students listed videos and movie clips. For improves, the majority listed “more videos.”

In administering the Inventory of Learning Styles, results show that students are overwhelmingly visual learners (see Figure 1) and each section has its own learning style profile (see Figures 2 and 3). Figure 1 shows the combined learning style profiles of all 49 students by hour on each of the 4 dimensions, highlighting the stronger visual learning style preference. Figure 3 shows the learning style profiles of 2 other sections of PL300, I Hour and J Hour, highlighting the both hours were very similar in their learning styles. Teaching methods remained about the same.
Figure 1.

Learning Style Profile of Students (n=49) across 4 sections of PL300 in Fall 2013

Students as stronger visual learners

Figure 2 (below) shows the learning style profiles of 2 different sections of PL300: Military Leadership, C Hour and D Hour, highlighting that C Hour had students that were more reflective than D Hour. C Hour students were quieter than D Hour students, and that difference may be due to differences in the Active/Reflective dimension.
Learning Style Differences Between 2 Sections of PL300 (C Hour, n=12; D Hour n=11): C Hour was more reserved and quiet while D hour was much more talkative.
Learning Style Differences Between 2 Sections of PL300 (I Hour, n=13; J Hour n=1): Both hours were very similar so teaching methods stayed about the same.
Interestingly, because 20 of 49 participants were engineering majors (41%), I separated out the learning styles of engineering students from students of other majors. (The population was 23 engineering students out of 62 total students, or 37% of the total population.) Figure 4 shows the learning styles of engineering students as compared to non-engineering students, highlighting that engineering students were stronger sensors and sequential learners as compared to students of other disciplines; the figure shows number of students by hour. This supports previous research. In looking at the Visual/Verbal dimension and the Active/Reflective dimension, there were no striking differences between the two subsamples (see Figure 4). This demonstrates that even separating out engineering students, all subsamples and the total sample were stronger visual learners. This supports previous research that shows engineering students are strong visual learners. What is not clear from previous research is if nonengineering students are strong visual learners.

I also took the Inventory of Learning Styles prior to teaching the student population. The results indicated that I was fairly balanced on all four dimensions since each one was between 1 and 3. As a note, I am Generation X, branched Engineer, and have an undergraduate degree in history and political science with a graduate degree in sociology. I have found studying engineers very interesting, and noticing not only the large number of engineering students but the differences between them and students of other majors piqued my interest.
Learning Style Profile of Engineering Students (n=20) in PL300 compared to Students of Other Majors (n=29) across 4 sections in Fall 2013

Students in an engineering major were stronger sensors and sequential learners as compared to students of other disciplines.

**Figure 4.**
Discussion

Students of today’s classroom – and in this project - are Millennials: a generation that is connected by social media, expressive, tolerant and open to change. When the Inventory of Learning Styles (ILS) was created in 1991, it was developed when Generation X (born in 1965 to around 1980 and includes the instructor) was primarily in adulthood. This study shows that the vast majority of students regardless of major are stronger visual learners. This may be a period effect because of major events such as the explosion of social media, digital connectedness, and use of the internet; it may also be a cohort effect because these aforementioned major events have a deep impression on young adults. Because of the strong visual nature of the sections, I emphasized multi-media in the classroom: PowerPoint slides highlighted the main concepts, YouTube videos illustrated applications of theories and concepts; I encouraged students to find videos or movie clips during class for application to course concepts and theories; and each student served as a discussion leader for 15-20 minutes of select lessons after meeting with me for guidance.

Interestingly, the sample consisted of 41% (20 of 49) engineering majors. The results show that engineering students are stronger sensing learners and stronger sequential learners as compared to nonengineering majors. I was uniquely positioned to pay attention to this, being branched as an Engineer in the active Army. Having so many students in PL300: Military Leadership that are in engineering, I tried to emphasize step-by-step processes in discussing leadership theories and concepts, and used charts as applicable. Additionally, if engineering students expressed doubt about taking essay exams, I suggested that if engineering students thought in bullet points, then they should write draft answers in bullet points and make complete sentences – then take the actual bullets away after making the sentences into paragraphs. This
step-by-step process appeared to work as no engineering students stood out as doing poorly on exams, and not one engineer submitted an exam with bullets. Between engineering students and those majoring in other disciplines, there is no striking difference in the Active/Reflective dimension.

I found it helpful to plot each student by name on the Inventory of Learning Styles chart by each hour/section (see Appendix A). This helped paint the picture – so to speak – of who was in the classroom by learning style. Periodic review of each hour’s learning style profile helped remind and guide me on what classroom techniques to use. For example, when one section did not like partnered discussions, that activity was no longer used. Additionally, the learning style profile indicated why one hour (C Hour) was more quite than the other sections – C Hour was more reflective than the other sections. Because I was balanced on all four learning style dimensions, this differed from the sample’s overall learning style profile because students were stronger visual learners. Hence, that explains why I was somewhat surprised to find the vast majority of students were strong visual learners.

**Conclusion**

With students that have come of age in the current era of technology - email, social media, and YouTube - as teachers we should think about how we can help students learn by using tools they have grown up with and have all around them – and us. In the military we have intelligence preparation of the battlefield, and as teachers we can use a tool such as the LSI to form a better picture of who we teach so we can be better prepared to help them learn – and lead. Having an awareness of each section’s learning style profile may be helpful in explaining the dynamics of each section, individual student performance, and how student learning styles differ from our own. We can teach to learning styles when we know the learning styles of our students.
Appendix A

Blank Learning Styles Profile for Each Section/Class Hour

ACT

| 11 | 9 | 7 | 5 | 3 | 1 | 1 | 3 | 5 | 7 | 9 | 11 |

<-- -->

SEN

| 11 | 9 | 7 | 5 | 3 | 1 | 1 | 3 | 5 | 7 | 9 | 11 |

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VIS

| 11 | 9 | 7 | 5 | 3 | 1 | 1 | 3 | 5 | 7 | 9 | 11 |

<-- -->

SEQ

| 11 | 9 | 7 | 5 | 3 | 1 | 1 | 3 | 5 | 7 | 9 | 11 |

<-- -->

I printed this off and put in students’ last names for each section/hour for my use only.
This feedback form specifically asks questions regarding how you learn.

Please circle your learning styles numbers below. If you forgot or don’t have them, please let me know. If you did not complete the survey, please describe your learning style for this class:

<table>
<thead>
<tr>
<th>ACT</th>
<th>11 9 7 5 3 1 1 3 5 7 9 11</th>
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</thead>
</table>
| REF<--|-->

<table>
<thead>
<tr>
<th>SEN</th>
<th>11 9 7 5 3 1 1 3 5 7 9 11</th>
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| INT<--|-->

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<tr>
<th>VIS</th>
<th>11 9 7 5 3 1 1 3 5 7 9 11</th>
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| VRB<--|-->

<table>
<thead>
<tr>
<th>SEQ</th>
<th>11 9 7 5 3 1 1 3 5 7 9 11</th>
</tr>
</thead>
</table>
| GLO<--|-->

1. What helps you learn the best for this class (in or outside of class)?

2. Which classroom activities help you learn the best for this class?

3. What classroom activities do you like (i.e. whole class discussion, partnered conversations, boards, other groups, having discussion leaders)?

4. What classroom activities do you NOT like (i.e. whole class discussion, partnered conversations, boards, other groups, having discussion leaders)?

5. For this class, what would you suggest to improve learning for your particular learning style?

6. What was an ‘Aha!’ moment when something really clicked for you and you learned the concept or idea for this class?

7. Any general comments, questions or feedback you would like to provide:
Appendix C

PL300 – Leadership Theory Block III Feedback Form – Lesson 39

This feedback form specifically asks questions regarding how you learn.

Please circle your learning styles numbers below. If you forgot or don’t have them, please let me know. If you did not complete the survey, please describe your learning style for this class:

ACT
11 9 7 5 3 1 1 3 5 7 9 11

REF
<-- -->

SEN
11 9 7 5 3 1 1 3 5 7 9 11

INT
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VIS
11 9 7 5 3 1 1 3 5 7 9 11

VRB
<-- -->

SEQ
11 9 7 5 3 1 1 3 5 7 9 11

GLO
<-- -->

1. What is your major?

2. Which classmate(s) have you learned the most from in this course? Why?

3. How have Case Studies helped you learn? Please circle which case study you are talking about and provide comments (Bad Voodoo, Gettysburg, Fire at Mann Gulch, French Foreign Legion)

8. How have speakers helped you learn? Please circle which speaker you are talking about and provide comments (Alison Levine, Jim Collins, Administrator Bolden).

9. How has MAJ Edens helped you learn? (personal experiences, photos, assignment feedback, etc.)

10. How has knowing your learning style help you learn (either in this course or another course?)

11. Any general comments, questions or feedback you would like to provide:
Works Cited


Harr, Jean, Gretchen Hall, Paul Schoepp, and David Smith, D. 2002. “How Teachers Teach to Students with Different Learning Styles.” The Clearing House 75(3) 143-143,


