Evaluating the Differential Impact of Teaching Assistant Training Programs on International Graduate Student Teaching

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Abstract

In this study, we compared the effects of a traditional teaching assistant (TA) training program to those of a specialized program, with a substantial inter-cultural component, for international graduate students. We expected both programs to result in an increase in international graduate students' teaching self-efficacy, observed teaching effectiveness, and adoption of student-centred approaches to teaching, and we anticipated a greater degree of change for the participants in the specialized program. We found the expected increases for graduate students in both programs, with a larger increase in observed teaching effectiveness for students in the specialized program. We discuss the implications of tailoring TA training programs for international graduate students and of providing time and learning activities for the development of student-centred teaching and reflective practice.

Résumé

Dans cette étude, nous comparons les répercussions d'un programme traditionnel de formation d'assistants en enseignement avec celles d'un programme spécialisé pour étudiants internationaux des cycles supérieurs doté d'une composante interculturelle importante. Nous nous attendions à ce que les deux programmes améliorent l'auto-efficacité de l'enseignement chez les étudiants internationaux. Par l'observation de l'efficacité de l'enseignement et l'adoption d'approches d'enseignement centrées sur l'apprenant, nous anticipions une plus grande évolution chez les participants du programme spécialisé. Nous avons constaté les améliorations attendues parmi les étudiants des cycles supérieurs des deux programmes, ainsi qu'une amélioration plus importante de l'efficacité de l'enseignement chez les étudiants du programme spécialisé. Dans le présent article, nous discutons

des enjeux liés à l'adaptation des programmes de formation aux étudiants internationaux des cycles supérieurs, ainsi que de l'importance d'offrir du temps et des activités d'apprentissage pour le perfectionnement de l'enseignement centré sur l'apprenant et la pratique réflexive.

Introduction

Graduate student teaching assistants (TAs) play a vital role in undergraduate teaching in higher education in North America through their work as graders, tutorial leaders, and lab demonstrators. International graduate students make up a significant portion of new teaching assistants at Canadian universities, particularly in the STEM disciplines (LeGros & Faez, 2012). International teaching assistants (ITAs) have unique training needs when they begin to teach at Canadian universities, because they are transitioning to a new cultural and social context at the same time as they are learning to teach for the first time. Teaching and future faculty development programs have proliferated across Canada in response to the professional development needs of graduate students, and researchers increasingly are recognizing the need to examine the impact of such programs (Boman, 2014; Cassidy, Dee, Lam, Welsh, & Fox, 2014; Dimitrov, Dawson, Olsen, & Meadows, 2014; Dimitrov et al., 2013; Kenny, Watson, & Watton, 2014; Korpan, 2011; Rolheiser et al., 2013). A number of Canadian universities offer both general teaching development programs and some form of specialized training for ITAs. We believe that in comparison to a traditional training program, a training program designed specifically for ITAs likely has a stronger impact on teaching self-efficacy, the acquisition of effective teaching behaviours, and the use of student-centred approaches to teaching. Thus, the goal of this research is to assess the relative impact of the specialized and traditional TA programming.

Background

ITA training needs. New ITAs are preparing to teach in a second language and in an academic environment where norms and expectations for teacher behaviour and communication style are often very different from expectations in their home cultures (Biggs & Watkins, 1999; Brown, 2008; Crabtree & Sapp, 2004; Eland, 2001; Gorsuch, 2003; Hoekje & Williams, 1992; McCalman, 2007). Through training and mentorship, they need to discover key cultural differences in teaching communication that influence their interactions with students and faculty, such as cultural differences in power distance (Eland, 2001; Hofstede, 1991), communication and reasoning styles (Dimitrov, 2009), and teacher- versus student-centred learning. For example, the majority of international graduate students come from high power distance cultures such as Iran, India, Egypt, or China—cultures in which higher education is primarily teacher-centred (Crabtree & Sapp, 2004; Eland, 2001; Watkins & Biggs, 2001). In these cultures, the difference between the relative status of the instructor and the student is large. As a result, during their undergraduate education, ITAs may have rarely seen students interrupt the professor to ask questions (Bates Holland, 2008) or disagree with the professor during class discussion (Knight, 1999; Smith, 1999). In the cultures of most ITAs, students cannot challenge a grade (Gorsuch, 2003). In contrast, at Canadian universities, students are more likely to interrupt their instructors to ask for clarification, challenge instructors' ideas, and communicate with them in a relatively informal style.

To address the learning needs of ITAs, we have designed a TA development program in which ITAs experiment with new teaching techniques in a "sheltered" environment with other international graduate students (Smollett, Arakawa, & Keefer 2012) and have the chance to ask questions that explore expectations and potential misunderstandings in Canadian academic culture. The goals of the program are (a) to promote intercultural teaching competence among ITAs (Dimitrov et al., 2014) and (b) to help participants learn about effective teaching through an intercultural communication lens.

Previous research on TA development program impact. Although research on the impact of TA training programs is slowly growing, the majority of studies have relied on small samples (e.g., Chadha, 2015; Hardré & Burris, 2010; Step-Greany, 2004) and self-report measures. In order to get more nuanced descriptions of the TA development process, recent studies have started to incorporate data from multiple sources, including: feedback on TA teaching from instructors, students, and peer trainers (Rolheiser et al., 2013); changes in student grades after TA training (Hughes, 2014); control groups; and changes in the teaching philosophies of graduate students as a result of training (White, Syncox, Heppleston, Isaac, & Alters, 2012). In this study, we have combined self-report survey data with observer ratings of teaching by graduate student instructors, as well as qualitative data from focus-group interviews several months after program completion. This multi-method approach allows us to examine how TAs grow as instructors as a result of training and how they apply new teaching approaches in their own classrooms. Three key areas of the teaching development research literature informed our study: (a) teaching self-efficacy, (b) low-inference teacher behaviours, and (c) student-centred teaching.

Teaching self-efficacy. Teaching self-efficacy is one's belief in one's own ability to successfully achieve learning outcomes (Prieto & Meyers, 1999). Developing a sense of self-efficacy related to teaching is an important developmental goal for novice instructors because teachers with a high sense of self-efficacy are more likely to create a classroom environment that fosters achievement than those with low self-efficacy (Bandura, 1993). Grounded in Bandura's (1993) social-cognitive theory of efficacy expectations, self-efficacy theory suggests that effectively performing behaviours that are important to success will lead to increases in an individual's sense of self-efficacy. High self-efficacy beliefs lead to teachers engaging in more effective teaching practices (Boman, 2008; Gordon & Debus, 2002) and having increased levels of enthusiasm, organization, and planning (Allinder, 1994). Furthermore, self-efficacy influences both student achievement and student engagement (Goddard, Hoy, & Hoy, 2000).

New ITAs are likely to have relatively low teaching self-efficacy, as they are unfamiliar with the context of teaching in Canada. Given that our traditional TA training program has been found to lead to increased teacher self-efficacy (Boman, 2013), one of the questions we wanted to explore was whether a specialized ITA training program using an intercultural approach would help facilitate the development of teaching self-efficacy more than the traditional TA training program. To achieve this goal, we administered a self-report measure of teaching self-efficacy developed by Boman (2008), before and after the programs studied.

Low-inference teacher behaviours. Although self-report measures such as the Teaching Assistant Self-Efficacy Scale (Boman, 2008) provide key insights into instructor perspectives, they do not address what teachers actually do in the classroom. Thus, observations of teaching effectiveness are also critical to assessing the impact of teaching development programs. Research by Murray (e.g., 1997) examined how instructors effectively

facilitate learning among undergraduates and demonstrated that low-inference teacher behaviours (such as an instructor speaking expressively) are tied to student academic performance and predictive of student evaluations of teaching (see Murray [2007] for a review). These low-inference behaviours are concrete actions that can accurately be measured by observers in the classroom (Murray, 1983). Studies have also found that behaviours associated with effective teaching can be increased as the result of training programs geared to novice domestic and international TAs (e.g., Boman, 2013; LeGros & Faez, 2012). Of particular importance in these studies is that the researchers examined what teachers actually do in the classroom and not just self-reports of their behaviours. Boman (2013) found increases in observer ratings of teaching effectiveness among Canadian and international graduate students in our traditional TA training program. We sought to extend her study by comparing observer ratings of ITA teaching in our general and specialized programs for new TAs.

Student-centred teaching. Research has shown that teachers who participate in training can become more student-centred in their orientation (Chadha, 2015; Ho, 1998). Because of the growing emphasis on student-centred approaches to teaching in the university classroom (Dawson, Mighty, & Britnell, 2010; Gibbs & Coffey, 2004; Stes, Coertjens, & Van Petegem, 2010), TA programs have increasingly included a focus on student engagement, inquiry-based learning, and the use of active learning techniques (Hughes, 2014). These techniques are considered key to helping students develop a "deep approach" to learning, in which they apply their knowledge to tasks rather than take a surface or rote approach (Trigwell, Prosser, & Waterhouse, 1999). Entwistle (2010) suggested that a deep approach to learning is essential for meaningful learning at the post-secondary level of education. Newer TAs, however, tend to focus on surviving these early teaching experiences and, therefore, are more likely to have self-oriented goals rather than student-centred approaches to learning (Ferzli et al., 2012; Nyquist & Sprague, 1998; Sprague & Nyquist, 1991). In particular, new ITAs are likely to start their teaching journey on the "teacher-centred" end of the spectrum because the majority of ITAs received their undergraduate education in cultures where teacher-centred approaches are dominant (Ryan & Carroll, 2005; Watkins & Biggs, 2001). It is likely that these new ITAs have not experienced a student-centred classroom as learners and have rarely seen instructors facilitate active learning in a classroom; thus, they have difficulty envisioning their role in a student-centred classroom until they see examples of it during TA training programs. In this study, we used focus-group interviews conducted four to seven months after program completion to gain insight into the ways in which new TAs had started to use student-centred approaches learned in the programs. Focus-group interviews allowed TAs to share concrete examples and describe the learning activities they had experimented with in their labs and tutorials.

The Current Study

We sought to extend previous research that explored the impact of TA training programs on teaching self-efficacy and effectiveness by comparing two TA training programs: the general TA Training Program designed for all TAs (TATP; 20 hours) and the Teaching in the Canadian Classroom program, designed specifically for ITAs (TCC; 20 hours).

TATP. TATP is a general, intensive workshop designed for new TAs that takes place over two and a half days. The program consists of eight workshop modules, focusing on effective lesson and feedback strategies, marking practices, active learning, discussion facilitation and science teaching techniques, case studies of common TA teaching situa-

tions, and a ninety-minute session on facilitating learning in an intercultural classroom. During the workshop, new TAs experience a wide variety of student-centered, participatory learning activities. They also facilitate two 10-minute microteaching sessions that are digitally recorded and receive feedback on their lesson from a small group of four to five peers. Each year, 250 to 300 TAs complete the program over eight sessions. On average, 50% of TATP participants are ITAs, many of whom are new to Canada.

TCC. We offer TCC specifically for ITAs and run the program over three to four weeks. The outcomes and learning activities of TCC are very similar to those of TATP, but participants learn about active learning, giving feedback, and facilitating discussions through an intercultural communication lens. TCC is unique because it combines elements of traditional teaching development programs with modules on cultural differences in feedback and communication styles that may impact ITAs' relationships with students, supervisors, and university staff. When TCC participants receive feedback during microteaching, facilitators comment on their ability to communicate and facilitate learning effectively across cultures. As with TATP, TCC participants experience a variety of active learning activities and complete two 10-minute video-recorded microteaching sessions. The 90-minute session provided during TATP on facilitating learning in an intercultural classroom is also part of the TCC program (see Dawson, Dimitrov, Meadows, and Olsen [2013] for a detailed outline of topics and learning activities in the two programs).

Research question. Previous research has demonstrated that both TATP and TCC have a positive impact on the teaching self-efficacy and teaching effectiveness of ITAs (Boman, 2008, 2013; LeGros 2010; LeGros & Faez, 2012), but no one to our knowledge has compared the relative impact of general and specific programs for ITAs to date. We believe that TCC participants will demonstrate more substantive gains in their teaching self-efficacy and effectiveness as well as have a more student-centred approach to teaching than their international counterparts in TATP because they will have a better understanding of the norms and expectations of Canadian teaching culture. Our hypotheses are:

- Teaching self-efficacy will increase significantly from pre- to post-program for TAs in both programs, but this increase will be greater in the program explicitly designed for ITAs (TCC) than in the traditional training program (TATP).
- Observer-rated effective teaching behaviours will increase from pre- to post-program for TAs in both programs, but the increase will be greater in TCC than in TATP.
- TAs' understanding of the importance of student-centred teaching will increase in both programs, but the increase will be more substantive for participants in TCC than in TATP.

Although we did not anticipate a differential impact of the TATP program on domestic and international graduate students' teaching self-efficacy and observer-rated teaching behaviours (Boman, 2013), we examined the groups separately to have the TATP Canadian TAs as a comparison group.

Method

Participants

Graduate students enrolled in TATP and TCC were invited to participate in the present research on the first day of the programs as part of a larger research study (Dawson et al.,

2013). Interested participants were given a questionnaire package on the first and last days of training and consented to the analysis of their 10-minute, digitally recorded microteaching segments. Two hundred and four participants took part in the research. Twenty-three of these graduate students participated in focus groups four to seven months after the conclusion of the programs (see Table 1 for participant demographic information).

Measures

Teaching Assistant Self-Efficacy Scale. Participants completed the Teaching Assistant Self-Efficacy Scale (TSE) to determine their level of confidence in performing behaviours related to their role as TAs (Boman, 2008, 2013). The TSE is comprised of one item to assess overall confidence in carrying out their teaching responsibilities, and three subscales:

- *Interaction:* confidence in lecturing and interacting with students (15 items);
- *Written:* confidence in teaching preparation and course-related writing (12 items);
- *Improvement:* confidence in improving teaching (4 items).

TAs rated the items on a five-point scale (1 = *Not Confident* to 5 = *Completely Confident*). Cronbach's alphas for the three subscales at times 1 and 2 ranged from .77 to .92.

Observations of teaching effectiveness. Participants completed two 10-minute, digitally recorded microteaching segments. The recordings were evaluated by two coders using a 19-item version of Murray's (1983) abbreviated Teacher Behaviour Inventory (TBI-A; Boman, 2008). Due to low frequency of occurrence and low reliabilities, six items were not included in the final analyses.

The frequency of the instructors' teaching behaviours during microteaching were rated by the coders on a five-point scale (1 = *Almost Never* to 5 = *Almost Always*). A final item, "Individual is generally effective as an instructor," was evaluated by the coders on a 1 (*Strongly Disagree*) to 7 (*Strongly Agree*) scale. For 40 randomly selected microteaching segments (10.6%), interrater reliability ranged from $r = .65$ to $r = .90$. A principal components analysis found two components with moderate to good Cronbach's alphas (range .58 to.71): *Interaction* (instructor interactions with her/his students, 6 items) and *Organization* (instructor organization of teaching materials, 6 items).

Data Analysis

To control for possible inflation of type 1 error due to multiple comparisons, we employed a Bonferroni correction. For analyses involving the TSE and TBI-A, the significance levels were set at .0125 (.05/4) and .0167 (.05/3), respectively. Findings that do not meet this conservative significance level but would meet the standard level ($p < .05$) we report as trends to highlight areas that warrant further investigation.

A series of 3 x 2 split-plot ANOVAs were conducted to examine Group [Canadian TATP participants (TATP-Can), international TATP participants (TATP-Int), and TCC participants] by Timing (Times 1 and 2) differences on the dependent variables [TA self-efficacy (TSE) and effective teaching behaviours (TBI-A)]. Times 1 and 2 reflect the pre- and post-program administration of the surveys for the analyses involving the TSE, whereas for the TBI-A analysis, they reflect the microteaching segments early and later in the program.

Table 1.
Demographic Characteristics of Questionnaire, Microteaching, and Focus Group Participants[1]

	TATP International *n* = 64	TATP Canadian *n* = 85	TCC *n* = 55
Questionnaire and Microteaching Participants			
Age[2]	27.4 (5.71)	25.2 (6.01)	28.4 (5.62)
Gender			
Female	26 (40.6)	44 (51.8)	21 (38.2)
Male	38 (59.4)	41 (48.2)	34 (61.8)
Degree			
Master's	39 (60.9)	66 (77.6)	28 (51.8)
PhD	25 (39.1)	19 (22.3)	26 (48.1)
Terms as a TA			
0	39 (61.9)	59 (69.4)	28 (50.9)
1–2	11 (17.5)	13 (15.3)	18 (32.7)
3 or more	13 (20.6)	13 (15.3)	9 (16.3)
Time in Canada			
1 year or less	47 (73.4)	0 (0)	50 (89.3)
2 years or more	17 (26.6)	84 (100)	6 (10.7)
Participated in TA Training Programming			
TA Conference on Teaching	17 (26.6)	15 (17.6)	12 (21.4)
Departmental TA Orientation	16 (25.0)	17 (20.0)	11 (19.6)
TSC Workshops	7 (10.9)	11 (12.9)	13 (23.2)
Course on Teaching	4 (6.2)	1 (1.2)	1 (1.8)
Other TA Training Workshop	2 (3.1)	3 (3.5)	4 (7.3)
Other	5 (7.8)	7 (8.2)	10 (18.2)
Trained as a School Teacher			
Yes	7 (11.5)	5 (5.9)	13 (23.2)
No	54 (88.5)	80 (94.1)	43 (76.8)
Received Pedagogical Instruction			
Yes	12 (20.3)	11 (12.9)	11 (20.0)
No	47 (79.7)	74 (87.1)	44 (80.0)
Taught at Undergraduate Level			
Yes	23 (37.7)	14 (16.7)	20 (35.7)
No	38 (62.3)	70 (83.3)	36 (64.3)

	TATP International $n = 9$	TATP Canadian $n = 4$	TCC $n = 10$
	Focus Group Participants		
Age[2]	27 (2.67)	25.3 (2.06)	28.1 (6.03)
Gender			
Female	4 (50)	1 (25)	6 (60)
Male	4 (50)	3 (75)	4 (40)
Degree			
Master's	3 (33.3)	2 (50)	8 (80)
PhD	6 (66.7)	2 (50)	2 (20)
Terms as a TA			
0	0 (0)	0 (0)	1 (10)
1−2	7 (77.8)	1 (25)	3 (30)
3 or more	2 (22.2)	3 (75)	6 (60)
Time in Canada			
1 year or less	7 (77.8)	0 (0)	4 (40)
2 years or more	2 (22.2)	4 (100)	6 (60)

[1] Due to missing data, the frequencies do not always sum to the overall total participants in each group.
[2] Indicates mean and standard deviation provided rather than percentage.

Focus Groups

We conducted six focus groups: three for each program, with two to six participants per session (see Table 1 for demographic information). The facilitator followed a common script and audio-recorded each session. Questions addressed participant perceptions of the program and asked about the application of teaching approaches learned in the program in the instructors' own teaching context. A research assistant first took notes during the interviews, identifying key themes related to the application of learning, such as change in participants' teaching approach, reflective practice, and use of student engagement strategies (Rubin & Rubin, 1995). Members of the research team then listened to the audio recordings and extended or clarified the themes identified in the first round of coding where needed, using theme analysis of the interview data (Miles & Huberman, 1994). For anonymity, quotes are identified by faculty, degree level, and training program.

Results

Teaching Assistant Self-Efficacy

As expected, TA self-efficacy increased significantly from pre- to post-program for all participants (i.e., there was a main effect for Timing; see Table 2). TAs in both programs increased significantly on the overall TA self-efficacy item and on the Interaction, Written, and Improvement subscales of the TSE. This means that participants were generally

more self-assured regarding their ability to carry out their teaching duties and felt more confident with lecturing and interacting with students, preparing for teaching, writing in relation to a course, and improving their teaching.

Table 2.
Means, Standard Deviations, and Significance Tests for the Self-Efficacy Subscales and the Overall Self-Efficacy Item at Time 1 and Time 2

	Time 1		Time 2		
Subscale	Mean	SD	Mean	SD	Significance Test
Interaction	3.29	.672	4.04	.512	$F(1, 158) = 271.32^*$; $\eta_p^2 = .63$
Written	3.63	.593	4.17	.451	$F(1, 170) = 183.13^*$; $\eta_p^2 = .52$
Improvement	3.47	.669	4.25	.526	$F(1, 159) = 198.13^*$; $\eta_p^2 = .56$
Overall	3.48	.841	4.23	.537	$F(1, 159) = 173.83^*$; $\eta_p^2 = .49$

$^*p < .001$.

Contrary to our prediction, increases in TA self-efficacy were no greater for the TCC participants than for the international and Canadian TATP participants (i.e., no Group by Timing interaction). In other words, all of the groups showed an increase in self-efficacy over the course of the programs, but TCC participants did not show more of an increase than their international and Canadian counterparts in TATP.

Although not hypothesized, Canadian TATP participants had greater confidence in their lecturing and interactive skills (i.e., higher Interaction self-efficacy) overall than the TCC participants—i.e., there was a main effect for Group; see Table 3; $t(158) = 2.10$, $p < .05$, $d = .53$, but not greater than international participants in TATP, $t(158) = 1.41$, ns. In addition, no appreciable difference was observed between the TCC and international TATP participants on Interaction self-efficacy, $t(158) = .983$, ns.

Table 3.
Means and Standard Deviations for the Self-Efficacy Subscales, and Overall Self-Efficacy Item for the TCC, TATP-Int, and TATP-Can Groups

Self-Efficacy Subscale	TCC		TATP-Int		TATP-Can		Significance Test
	Mean	SD	Mean	SD	Mean	SD	
Interaction	3.49[a]	.537	3.62[a,b]	.534	3.77[b]	.514	$F(2,158) = 3.41^*$; $\eta_p^2 = .04$
Written	3.92	.458	3.91	.486	3.89	.460	$F(2,170) = .065$, ns.
Improvement	3.89	.567	3.85	.415	3.86	.537	$F(2,159) = .062$, ns.
Overall	3.86	.629	3.78	.567	3.91	.606	$F(2,182) = .758$, ns.

$^* p = .036$; means not sharing the same superscript in a row are appreciably different ($p = .036$).

Observations of Teaching Effectiveness

We predicted that observer-rated effective teaching behaviours would increase over the course of the programs for all three groups but that the increase would be greater among the TCC than the international and Canadian TATP participants (i.e., there would be a Group by Timing interaction). This prediction was partially supported for the overall teaching effectiveness item from the TBI-A, $F(2,186) = 3.147$, $p = .045$, $\eta_p^2 = .03$. We found a trend that indicated that the TCC and international TATP participants had substantive increases in effective teaching behaviours from the first to second microteaching segments—$F(1,186) = 21.93$, $p < .001$, $\eta_p^2 = .11$, and $F(1,186) = 13.50$, $p < .001$, $\eta_p^2 = .07$, for TCC and TATP-Int, respectively—with the increase being larger in absolute value for the TCC group than the TATP-Int group (see Table 4). The TATP-Can group did not demonstrate a significant increase in teaching effectiveness, $F(1,186) = 1.84$, ns. Thus, for the one-item assessment, the programs seemed to increase observed teaching effectiveness for ITAs, particularly for the students enrolled in TCC, but not for the Canadian students.

Table 4.
Means and Standard Deviations for the TCC, TATP-Int, and TATP-Can Groups at Time 1 and Time 2 for the TBI-A Subscales and Overall Effectiveness Item[1]

	Time 1		Time 2	
TBI Scales	Mean	SD	Mean	SD
TCC				
Interaction	3.24	.754	3.56	.692
Organization	3.08	.734	3.33	.574
Overall Effectiveness	4.38[a]	1.390	5.23[b]	1.103
TATP-Int				
Interaction	3.20	.706	3.38	.638
Organization	3.12	.676	3.25	.685
Overall Effectiveness	4.40[a]	1.271	4.96[b]	1.299
TATP-Can				
Interaction	3.45	.628	3.54	.622
Organization	3.45	.677	3.50	.532
Overall Effectiveness	5.20	1.195	5.43	1.056

[1]All of the scales of the TBI are rated on a five-point scale except for the Overall Effectiveness item, which is rated on a seven-point scale. Means not sharing the same superscript in a row are substantially different.

As expected, effective teaching behaviours increased significantly from pre- to post-program (i.e., there was a main effects for Timing; see Table 5). TAs in both programs were significantly higher on the Interaction and Organization subscales on the second microteaching segment than on the first. This means that participants became more effective in their interactions during teaching as well as the organization of their teaching over the course of the programs.

Table 5.
Means, Standard Deviations, and Significance Test for the TBI-A Subscales and Overall Effectiveness Item at Time 1 and Time 2

	Time 1		Time 2		
TBI Scales	Mean	SD	Mean	SD	Significance Test
Interaction	3.29	.700	3.48	.650	$F(1,184) = 19.387^{**}$, $\eta_p^2 = .10$
Organization	3.20	.706	3.35	.619	$F(1,153) = 6.149^*$, $\eta_p^2 = .04$
Overall Effectiveness	4.65	1.278	5.19	1.182	N/A[1]

* $p = .014$, ** $p < .001$.
[1] When an interaction is statistically significant, it is not meaningful to address main effect differences (Gardner, 2001).

Although not hypothesized, Canadian TATP participants were significantly more organized in their teaching (i.e., higher Organization teaching effectiveness) than their TCC and international TATP counterparts—$t(86) = 2.42$, $p = .017$, $d = .52$ and $t(112) = 2.86$, $p = .005$, $d = .55$, respectively; that is, there was a main effect for Group (see Table 6). There was no appreciable difference between the TCC and international TATP students, $t(108) = -.176$, *ns*; that is, the Canadian participants were more structured in their teaching—for example, providing a more manageable amount of material for the allotted time—than participants in the TCC program or international graduate students in TATP.

Table 6.
Means and Standard Deviations for TBI-A Subscales and Overall Effectiveness Item for the TCC, TATP-Int, and TATP-Can Groups

	TCC		TATP-Int		TATP-Can		
TBI Scales	Mean	SD	Mean	SD	Mean	SD	Significance Test
Interaction	3.40	.664	3.29	.577	3.49	.568	$F(2,184) = 1.934$, *ns.*
Organization	3.20[a,b]	.555	3.18[a]	.555	3.48[b]	.494	$F(2,153) = 4.502^*$, $\eta_p^2 = .06$
Overall Effectiveness	4.80[a]	1.085	4.68[a]	.957	5.31[b]	.980	N/A[1]

* $p = .013$; means not sharing the same superscript in a row are significantly different ($p < .05$).
[1] When an interaction is statistically significant, it is not meaningful to address main effect differences (Gardner, 2001).

Focus Groups

The focus-group data support the hypothesis that teaching self-efficacy increased from pre- to post-program (Theme 1). The data also demonstrate a shift towards student-centred learning, including the adoption of student engagement techniques by both TCC and TATP participants (Theme 2). While the two groups were relatively similar in their

increased confidence and ability to facilitate active learning, we observed an important difference between the two in their ability to reflect on their teaching and in their flexibility in using student-centred approaches. In the focus groups, TCC participants showed a greater ability to engage in critical, student-centred reflection related to their teaching practices and to adapt their teaching approaches to new situations (Theme 3).

Theme 1: Increased teaching self-efficacy. Participants in both the TCC and the TATP programs described an increase in their confidence and preparedness for teaching. They felt better prepared to facilitate classroom learning and had tools to respond to difficult classroom situations. The examples of increased teaching self-efficacy cited by participants in interviews are consistent with the increase in self-efficacy on the TSE survey from Time 1 to Time 2.

> TATP helped me with how to lead a discussion. It's a skill that looks easy but it is not—and how to make sure that the ideas flow without you having to impose yourself, or let it stagnate—and some people make it look flawless or easy, but it's not, and it is one of the skills that I have used even in my grad courses. That was the biggest takeaway that I had. (social science, master's student, TATP)

TAs in both programs identified digitally recorded microteaching and the feedback they received on their microteaching as the program components that contributed most to their teaching effectiveness. During training, TAs gained greater clarity regarding their role which also contributed to their ability to support undergraduate learning.

An important element of teaching self-efficacy is the willingness to experiment with new teaching techniques. During the microteaching sessions, participants were encouraged to try out new teaching techniques and ask for feedback in a safe learning space among peers. This experience allowed them to continue experimenting with new ways of promoting student learning after the program. TAs felt more comfortable introducing new discussion strategies and active learning techniques in their classes, knowing that the activity may fail for the first time but that undergraduates will still learn by wrestling with difficult concepts.

> I tried to have more activities in class—I got some people to go to the board and solve problems. It didn't work. First I underestimated the time that it would take to do the activity. And I went around the class and saw that more than half of the students were doing something else. . . . And I looked at the situation and saw that sometimes when you have an activity it doesn't work out quite the way you want, and that's OK. (health sciences, doctoral student, TATP)

> One of the approaches I used is a group discussion. In my first term as a TA I had to lead a tutorial, it was a small class of 15 of them, and the first couple of weeks it was really quiet. So I . . . broke them into groups and they started to talk more and feel comfortable, and then later I split them into two big groups and try and let them debate, and then it was even better and they debated well. (social science, doctoral student, TCC)

Theme 2: Student-centred learning. Participants in both training programs described a shift from a teacher-centred approach towards a student-centred approach

to teaching. TAs talked about listening to their students and working to adapt to their students' level of background knowledge. They checked for understanding among their students more frequently and promoted inquiry by asking open-ended questions, letting students discover the answer rather than waiting for the TAs to provide the answer. They tried out debates in tutorials, included active learning activities in science labs, and tried to foster critical thinking among their students. The teaching strategies described by TAs map onto the "Interaction" factor of the TBI and complement the increase in TAs' ability to promote interaction among students that was identified in our microteaching data.

> I TA'd a second course and I found a big difference in my teaching style, and I noticed that students were participating more after I took TCC. (engineering, master's student, TCC)

> The part on facilitating discussions is also essential. How to help the students but . . . without giving them the exact answer. How to guide them through this, or talking them through the points they have questions about through enhancing the discussion and providing them with ways to think about the problems. (science, doctoral student, TATP)

TAs from across disciplines cited examples of student engagement techniques. One ITA described the way he introduced stories and role-plays in his introductory language course, involving students in real-world conversations from the very first class. A science TA talked about promoting transferable problem-solving skills in an advanced math class. A participant from health sciences described how he challenged undergraduates to reflect on the impact of war on sport through an experiential activity:

> I am trying to think about different ways to get students' attention. The class was about sport as a development tool and we discussed people with disabilities especially in countries that suffered by war. . . . [W]hen they would get in the class there were pieces of paper spread out in the class, and most of them were stepping on the papers. . . . [T]hen I asked the class, "How many of you remember stepping on one of those papers? Because if you did, then you would have just stepped on a landmine." This is the reality of many people around the world. Just thinking about different ways of bringing the knowledge. (health sciences, master's student, TCC)

Theme 3: Reflective practice. There was clear difference between TCC and TATP participants in their ability to reflect on their teaching. Both groups cited examples of reflection, but TCC participants engaged in more nuanced, in-depth critical reflection that was highly student-centred and focused on more complex active learning approaches.

> I reflect on my teaching—this stayed with me from the program, it has helped me. So after I teach, I sit back and think—this student asked me that question—was it because I didn't involve them in the course, what could I have done to make her understand this question? (arts and humanities, doctoral student, TCC)

As part of their developing reflective practice, TCC participants asked for feedback from their students on how the course was going and noticed differences in student needs

among undergraduates from different disciplinary and cultural backgrounds. TCC participants also engaged in reflection about their interpersonal communication strategies with students. For example, they talked about carefully adjusting their tone of voice when they communicated with anxious or upset students in their office hours, and they were mindful of avoiding highly technical language with novice learners or undergraduates from other disciplines.

Discussion

The goal of this study was to compare the impact of two TA training programs on the teaching effectiveness of ITAs. We anticipated that the specialized program using an intercultural communication lens, Teaching in the Canadian Classroom (TCC), would lead to greater increases in teaching self-efficacy, effective teaching behaviours, and the use of student-centred approaches to teaching than the traditional TA Training Program (TATP). We found evidence to support our hypotheses. Consistent with previous research, both programs had a substantial impact on the participants, with significant increases in all aspects of teaching self-efficacy (i.e., interaction, written, improvement, and overall) as well as teaching effectiveness (i.e., interaction and organization; Boman, 2013; LeGros & Faez, 2012). We saw the expected differential impact of the programs on the overall teaching effectiveness score of participants. ITAs in the TCC program made greater gains in overall teaching effectiveness than the international and Canadian participants in TATP over the course of the programs, but this was not the case for their effectiveness in the interaction and organization domains. It is possible that the differential gains of ITAs enrolled in the TCC program reflect the subjective nature of rating overall teaching effectiveness. Overall teaching effectiveness, in this study represented by one item on the TBI-A (Boman, 2008), required considerable interpretation by the observers (high inference), whereas teaching effectiveness in interaction and organization required very little interpretation (low inference). Although overall teaching effectiveness required more interpretation, that interpretation was reliable across observers (interrater reliability $r = .87$).

. The TCC program helped ITAs develop a stronger understanding of the norms and expectations of the Canadian classroom, which may have been manifest in their teaching as something substantive but less tangible than the low-inference behaviours. For example, the TCC students may have been better able to apply effective communication strategies, such as employing more active listening or collaborative language in their teaching than they did at the beginning of the program (Dimitrov et al., 2014).

Both training programs had a measurable positive impact on the ability of TAs to promote student engagement in the undergraduate classroom. The impact of the two programs was relatively similar on the quantitative survey measures; however, qualitative analysis of the focus-group data revealed considerable differences in the programs' long-term impact. This finding is important because ITAs in the TCC program demonstrated a more advanced stage of teaching development than participants in TATP, in that they were able to provide more nuanced descriptions of student needs in their classroom, described adapting their teaching strategies to the needs of students with a variety of learning styles, and provided rationales for their choices. They saw themselves as facilitators of learning who worked to promote inquiry and discovery among their undergraduates and frequently sought feedback from their students.

Both the shift towards student-centred approaches to learning and the increase in reflective practice are consistent with previous findings in the literature. An increase in the use of student-centred approaches has been documented among faculty members participating in teaching development in other studies (e.g., Gibbs & Coffey, 2004; Postareff, Lindblom-Ylänne, & Nevgi, 2007). Greater reflection and increased adoption of student-centred teaching approaches were also found in a qualitative study on the impact of TA training in the UK (Chadha, 2015). Critical reflection is a key characteristic of student-centred teaching and is an important precursor to changes in practice (Brookfield, 1995). Mezirow and Taylor (2009) noted that transformative learning occurs when individuals are given opportunities to examine their assumptions, beliefs, and practices and to build on their previous experiences.

In an earlier study about the impact of TATP, Boman (2014) suggested that the short time frame (two and a half days) of the TATP program offered little time for reflection, although she did find more references to student engagement goals in TA written reflections at the end of the program relative to the beginning of the program. Our research extends her results by finding that ITAs in the specialized TCC program were more likely to demonstrate a deeper knowledge of student engagement in that they could reflect on the different approaches they might take with students, depending upon the latter's needs. Although TCC and TATP are the same in number of hours, the TCC program runs over a longer time frame (three to four weeks), giving ITAs more of an opportunity to reflect critically on the teaching and communication styles explored in the workshop and to observe them in action in their classes or interactions with faculty. Greater time may have allowed ITAs to try out some of the teaching techniques immediately in their concurrent teaching duties and bring those experiences into workshop discussions. In light of previous literature, and as a result of our findings, we have since made changes to TATP by setting aside more time for reflection and allowing participants to identify key pieces of learning, set goals, and plan the transfer of student-centred strategies observed and tried out in the program to their own teaching practices.

The increased reflectiveness observed in the focus-group discussions with TCC participants is also consistent with the *stages of concern model for TA development*, which conceptualizes a seven-stage pathway from teacher- to student-centred teaching (Ferzli et al., 2012). Comments by TCC participants focused on the impact of their teaching. They reflected on the consequences of new learning activities for student learning and sought feedback on their teaching, whereas TATP participants identified with a more task-focused earlier stage of development (e.g., concerned with class organization and time management). Although TAs in the TCC program appear to represent a higher, more student-centred stage of concern than those in TATP, this model would have to be explored more fully in future work to better assess progression through the stages of concern as a result of participation in TA training programs. Future research may include a pre-assessment of participants' key concerns before the program as well as a longitudinal design that would allow us to conduct follow-up interviews with participants six, 12, 24, and 36 months after their initial training. Alternatively, participants in teacher development programs could be asked to document their progression through the stages of concern in a teaching dossier or e-portfolio during their graduate teaching career.

Limitations

As this was action research, with graduate students self-selecting for participation in the two programs, it was not possible to address potential confounding variables such as participant characteristics by randomly assigning participants to the two programs. Although this is a limitation of the current study, the apparent differences between the two primary groups of interest—the ITAs in TATP and TCC—in demographic characteristics such as gender, age, education, TA experience, and pedagogical training were small and likely not impactful (i.e., they were not statistically significant and had small effect sizes).

A second limitation of the research is that we did not have a TA control group representing program non-participants for comparison purposes. Without the control group, it is difficult to conclude unequivocally that the reported changes were the result of the programs and not other variables, such as the impact of academic course work or of performing TA duties. That said, given the programs' relatively short time frames and focus group participants' testimonials to the programs' impact, these alternative explanations of the findings seem unlikely. To address these concerns, future research on the impact of TA training programs should include control groups.

Conclusion

This research is an important next step in the study of the effectiveness of TA training programs by comparing two TA training programs offered at a large Canadian university. To our knowledge, it represents the largest data set of digitally recorded graduate student teaching analyzed in the literature to date. Our mixed-method design allowed us to extend the research on the impact of such programs by examining the relative effects of a specialized program for ITAs. We demonstrated that a specialized program that emphasizes intercultural communication was as effective in increasing ITAs' teaching self-efficacy and aspects of teaching effectiveness as a traditional program but resulted in greater gains in their overall teaching effectiveness and in their adoption of student-centred approaches to teaching.

In addition, previous research on teaching development suggested that only extensive programming (over 30 hours) could have a substantive effect on teaching self-efficacy and student-centred approaches (e.g., Postareff et al., 2007). The present research, however, demonstrates that condensed programming (20 hours) also makes a significant difference in teacher effectiveness, particularly when there is an opportunity for distributed practice over a longer interval that allows time for participants to apply new teaching approaches and then reflect on what they have learned. This is an important finding, as TA programs are unlikely to become embedded in practice for all TAs if they are too time-consuming or not cost-effective.

Further, we were able to demonstrate that specialized training designed to meet the unique needs of ITAs has a long-term impact. An enduring adoption of a student-centred approach to teaching was evident in ITA focus-group comments. Future research will re-assess teaching self-efficacy and observations of effective teaching behaviours in the ITAs' actual classrooms or during third microteaching segments, several months after the end of the initial training.

Finally, our findings highlight the importance of providing sheltered training programs for ITAs using an intercultural communication lens that promotes the development of intercultural teaching competence (Dimitrov et al., 2014). Such programs support the development of ITAs as teachers within the Canadian context, help ITAs prepare for teaching in diverse undergraduate classrooms, and, in the long term, contribute to the development of future faculty who can facilitate learning in global settings. ❧

Acknowledgement

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