

## Do Academic Origins Influence Perspectives on Teaching?

### Introduction

Factors that influence the process of a teacher's development are only partially understood. Some researchers have shown that students enter preservice education programs believing that good teaching is highly related to their knowledge and abilities to convey that knowledge to others (Powell, 1992; Hollingsworth, 1989; Woodlinger, 1985; Weinstien, 1990). Feiman-Nemser et al (1988), for example, found that prospective elementary teachers begin their introductory education course believing that 'teaching is telling' and that learning is reproducing what the teacher tells you. Although the authors made no attempt to correlate specific disciplines with specific orientations to teaching, their overall findings suggest a possible relationship between disciplinary majors and personal beliefs about teaching.

Yet we know from other research that the types of knowledge to be taught (and learned) do influence the approach a teacher takes. For example, using two of Habermas' (1971) forms of knowledge (instrumental and communicative), Cross (1991) and Cranton (2002) found that the sciences were more concerned with transmitting instrumental knowledge, while disciplines that study human interactions were more often concerned with facilitation of communicative knowledge. This bespeaks differences not only in forms of knowledge, but in forms of teaching. Moreover, Lattuca & Starak (1995) and Braxton (1995) found that disciplines such as biology, physics and chemistry tended to be less receptive to concerns for the improvement of teaching (such as changing from transmission to facilitation) than did the humanities and social sciences. Menges and Austin (2001) noted disciplinary differences in the character of thinking that were fostered among students across disciplines. And in a 1991-1992 survey, the Carnegie Foundation for the Advancement of Teaching found that faculty members held stronger affinity and loyalty to their discipline than to their department or their institution. Presumably the common commitment was established during training in their respective disciplines and continued into their professional lives. (Menges & Austin 2001) Finally, Knight and Trowler (2000) found that faculty members tended to take on the normative values, beliefs and practices of teaching within their discipline. They found, for example, that faculty members believed the teaching practices of their own discipline were not only appropriate to their own discipline but were generally more preferable than were forms of teaching found in other disciplines. It seems that a culture of teaching exists within disciplines and that students are, wittingly or not, enculturated into the norms of teaching and learning that characterize their disciplines. (Pratt & Nesbit 2000)

Thus we know that studying within a discipline, especially to a level commensurate with an undergraduate or graduate degree, is a form of enculturation into ways of thinking, forms of knowledge and normative roles for both teachers and learners. As Bird et al suggest, pre-service teachers enter their B.Ed. programs as "experienced actors in the school that they have attended...from that experience, they have formed beliefs about schooling, teaching, and learning that are likely to vary with their histories and circumstances" (Bird, Anderson, Sullivan, and Swindler, 1993). It would not be surprising, therefore, to expect that students entering teacher training from an undergraduate degree in science, for example, might hold beliefs about teaching that differ from the beliefs of those who enter teacher training fresh out of a degree in the arts or the social sciences. Yet, we have little or no empirical evidence to support or refute this contention; nor do we have evidence to say how those normative beliefs might differ, if indeed they do.

To explore these questions and others, we tracked 356 teachers-in-training as they exited undergraduate degree programs in a variety of specific disciplines and entered a one-year intensive teacher-training program. This article reports on the relationship between disciplinary majors and preservice teachers' beliefs about teaching, learning and knowledge.

## Methodology

### Context

The authors work at a large research university in western Canada. All students entering our secondary teacher education program must hold a bachelor's degree in a discipline that is deemed a 'teachable subject'. Students applying to the Faculty of Education's secondary specialization first complete a Bachelor's Degree. The one year Bachelor of Education program is similar to a post-baccalaureate in the sense that students have already completed their undergraduate training. As such, students entering teacher training have spent several years immersed in the cultures of their respective disciplines and have been exposed to models of teaching and specific norms and conventions related to knowing, learning and teaching. Together, these beliefs, norms, conventions, models and expectations constitute a 'perspective on teaching' (Pratt, et al, 1998) that students bring with them to teacher education.

### Perspectives on Teaching

A perspective on teaching is an inter-related set of beliefs, intentions, and actions linked to knowledge, learning and the role of a teacher. It is a lens through which educators view their work. They may not be aware of their perspective because it is something they look through, rather than at, when teaching. Thus, perspectives on teaching not only provide direction and justification for what one does as a teacher, they also form the epistemic basis for normative roles and expectations regarding acceptable forms of teaching. Whether perspectives are justified or even reflected upon, they nevertheless influence what is adopted, what is adapted, and what is rejected when preservice teachers engage in their teacher education programs (Powell, 1992; Knowles and Charvoz, 1989).

### Assessing Perspectives on Teaching

The *Teaching Perspectives Inventory* (TPI) was used to assess prospective teachers' orientations to teaching (Pratt and Collins 2000). This instrument was developed from the conceptual and empirical work of Pratt (1992; 1998), which yielded five qualitatively different perspectives on teaching. By name, the five perspectives are: Transmission, Apprenticeship, Developmental, Nurturing, and Social Reform. None of these perspectives is inherently good or bad; they are simply five substantively different orientations to knowledge, learning, and to the roles and responsibilities of being an educator. Therefore it is important to remember that each of these perspectives represents a legitimate view of teaching when enacted appropriately: conversely, each perspective also holds the potential for poor teaching. Table 1 summarizes each of the five perspectives.

**Table 1: Five Perspectives on Teaching**

<p><b>Transmission:</b> <i>Effective teaching requires a substantial commitment to the content or subject matter.</i>          Good teaching means having mastery of the subject matter or content. Teachers' primary responsibilities are to represent the content accurately and efficiently. Learner's responsibilities are to learn that content in its authorized or legitimate forms. Good teachers take learners systematically through tasks leading to content mastery: providing clear objectives, adjusting the pace of lecturing, making efficient use of class time, clarifying misunderstandings, answering questions, providing timely feedback, correcting errors, providing reviews, summarizing what has been presented, directing students to appropriate resources, setting high standards for achievement and developing objective means of assessing learning. Good teachers are enthusiastic about their content and convey that enthusiasm to their students. For many learners, good transmission teachers are memorable presenters of their content.</p>
<p><b>Apprenticeship:</b> <i>Effective teaching must be planned and conducted "from the learner's point of view".</i>          Good teachers must understand how their learners think and reason about the content. The primary goal is to help learners develop increasingly complex and sophisticated cognitive structures related to the content. The key to changing those cognitive structures lies in a</p>

<p>combination of two skills: (1) teaching that engages learners with content while also challenging them to move from relatively simple to more complex forms of thinking, and (2) ‘bracketing of professional knowledge’ which allows learners time to construct their own understanding of the content. Questions, problems, cases, and examples form bridges that teachers use to transport learners from simpler ways of thinking and reasoning to new, more complex and sophisticated forms of reasoning. It is crucial, particularly in the initial stages of learning, that teachers adapt their professional knowledge to learners’ levels of understanding and ways of thinking.</p>
<p><b>Developmental:</b> <i>Effective teaching is a process of socializing students into new behavioral norms and professional ways of working.</i> Good teachers are highly skilled practitioners of what they teach. Whether in classrooms or at work sites, they are recognized for their expertise. Teachers must reveal the inner workings of skilled performance and must translate it into accessible language and an ordered set of tasks which usually proceed from simple to complex, allowing for different points of entry depending upon the learner’s capability. Good teachers know what their learners can do on their own and where they need guidance and direction; they engage learners within their ‘zone of development’. As learners mature and become more competent, the teacher’s role changes; they offer less direction and give more responsibility as students progress from dependent learners to independent workers.</p>
<p><b>Nurturing:</b> <i>Effective teaching assumes that long-term, hard, persistent effort to achieve comes from the heart as much as it does from the head.</i> People become motivated and productive learners when the standards for achievement are clear and accompanied by a balance of academic and emotional support. From a Nurturing point of view people are better at learning when they know that: (1) their learning efforts will be supported by both the teacher and their peers; (2) their achievement is acknowledged to be a product of their own effort and ability, rather than the benevolence of a teacher; and (3) their self-esteem and self-concept is not at risk during learning. From a Nurturing perspective, effective teachers do not lower their standards; nor do they excuse learners from doing what is required. Rather, effective teachers help learners set challenging but achievable goals, reinforce effort as well as achievement, and acknowledge individual growth as well as absolute achievement.</p>
<p><b>Social Reform:</b> <i>Effective teaching seeks to change society in substantive ways.</i> From the Social Reform point of view, the object of teaching is the collective rather than the individual. Good teachers awaken students to values and ideologies that are embedded in texts and common practices within their disciplines. Good teachers challenge the status quo and encourage students to consider how learners are positioned and constructed in particular discourses and practices. To do so, they analyze and deconstruct common practices for ways in which such practices perpetuate conditions that are unacceptable. Class discussion is focused less on how knowledge has been created, and more by whom and for what purposes. Texts are interrogated for what is said and what is not said; what is included and what is excluded; who is represented and who is omitted from the dominant discourse. Students are encouraged to take critical stances to give them power to take social action to improve their own lives and the lives of others. Critical deconstruction, though central to this view, is not an end in itself.</p>

Based on Pratt’s initial grounded study of more than 250 teachers and on data from another thirty-five thousand educators who have subsequently taken the TPI, we have reasonable evidence that most educators hold one – and occasionally two – of these perspectives as their dominant view of teaching, with one or two others as ‘back-up’ perspectives. It could not be otherwise, given that perspectives are composed of fundamentally different (and sometimes competing) beliefs about knowledge, learning, and teaching.

### The Teaching Perspectives Inventory

During the 1990s, a group of researchers (Chan, 1994; Pratt, 1998; Pratt and Collins, 2000) operationalized the themes and concepts uncovered in Pratt’s initial grounded study of more than 250 teachers in Canada, the

United States, China, Singapore, and Hong Kong. Qualitative themes were converted into testable items, which were eventually refined into a forty-five item instrument for self-assessing one's perspective on teaching (Pratt and Collins, 1998).

More than 35,000 respondents from a wide range of professions and about a hundred different countries have now completed the TPI on-line ([www.TeachingPerspectives.com](http://www.TeachingPerspectives.com)). Analyses of their responses repeatedly confirm that the five scales have factorial integrity and demonstrate both test-retest and inter-item reliability (Pratt and Collins, 2000).

The TPI consists of 45 items divided into three sections: beliefs, actions and intentions. Each of these three sections contains fifteen statements that participants are asked to rate on a 5-point scale. The TPI yields five global perspective scores – one for each of the five teaching perspectives, and three sub-scores – beliefs, intentions and actions – for each of the perspectives.

Scoring on any given statement ranges from 1 to 5 (strongly agree to strongly disagree) and global perspective scores can range from 9 to 45 points. Table 2 shows examples of the TPI items. Through its successive stages of refinement, the TPI showed early internal consistency (Cronbach's  $\alpha$ ) averaging about .80 with smaller and homogeneous samples (Pratt & Collins, 1998) and about .71 with the current large and heterogeneous groups. Test-retest reliabilities were also calculated for a 182-person sub-sample of those who have taken the TPI more than once. Of the 35,000 respondents, approximately 3% have taken it a second time – and sometimes a third or fourth. Test-retest reliabilities for each of the perspectives were Transmission=0.68, Apprenticeship=.68, Developmental=0.62, Nurturing=0.76, Social Reform=0.74 with an overall reliability of 0.73.

**Table 2: Teaching Perspectives Inventory Example Questions**

<b>Example Questions in the Beliefs Section which focuses on 'what do you believe about instructing or teaching?'</b>					
	Stongly Disagree   Disagree   Neutral   Agree   Strongly Agree				
	SD	D	N	A	SA
3. Most of all, learning depends on what one already knows.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The best learning comes from working alongside good practitioners.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Example Questions in Intentions Section which focuses on 'what do you try to accomplish in your instruction or teaching?'</b>					
	Stongly Disagree   Disagree   Neutral   Agree   Strongly Agree				
	SD	D	N	A	SA
24. I expect people to enhance their self-esteem through my teaching.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. I expect people to be committed to changing our society.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Example Questions in Actions Section which focuses on ‘what do you when instructing or teaching?’**

	SD	D	N	A	SA
<b>31. I cover the required content accurately and in the allotted time.</b>	<input type="radio"/>				
<b>38. I challenge familiar ways of understanding the subject matter.</b>	<input type="radio"/>				

Once a person’s global perspective scores are calculated, each score is compared against the mean of all five. A perspective is considered “dominant” if its score is one or more standard deviations above the mean of the five (itself included). Therefore, dominance is an ipsative characteristic calculated "within participants" rather than normative (between participants) and is relative only to each individual’s overall pattern of answers on the Inventory rather than to some absolute, arbitrary, or normative value.

Participants and Selection

We engaged the support of the Faculty of Education’s Administration Office in requesting instructors to make a one-hour time slot available for us to gather information from students. (Academic jurisdictions that would be called “Schools” or “Colleges” elsewhere are termed “Faculties” at our university.) During this hour, students completed the on-line version of the TPI together with brief demographic and background information. All instructors but one invited us to their course sections, thus yielding a study group of 356 out of the year’s total enrolment of 378 students seeking secondary school certification. Students seeking primary or middle-school certification completed the TPI but were not included as part of this study because disciplinary major plays a less important role in their program of studies and future careers.

Students enrolled in the secondary specialization complete a twelve month Bachelor of Education program which prepares them to teach one or two subject areas in grades seven through twelve (Jarvis-Selinger, 2002). Students first complete one term of coursework (September to December) and then move into their practicum experiences (January to April). During the final four months of their program, students return to the university (May to August) to complete their final courses.

Disciplinary Majors

Students enter the teacher education program at our university with a variety of academic backgrounds and experiences, and there is no single best way to classify the wide range of their previous disciplinary majors. However, the Faculty of Education itself maintains a 16-category system of secondary school “specializations” that designates which subject areas students are qualified to teach – given their previous disciplinary majors and minors. For this study, these specializations were re-grouped to achieve more evenly balanced numbers and fewer overall categories that better reflected the broader conceptual differences among people’s disciplinary majors. A moment’s attention to the two- or three-letter abbreviations preceding each of the eight categories and their respective numbers will simplify interpreting upcoming tables and figures.

**Mathematics/Sciences (MS=51)** included students in

Mathematics (n=18)

Chemistry (n=22)

Physics (n=9)

Science (n=2)

- Life Sciences (LS=64)** included students in  
 Biology (n=57)  
 Environmental Science (n=7)
- Social Studies (SS=60)** included students in  
 Geography (n=14)  
 History (n=46)
- Language Arts (LA=58)** included students in  
 English (n=46)  
 French (n=12)
- Home and Technical Sciences (HTS=37)** included students in  
 Home Economics (n=7)  
 Technical Education (n=30)
- Expressive Arts (EA= 15)** included students in  
 Art (n=3)  
 Music (n=12)
- Business (BS=22)** is a single-discipline category
- Physical Education (PE=49)** is a single-discipline category

## Results

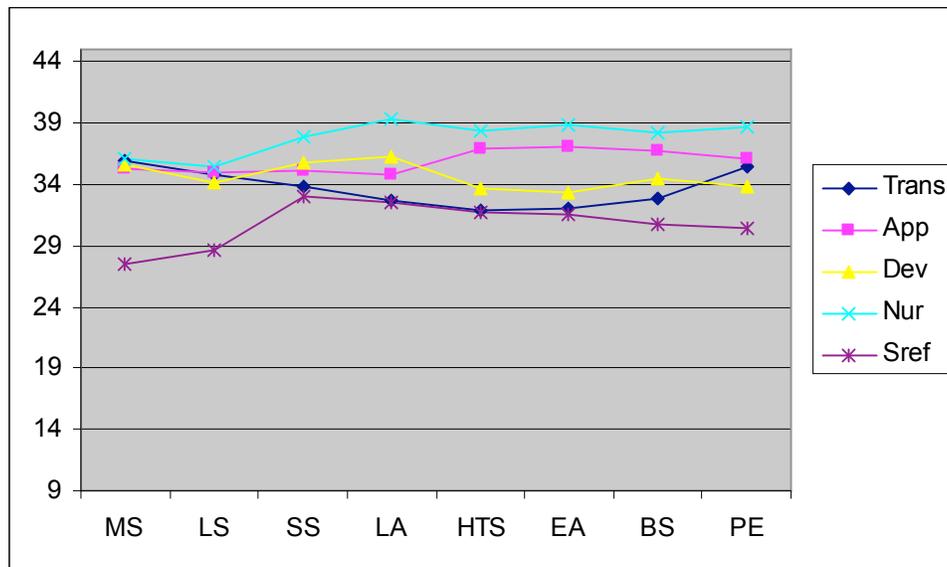
### Teaching Perspectives

Means and standard deviations were calculated across all eight disciplinary majors on each of the five perspectives on teaching (see Table 3). One-way analyses of variance with Tukey's paired comparisons show that disciplinary majors varied in systematic ways for all five perspectives. Figure 1 plots the means for the five perspectives across the eight different disciplinary majors. Nurturing scores are generally high – in the upper 30s -- for all disciplinary majors while Social Reform scores are generally low – in the upper 20s. It is important to examine not only which perspectives are high or low, but also which of the groups are high and which are low on *each* perspective.

**Table 3: Means and Standard Deviations for Eight Disciplinary Majors on Five Teaching Perspectives**

	N	Transmission		Apprenticeship		Developmental		Nurturing		Social Reform	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Math/Sciences	51	<b><i>35.98</i></b>	3.69	35.25	3.43	35.57	2.87	<b><i>36.06</i></b>	5.30	<b><i>27.43</i></b>	5.66
Life Sciences	64	<b><i>34.81</i></b>	3.69	34.88	3.37	<b><i>34.08</i></b>	3.59	<b><i>35.47</i></b>	4.12	<b><i>28.56</i></b>	4.23
Social Studies	60	33.83	3.41	35.05	3.23	35.83	3.42	37.92	3.50	<b><i>32.97</i></b>	5.19
Language Arts	58	<b><i>32.72</i></b>	3.40	34.86	3.25	<b><i>36.21</i></b>	3.22	<b><i>39.28</i></b>	3.11	<b><i>32.45</i></b>	4.79
Home/Tech Sciences	37	<b><i>31.89</i></b>	4.84	36.84	3.91	<b><i>33.68</i></b>	3.91	38.38	2.91	<b><i>31.76</i></b>	4.86
Expressive	15	<b><i>32.00</i></b>	4.55	37.00	3.36	33.33	2.26	38.80	4.21	31.60	4.87
Business	22	<b><i>32.82</i></b>	3.55	36.68	2.80	34.50	3.02	38.14	3.99	30.77	4.56
Physical Education	49	<b><i>35.47</i></b>	3.62	36.06	3.18	<b><i>33.73</i></b>	3.99	38.63	3.82	30.43	5.22
Total	356	34.02	3.97	35.53	3.39	34.84	3.54	37.63	4.12	30.63	5.29

\* Note: Boldface italics indicate pairs of disciplinary majors different from each other at the .05 level

**Figure 1: Means for Eight Disciplinary Majors on Five Teaching Perspectives**

#### Perspective Differences across Disciplines

Preservice teachers in both life sciences (LS) and math/sciences (MS) scored significantly higher on the Transmission perspective than did people in language arts (LA), expressive arts (EA), or home and technical sciences (HTS). As well, people preparing to become physical education instructors (PE) also scored high on Transmission, equally as high as prospective math/science teachers. Conversely, there were no overall group differences in terms of Apprenticeship. On the Developmental perspective, people's scores in language arts (LA) and social studies (SS) were significantly higher than in the life sciences, home and technical sciences, physical education, and the expressive arts.

Prospective teachers in language arts, home and technical sciences, and physical education scored significantly higher on Nurturing than those preparing to teach in mathematics, sciences or the life sciences. Gender differences were also noted: women's Nurturing scores showed small but significantly higher averages than men's scores. Finally, Social Reform showed the largest inter-group differences of all. Students preparing to teach in social studies, language arts and home and technical sciences scored significantly higher on Social Reform than those in the life sciences or in mathematics/science.

Disciplinary majors where the content is well-defined and where there can be an assumption of single 'right' and 'wrong' answers (math/science, life sciences, etc) are represented by students who are Transmission-oriented and who see their task as one of delivering the content in its authorized forms. In contrast, language arts and social studies are dominated by pre-service teachers who see their role from a more Developmental perspective, that is, engendering deeper understanding and promoting critical thinking skills.

Aspiring teachers with a dominant Nurturing Perspective are encountered more often among those preparing to teach language arts, physical education or home and technical sciences while math/science and life science instructors show less tendency toward Nurturing. Similarly, language arts, social studies, and home and technical science pre-service teachers show a greater orientation toward social reform views, whereas people in the math/sciences rarely view their role as one of reform. Interestingly, the absence of any systematic

differences in Apprenticeship together with its generally high overall mean may suggest that teaching in any of the disciplinary majors can profit by well structured apprenticeship experiences such as job internships, career days, or intelligently crafted work projects.

These differences of three to four points among different disciplinary majors and three-quarters to one-and-a-half points for gender differences are statistically significant. Recall, however, that people's scores on the five TPI scales can theoretically range from 9 to 45, a 36-point range. In actuality, their observed ranges are from about 20 to 44 (except for Social Reform), or about a 25-point range. Thus, the effective differences among groups amounts to about 3 or 4 points out of 25, or 12 to 16 percent of the range of observed scores. Overall, these differences in people's disciplinary majors account for about ten percent of the overall variance in teaching perspective scores, with eta-squared coefficients averaging about .10. In contrast, eta-squared coefficients for gender average .09 or about one percent of the variance; thus disciplinary background appears to account for about 11 times more overall variance than does gender.

The simple interpretation is that people's views about themselves in their roles as prospective teachers are linked significantly to their previous disciplinary majors and to their gender, but less strongly. But the two factors together still leave about 90 percent of the variance in teaching perspective scores unaccounted for. How else might this still-unexplained variance be investigated?

#### Classifying and Predicting

A different and complementary approach is to use discriminant analysis to test whether people's profiles on the five TPI scales can be used to classify and predict which disciplinary major they might belong to. Additionally, this procedure examines whether all five of the TPI scales are really necessary and how much each contributes to clarifying internal differences among the eight groups.

Stepwise discriminant analysis showed that all five TPI scales are important in distinguishing one disciplinary major from another, but that they contribute somewhat unequal weights in so doing.

Table 4 shows that Social Reform was initially the single best discriminator among the eight groups (Wilks lambda=.86), followed (in sequence) by Transmission (.75), Apprenticeship (.66), Developmental (.58), and Nurturing (.52). Furthermore, five canonical variables were required to maximize the discriminations among the groups and these (rotated) variables were highly correlated with the original five TPI scales. These canonical variables re-ordered the discriminating power somewhat, but still retained all five of the scales.

**Table 4: Contribution of Each TPI Scale to Discrimination Among Disciplinary Groups**

	Percent of Variance Accounted	Entry Sequence	Correlation with its Canonical Variable
Transmission	28.6	2	.96
Social Reform	19.5	1	.96
Developmental	17.9	4	.95
Nurturing	17.2	5	.96
Apprenticeship	16.7	3	.96

The table shows several important things about the linkages between the five perspectives on teaching and people's disciplinary backgrounds. First, the figures in the percent of variance column confirm that all five perspectives are required to discriminate adequately among groups, and all five make sizable contributions to the overall discriminating power among the different groups – Transmission the most at 28.6 percent and Apprenticeship the least at 16.7 percent, but still sizable. The entry sequence column shows that when people's perspective scores are examined serially one-by-one, their apparent ability to discriminate one group from another is different than when they are examined collectively. Social Reform initially appears to separate the groups most clearly, but in later stages of the analysis, Transmission does the best job; Social Reform moves into second place, followed by Developmental, Nurturing, and Apprenticeship. Finally, the correlation column indicates that the canonical variables (mathematical abstractions which most clearly discriminate among the groups) are tightly correlated with the five perspectives scores themselves.

Discriminant analysis also allows a classification/prediction summary on the basis of the overall TPI profile of each group. Since it is known which prospective teachers actually belonged to which disciplinary group, the classification summary tests how accurately each individual's group membership can be inferred from their TPI profile alone. Table 5 presents these results in percentage terms.

**Table 5: Classification/Prediction of Disciplinary Background.**

Actual Group Membership	Predicted Group Membership							
	MS	LS	SS	LA	HT	EA	BS	PE
Math/Science	<u>39.2%</u>	23.5%	9.8%	9.8%	3.9%	0%	0%	13.7%
Life Sciences	25.0	<u>31.9</u>	14.1	6.3	4.7	0	0	10.9
Social Studies	10.0	11.7	<u>36.7</u>	25.0	3.3	0	0	13.3
Language Arts	10.3	10.3	17.2	<u>43.1</u>	8.6	0	0	10.3
Home& Technical	0	10.8	13.5	16.2	<u>45.9</u>	0	0	33.3
Expressive Arts	0	0	6.7	0	60.0	<u>0</u>	0	22.7
Business	4.5	13.6	22.7	13.6	22.7	0	<u>0</u>	22.7
Physical Education	8.2	22.4	10.2	16.3	14.3	0	0	<u>28.6</u>

The table further shows that based on their TPI profiles, people with a math/science background were most likely to be classified correctly (39.2%), but that some math/science teachers (23.5%) looked like they might have life science backgrounds instead. Similarly, most preservice teachers with social studies backgrounds were correctly classified (36.7%), but several (25%) had profiles rather like people in language arts. The diagonals (underlined) show the percentage of people correctly classified in each disciplinary group.

Overall, 123 of these 356 prospective teachers (34.6%) could be correctly identified on the basis of their five TPI profile scores. While this percentage may seem low, it is considerably higher than the 1.6% figure that

would be obtained by chance alone, and suggests that people's profiles reveal substantial information about their academic backgrounds and the topic areas they are preparing to teach.

As well, the mis-classifications are similarly instructive. No one in business or the expressive arts was correctly classified; most people with expressive arts backgrounds appeared to have home-and-technical backgrounds (60%). Some people with business backgrounds had profiles similar to those in social studies (22.7%), home-and-technical (22.7%), or physical education (22.7%). This indicates that prospective teachers in business and expressive arts are considerably more heterogeneous in their TPI profiles than are math/science, social studies and language arts majors and are most often confounded with pre-teachers who have home and technical science backgrounds.

This finding suggests that business and expressive arts undergraduate programs may encompass quite different learning experiences than do other majors. Similarly, one could speculate that there is less coherence within business or expressive arts programs than with language arts or math/sciences. It may also be that students in these undergraduate programs are more pluralistic in their teaching perspectives. Thus, while there may be many reasons why these students were mis-classified, it is beyond these data to be sure why this happens. Interestingly, for the business majors, this category of students was not a combination of various undergraduate programs (see the categorization of students in the bulleted list above). Therefore in terms of teachable majors, business students are homogeneous in terms of their declared major but are predicted as heterogeneous in the discriminant analysis.

### **Implications**

What do these findings suggest to university programs that prepare students for teaching careers in secondary education? And what might our findings suggest for further research? Our university's current program of teacher education is typical of many others that espouse a 'student-centered', constructivist focus with a corresponding de-emphasis on transmission of content. This orientation is consistent with the TPI's Developmental Perspective and, to a lesser extent, the Nurturing Perspective. As such, our study provides a measure of 'fit' between the dominant ethos of teacher preparation programs, such as our own, and the orientations to knowledge, learning and teaching that students bring with them from their disciplinary training.

Of course the unstated assumption in the Faculty of Education is that pre-service teachers should be more aligned with the dominant ethos and homogeneous in their teaching perspective. This study's findings support the notion that students begin teacher education with a variety of teaching perspectives which are influenced by their history as a learner. The disequilibrium occurs where students are uncertain whether to align themselves with the dominant teaching ethos of their disciplinary majors or that of the faculty of education. In other words, should preservice teachers maintain the teaching perspective of their content area (i.e. math/sciences connection with the Transmission perspective) or take on a potentially new way of understanding teaching (i.e. a 'universal perspective' like student-centeredness espoused by the faculty of education). Given this, what is the implication for those who choose not to 'align' with the faculty of education's perspective? What about those who come into the program in agreement with this espoused view?

Further research is needed to investigate the challenges students may face in teacher education given the fact that they begin with different ideas of 'good teaching'. This research should focus on the students' voice in personally understanding how their perspectives were or were not challenged throughout teacher preparation and into their teaching practice. As well, understanding why certain undergraduate majors are mis-classified by the teaching perspective inventory warranted further examination.

Faculties of education have a weighty responsibility to monitor and evaluate the performance of preservice teachers and to insure that they are mindful of local expectations and cultural views of their new career choice. All too often however, faculties have a single (and sometimes myopic) view of how teachers “should teach”. It is critical for faculties to keep all five teaching perspectives in the foreground of their early supervision and evaluation practices to ensure a pluralism of effectiveness and to recognize that there are many ways to be an excellent teacher – irrespective of teaching topic and content.

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