

## ***The school of hard knocks: Pre-service teachers' mindset and motivational changes during their practicum***

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**Abstract:** The mindset and motivation that teachers demonstrate are likely to influence their students' mindset and motivation. While mindset and motivation of in-service teachers have been investigated thoroughly, the same cannot be said of pre-service teachers. Pre-service teachers' mindset and motivation are likely developed during in-class experiences or practicum, the latter seen as the defining experience of pre-service teachers' preparation. Understanding the changes that pre-service teachers undergo during their practicum experiences in terms of theories of intelligence, teaching efficacy, resilience, and grit is therefore crucial. This study used these constructs as examples of mindsets, self-beliefs, capacities, and personality traits. A cross-sectional design compared American and Canadian pre-practicum versus post-practicum pre-service teachers' growth mindset and motivation and illustrated that similar effects occur across national contexts through a primarily quantitative questionnaire with open-ended questions. Triangulated statistical and thematic analyses illustrated that post-practicum students were less idealistic about the incremental nature of intelligence and reported higher resilience and a more pragmatic approach to teaching than their pre-practicum peers. The study's findings extended other studies' findings illustrating that changes occur specifically in teacher mindset as well as their strategies. Teacher education programs informed by these specific changes can capitalize on the pragmatic shift of teachers' strategy selection while also coaching them to retain an incremental view of intelligence for their students' benefit.

**Keywords:** Motivation; practicum; pre-service teachers; resilience; teacher education; teacher efficacy; theories of intelligence.

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## 1. Introduction

Pre-service teachers and their experiences in practicum (student teaching) have in recent years become a topic of intense interest to researchers with numerous studies looking the relationships of practicum with pre-service teacher self-efficacy [e.g., Martins, Costa and Onofre (2015)], pre-service teacher international practicums [e.g., Kabilan (2013)], pre-service teacher reflection and growth [e.g., Jones and Ryan (2014)], and pre-service teacher identity development [e.g., Henry (2016)]. An area that has received less scholarly attention is the role that practicum plays in the developing mindsets and motivations of pre-service teachers. In the same way, there has not been much study of how mindsets, self-beliefs, capacities, and personality traits are affected by practicum experiences.

While teaching skill is often heralded as being the main concern of a teacher education program, a growing body of research has begun to pay more attention to the holistic development of pre-service teachers by focusing on various dispositions, mindsets, and motivational characteristics [e.g., Dweck (2014); Jennings and Greenberg (2009); Ottenbreit-Leftwich *et al.*, 2012)]. Pre-service teachers learn a variety of psychological theories as they apply to students in their teacher education, however, they may not apply these theories to themselves. Theories such as incremental approaches to intelligence, self-efficacy, resilience, and grit that are learned in many teacher education programs at first glance seem to be wholly concerned with student learning, however the practices and implications of these theories also profoundly impacts teachers and their practice. Teachers model behaviours in alignment with their dispositions, mindsets, and motivations. Students can vicariously experience and observationally learn desirable behaviours like learning from mistakes or seeking help when needed, as inspired by these theories, from their teachers (Bandura, 1986, 2001, 2006).

Conversely, students can also observe undesirable behaviours from observing teachers advertently or inadvertently modelling undesirable behaviours based on their mindset and motivation beliefs. These beliefs also impact a great deal of what teachers do in the classroom. A teacher's mindsets and the motivational factors at play have deep impacts of the teachers that they will be. Investigating pre-service teachers, teachers who are still in their teacher education programs, might offer perspectives about their attitudes and dispositions that may soon compose widespread teaching practice as they become «in-service» teachers. The time to promote productive mindsets and motivations for teachers is in teacher education. An insight into the change processes that happen in teacher education and how they shape the development of pre-service teachers' mindsets and motivations would be timely and meaningful as they prepare to enter classroom practice.

## 2. The importance of incremental theories of intelligence to teachers

Implicit theories of intelligence, also known as *mindset*, have been acknowledged as a critical component of teacher development [e.g., Gutshall (2014); Leroy, Bressoux, Sarrazin and Trouilloud (2007); Malone, Bryant, Jones and Snyder (2012)]. Research on implicit theories of intelligence, originally investigated by Dweck

and her colleagues (Dweck, 1999, 2006; Dweck and Leggett, 1988), has shown that individuals may hold different implicit theories about the nature of intelligence, ranging along a continuum from *entity beliefs* (fixed mindset) to *incremental beliefs* (growth mindset). Fixed mindset refers to beliefs that intelligence is fixed and largely unchangeable. Intelligence is pre-determined so that individuals do not have control over their own intelligence. In contrast, growth mindset refers to beliefs that intelligence is malleable. Intelligence can be developed through learning and practice. Blackwell, Trzesniewski and Dweck (2007) found that elementary students who held the belief that intelligence was malleable were more likely to improve in future academics than students who held a different view. In addition, their intervention, teaching an incremental theory of intelligence to elementary students, promoted positive changes in motivation and attitudes compared with a control group.

A similar line of logic would point to teachers' incremental beliefs being linked to a variety of mindset and motivation factors. Indeed, research studies show that in-service teachers with a growth mindset tend to provide more feedback to students to facilitate their growth and development and to learn from their mistakes rather than avoiding the topic at hand (Dweck, 1999; O'Rourke, Haimovitz, Ballweber, Dweck and Popović, 2014). Based on this evidence, the mindset pre-service teachers hold is similarly likely to be associated with their choice of actions, their intentions, and various motivational techniques that would likely impact their future teaching practices. A question with scant consideration in the literature is to what degree practicum impacts the mindsets of pre-service teachers?

### **3. Teacher efficacy and its impact on how teachers teach**

Not only do teachers' mindsets impact their students, but their motivation also factors in the choices they make and the behaviours that they model in the classroom. One aspect of teacher motivation, teacher self-efficacy, refers to teachers' own beliefs about their capacities for engaging students and facilitating student learning. Teacher efficacy has been shown to impact teacher persistence, enthusiasm, and instructional decision making, as well as student outcomes, such as, academic achievement, motivation, and self-efficacy (Hoy and Spero, 2005; Leithwood and Jantzi, 2008; Tschannen-Moran and Hoy, 2001).

Although teacher efficacy is centred on the teacher as the locus of control, the effects of teacher efficacy can meaningfully impact the engagement and learning of their students, irrespective of the students' level of motivation (Bandura, 2001). Tschannen-Moran and Hoy (2001) therefore argued that the potency of efficacy beliefs to impact student learning should be a serious consideration of induction and teacher education experiences. Teachers with a high efficacy are much more likely to hold incremental beliefs (Blackwell, Trzesniewski and Dweck, 2007) and model resilience when events in their classroom do not go smoothly (Beltman, Mansfield and Price, 2011; Soleas and Hong, 2017). The question remains, how much do practicum experiences effect the efficacy of pre-practicum pre-service teachers?

#### 4. Teacher resilience

Another teacher characteristic that relates to student outcomes is resilience, which has been measured directly (Carver, 1998; Hong, Nie, Lewis, Looney and Soleas, 2017) and indirectly through the construct of grit (Duckworth, Peterson, Matthews and Kelly, 2007). Resilience has been conceptualised as being both social and personal (Freeman, Stoch, Chan and Hutchinson, 2004). Resilience may be viewed as being composed of protective factors (Beltman, Mansfield and Price, 2011) or as a capacity that is built by overcoming obstacles and acquired through experience (Day and Gu, 2010). Indeed, analogous literatures, using the personality construct of grit, differ from the built capacity conceptualization of resilience, and view it instead as being a trait that is slightly incremental and built through experience (Kelly, Matthews and Bartone, 2014; Von Culin, Tsukayama and Duckworth, 2014).

Resilient teachers have acquired the capacity, largely through experience, to persist in the face of challenges and counteract stress, burnout, and the constant danger of attrition from the profession. They are much more likely to hold incremental views of student abilities (Tschannen-Moran and Hoy, 2001), as well as model persisting and meeting challenging goals for their students to emulate. These teachers are much likely to persevere in their teaching pursuits to the benefit of their students by remaining motivated as opposed to burning out and not doing the best job they might otherwise be capable of doing (Grayson and Alvarez, 2008; Reichl, Wach, Spinath, Brünken and Karbach, 2014). Much like mindsets like theories of intelligence, or self-beliefs like teaching efficacy, capacities like pre-service teachers' resilience and traits like their grit may also be shaped by their earliest teaching experiences: practicum.

#### 5. Why is practicum such a pivotal event?

While there have been numerous studies on in-service teachers' mindset and motivation [e.g. Gutshall (2014); Harfitt (2015); Lavigne (2014); Maehr and Meyer (1997); O'Rourke, Haimovitz, Ballweber, Dweck and Popović, (2014); Yeager and Dweck (2012)], those of pre-service teachers have been understudied. Both in-class experiences and student teaching (practicum) can contribute to pre-service teacher development. Practicum is a landmark in the development of emerging teachers, as it marks a dramatic increase in the responsibilities and provides the first long-term exposure to students. Practicum is hypothesized across international contexts to provide opportunities for the tangible transformation of a post-secondary student to a pre-service teacher (Gutshall, 2014; Lambe and Bones, 2006). The nature of this transformation has received scant attention in terms of whether it effects mindsets, self-beliefs, capacities, and personality traits.

Some pre-service teachers quickly make the decision that teaching is not for them based on their practicum experiences, while others thrive from these experiences (Reichl, Wach, Spinath, Brünken and Karbach, 2014). Despite the significant role of practicum for pre-service teachers' development, the nature and extent of changes due to practice teaching experiences have not been thoroughly investigated. Many more studies look at the first years of in-service teaching [e.g. Harfitt (2015); Kelly

and Northrop (2015); Reichl *et al.* (2014)], however, by that point a teacher is already facilitating the learning of large numbers of students in their classes and beyond the reach of teacher education programs to meaningfully help. Thus, this study focuses on investigating if and how pre-service teachers' mindset and motivational characteristics, such as incremental theory, teacher-efficacy, resilience, and grit differ between cohorts who have and those who have not completed their practicum. There is abundant evidence to suggest that the systems of teacher education, educational philosophy, and the classroom dynamics are different amongst teachers from different nations (Akbari, 2007; Atkinson, 2000; Avalos, 2011; Howe, 2006). This study did not compare American versus Canadian pre-service teachers to illustrate differences between the countries, but rather to investigate if the phenomenon was isolated to any one system.

## 6. Purpose

The purpose of this study was to explore the differences in mindset and motivation of four groups of pre-service teachers: Canadian pre-practicum (n= 168) and post-practicum (n= 264), and American pre-practicum (n= 262) and post-practicum (n= 161) samples and identify methods for promoting incremental mindsets and resilience in this population. Two research questions guided this study:

1. To what extent do implicit theories of intelligence (growth mindset vs. fixed mindset) differ between pre-practicum and post-practicum groups in the United States and Canada?
2. To what extent do motivational characteristics (efficacy, resilience, and grit) differ between pre-practicum and post-practicum groups in the United States and Canada?
3. To what extent do practicum experiences comparatively effect mindsets, self-beliefs, capacities, and personality traits in pre-service teachers?

## 7. Methodology

This study used a survey with 41 close-ended questions complemented by four open-ended questions. The close-ended questions gathered numerical data for descriptive statistics and statistical analyses. The open-ended questions provided thematic insight on the differences between pre- and post-practicum pre-service teachers to corroborate the findings of the quantitative data. The study was conducted in strict compliance with the ethical research guidelines of both the Canadian and American institutions where pre-service teachers were sampled.

**Participants:** The questionnaire was sent to pre-service teachers through email gatekeepers such as teacher education program directors, administrators, and faculty members. The pre-service teachers were separated into pre- and post-practicum samples for both Canada and the United States. Gender breakdowns favoured females as was expected, in that enrolment in teacher education programs is higher for female pre-service teachers than for male (Soleas, 2016). As a result,

gender was controlled. The samples tended to have more elementary teachers than secondary teachers, as is the case in many teacher education programs; therefore, teaching division was also controlled (see Table 1). The American pre-practicum pre-service teachers are required to observe local school classrooms 20 hours per semester for three semesters in a variety of grade levels and school settings (e.g., urban/suburban/rural; Title I schools). They are not required to teach class; however, they have a chance to observe classroom dynamics, interact with students, and help making lesson plans. In the last year of their teacher education program, they are required to complete practicum, which includes full time classroom teaching for 16 weeks. In the Canadian sample, pre-service teachers completed observations in their first four years of the program while observing and working to support the classroom teaching with limited and entirely voluntary leadership in the classroom. In their last year of teacher education, they completed 12 weeks of teaching, with full-time teaching responsibilities in their final four weeks

**Quantitative data and analysis:** Four previously validated instruments (41 items total), all using Likert-type responses, were administered via electronic survey systems (see table 2 for reliabilities): i) Implicit Theories of Intelligence Scale (Dweck, 1999); ii) Teachers' Sense of Efficacy Scale–Short Form (Tschannen-Moran and Hoy, 2001); iii) Pre-service Teacher Resilience Strategy Scale (Hong *et al.*, 2017); and v) 12-item Grit Scale (Duckworth, Peterson, Matthews and Kelly, 2007). A 2 (pre-versus post-practicum) x 2 (Canadian versus American) MANCOVA, controlling for gender and teaching division (i.e., elementary or high school), examined differences across groups. Reliabilities for each instrument ranged from acceptable to excellent (see Table 2).

### Implicit Theories of Intelligence Scale

The three-item Implicit Theories of Intelligence Scale (Dweck, 1999) examines individuals' beliefs about intelligence malleability, each item measured on a 6-point scale with 1 (strongly agree) and 6 being (strongly disagree). Lower scores represent entity beliefs, while higher scores represent incremental beliefs.

### Teachers' Sense of Efficacy Scale–Short Form

The Teachers' Sense of Efficacy Scale–Short Form (Tschannen-Moran and Hoy, 2001) contains 12 items measuring teacher self-efficacy in both in-service and pre-service populations (Dellinger, Bobbett, Olivier and Ellett, 2008; Hoy and Spero, 2005; Leithwood and Jantzi, 2008; Tschannen-Moran and Johnson, 2011). Respondents indicate on a 9-point scale ranging from «Nothing» to «A Great Deal» their capacity to handle regularly faced teaching challenges. Tschannen-Moran and Hoy (2001) recommended running a factor analysis to ensure that the participant responses aligned with their identified factors: classroom management, student engagement, and instructional strategies. The factor analysis in this study resulted in an identical factor structure to that found by Tschannen-Moran and Hoy (2001).

**Table 1.** Participant demographics from Canadian and American pre- and post-practicum samples

Pre-Service Group	Sample Size	Gender Break-down	Mean Age (SD)	Teaching Division
Canadian Pre-Practicum	258	14.6% Male 85.4% Female	21.43	60.9% Elementary 39.1% Secondary
Canadian Post-Practicum	162	19.1% Male 80.8% Female	23.07	43.2% Elementary 56.8% Secondary
American Pre-Practicum	123	18.7% Male 81.3% Female	22.02	56.9% Elementary 43.1% Secondary
American Post-Practicum	159	20.5% Male 79.5% Female	24.14	67.9% Elementary 32.1% Secondary

**Table 2: Reliabilities for each scale across all four samples**

Pre-Service Group	Theories of Intelligence- 3 items	Teacher Efficacy- 12 Items	Resilience-Managing Well-being - 8 items	Resilience-Seeking Social Support- 6 items	Grit- 12 item
Canadian Pre-Practicum	0.869	0.928	0.817	0.800	0.797
Canadian Post-Practicum	0.863	0.922	0.810	0.807	0.735
American Pre-Practicum	0.989	0.942	0.775	0.760	0.744
American Post-Practicum	0.881	0.908	0.828	0.740	0.742

### Pre-service Teacher Resilience-Strategy Scale

The Pre-service Teacher Resilience-Strategy (PTR-S) Scale (Hong *et al.*, 2017) consists of 14 items rated on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always). This scale was developed after an extensive review of literature, which yielded two overarching understandings: resilience as a built capacity [e.g., Castro, Kelly and Shih (2010); Huisman, Singer and Catapano (2010)] and resilience as strategies, rather than events or outcomes [e.g., Johnson *et al.* (2014); Mansfield, Beltman, Price and McConney (2012)]. In the initial validation (Hong *et al.*, 2017), an analysis of responses revealed a two-factor solution with two subscales: managing

emotional well-being (eight items) and seeking social support (six items). A factor analysis was performed using the responses from this study, which resulted in an identical two-factor solution.

## Grit Scale

In conjunction with the PTR-S scale, a trait-based scale of persistence and resilience, the 12-item Grit Scale (Duckworth *et al.*, 2007) was used to examine if practicum affected personality traits as well as capacities.

**Qualitative Data Analysis:** To develop a more context-specific and detailed understanding, respondents answered four open-ended questions: (i) participants' definitions of success and failure; (ii) perceived causes of successes and failures from practicum experiences; (iii) responses to setbacks and challenges; and (iv) personal, professional, and situational factors that impacted mindset and motivation. These questions were inductively coded using ATLAS.ti V8.0. These codes naturally consolidated to three themes which aligned neatly in support of the quantitative findings during triangulation.

## 8. Results

From the 232 participants who responded to the open-ended responses, 126 pre-practicum (27 Canadian and 99 American) and 106 post-practicum (88 Canadians and 18 Americans) pre-service teachers answered the open-ended questions.

MANCOVA was conducted to investigate differences between pre-service teachers who had completed practicum and those who had not in both the United States and Canadian samples (see Table 3) while controlling for gender and desired teaching level (elementary or high-school). Gender and teaching level were found following statistical tests to have no significant difference across teaching samples. As well, Cohen's *d* was calculated as a means of determining the effect size of the differences. MANCOVA tests indicated that there was no interaction between completion of practicum and country where teacher education was completed providing some support for the notion that any detectable difference would be the product of the practicum experience. This contrast points to the change occurring during the period of practicum as opposed to being explained by other factors. There were however significant differences between pre-practicum and post-practicum groups across both the Canadian and American samples in terms of theories of intelligence, resilience, but not in their grit or teacher efficacy.

### Mindsets: Theories of Intelligence

Significant differences were found in theories of intelligence between Canadian pre-practicum ( $M= 4.60$ ,  $SD= 1.15$ ) and post-practicum ( $M= 3.94$   $SD= 1.32$ ) as well as the American pre-practicum ( $M= 4.75$ ,  $SD= 0.88$ ) and post-practicum ( $M= 3.97$ ,  $SD= 1.19$ ) samples ( $p < 0.001$ ); pre-practicum teachers' responses were more aligned with incremental beliefs than post-practicum teachers, as the higher the score on the scale, the greater the endorsement of incremental beliefs. The statistical difference

resulted in a Cohen's d of 0.54 for the Canadian samples and a Cohen's d of 0.75 for the American samples, constituting medium effect sizes (Cohen, 1988).

**Table 3.** Canadian and American Pre-Service Teachers Mindset and Motivation Measures

	Canadian Pre-Practicum M(SD)	Canadian Post-Practicum M(SD)	Cohen's d	American Pre-Practicum M (SD)	American Post-Practicum M (SD)	Cohen's d	Sig
Theories of Intelligence	4.60 (1.15)	3.94 (1.32)	0.54	4.75 (0.88)	3.97 (1.19)	0.75	<0.001*
Efficacy	3.32 (0.58)	3.37 (0.44)	0.09	3.45 (0.83)	3.48 (0.77)	0.04	0.14
Resilience- Managing Emotional Well-being	3.36 (0.60)	3.66 (0.57)	0.51	3.64 (0.61)	3.91 (0.44)	0.51	<0.001*
Resilience- Seeking Social Support	3.59 (0.82)	3.83 (0.75)	0.31	3.82 (0.66)	4.03 (0.47)	0.37	0.008*
Grit	3.30 (0.48)	3.43 (0.56)	0.25	3.49 (0.47)	3.59 (0.32)	0.25	0.04

\* Significant at p = 0.01

Teachers are more optimistic with their theories of intelligence before their practicum than their post-practicum peers

The qualitative analyses tended to support the quantitative findings. For example, one Canadian pre-practicum participant described this belief in growth mindset «I most definitely believe that teachers can teach growth mindset. Teachers have the ability to show children that if they work hard and persevere that anything is possible». Another Canadian pre-practicum teacher described the impact she felt that she could have, «students really look up to teachers as role models for their life, especially in a younger grade level». She further specified that «if a teacher has a growth mind set, and is open about what it is, and how it is a positive thing, the students will see this, and hopefully replicate it». Similarly, an American pre-practicum pre-service teacher described their view that they could have some degree of efficacy in shaping the mindset of students though it was dependent on

some external factors: «To some extent. It depends in large part what they believe and what their families believe».

In contrast, an American post-practicum participant described this belief on intelligence, «We must agree everyone has limits. There are very few students who have the potential to do the things Carl Gauss and Evariste Galois did when he was their age». A Canadian post-practicum teacher candidate was also skeptical of the effect that a teacher might have «No. Everybody learns differently which means they will all have their own theory of intelligence that will be a bit different than yours». Another Canadian post-practicum teacher stated that they were unsure that any teacher could really have an effect on the mindset of their students «Not really, intelligence within my view is innately genetic. However, just because someone has a limited intellectual capacity, does not mean they are unable to succeed in a classroom».

Both samples tended to have low scores, meaning that they held largely incremental views. However, their views of their potential efficacy in imbuing their students with those views were found to be higher in the pre-practicum samples. Post-practicum teachers reported needing practical strategies for encouraging students to work hard on building their capacities, while pre-service teachers were largely convinced that their teaching was sufficient to encourage growth. Specifically, the pre-practicum samples were much more optimistic, whereas the post-practicum participants showed less optimism, but more pragmatic orientations in terms of their theories of intelligence.

### Resilience: Emotional Well-being Capacity

Significant differences were found in the resilience subscale: managing emotional well-being between Canadian pre-practicum ( $M= 3.36$ ,  $SD= 0.60$ ) and post-practicum ( $M= 3.66$ ,  $SD= 0.57$ ) as well as the American pre-practicum ( $M= 3.64$ ,  $SD= 0.61$ ) and post-practicum ( $M= 3.91$ ,  $SD= 0.44$ ) teacher candidate samples ( $p < 0.001$ ); which indicated that post-practicum teachers reported higher management of emotional well-being than pre-practicum teachers in our samples. These differences resulted in a Cohen's  $d$  of 0.51 for both the American and Canadian samples which Cohen (1988) describes as constituting a medium effect size.

### Resilience: Seeking Social Support Capacity

Significant differences were found in the resilience subscale: seeking social support between Canadian pre-practicum ( $M= 3.59$ ,  $SD= 0.82$ ) and post-practicum ( $M= 3.83$ ,  $SD= 0.75$ ) as well as the American pre-practicum ( $M= 3.82$ ,  $SD= 0.66$ ) and post-practicum ( $M= 4.03$ ,  $SD= 0.47$ ) teacher candidate samples ( $p < 0.001$ ); which indicated that post-practicum teachers reported higher management of emotional well-being than pre-practicum teachers in our samples. These differences resulted in a Cohen's  $d$  of 0.51 for the Canadian samples and a Cohen's  $d$  of 0.37 which Cohen (1988) describes as constituting a medium and small effect size respectively.

Additionally, in both Canadian and American samples there was shown to be no significant difference in reported grit personality trait between pre and post-

practicum samples, illustrating that at least in this sample, a trait like grit does not change sufficiently to statistically detect significant differences, whereas a capacity like resilience does.

### Changes in Resilience and responses to «failure»

In line with this view, post-practicum participants showed more grounded and realistic perceptions about their work. For example, one Canadian post-practicum candidate wrote, «I had a lesson fall completely flat a few weeks ago, and students seemed completely disinterested in what I was trying to say. I had to reflect on my work in between class periods». Several other participants from both the Canadian and the American samples reported similar anxieties and having to deeply ponder their challenges. Another Canadian post-practicum candidate discussed their understanding that «sometimes lessons flop, but that's okay because you and the students will get over it, and you will know what not to do in the future». Other post-practicum responses corroborated this view and articulated a need for practical strategies that they could utilize in the classroom context to recover when their lessons are not going to plan. Similarly, an American peer stated that «humility is one of the greatest signs of intelligence. So how do I conceptualize failure? I think it makes me smarter». Post-practicum teachers seemingly did not dwell on negative experiences, rather they focused on what they can learn from them to continue their development.

In contrast, an American pre-practicum participant recalled from their time as a class volunteer that, «there were behavioural issues with a student, and the student was unwilling to participate, there was nothing I could do». A fellow American pre-practicum candidate stated their brief belief that «you cannot control what happens in your classroom». Analogously, a Canadian pre-practicum candidate told the story of a student who simply would not take direction and was shouting rather incorrigible obscenities. She elaborated that the student «walked out of class and did not return for over a week. This failure made me nervous to interact with this student again. I was worried of how the other students would perceive me as weak». A fellow Canadian pre-practicum teacher candidate gave the scenario of teaching music where his students «were not able to understand the material I gave to them». He elaborated that «It made me feel like I was inadequate in teaching». This perspective was in-line with less realistic expectations about the work of teaching or viewing solutions as being perhaps outside the teacher's control.

### Requested resources for developing incremental theories of intelligence

Pre-practicum pre-service teachers almost universally sought mentorship opportunities from experienced teachers in the form of practicum, apprenticeships, and teacher-induction programs. It was important to note that the requests for supports were practically identical, except in the use of local language with Canadian pre-practicum pre-service teachers typically using the term «associate teacher» as opposed to using «mentor» as might their American colleagues. In particular, they reported significant praise for «other teachers that are more experienced who

can help guide their development». They also commented that «developing close relationships with experienced teachers helps new teachers handle new situations». Pre-practicum teachers seemingly held the view that their practicum experiences would provide the necessary experience and resources that would enable them to develop fully.

In contrast, post-practicum pre-service teachers while acknowledging the value of their peer mentors, often placed additional importance on specific, practical resources such as professional development, evidence-based practice, opportunities for reflection, government documents, and the promotion of «non-perfectionist attitudes». Several post-practicum candidates sought «more evidence-based practices rather than theoretical lectures» as they found the theories much easier to apply when accompanied with concrete strategies and tactics from successful teachers. Another few post-practicum participants stated that «when reflections become a habit, it increases the chances of a teacher developing a growth mindset». Others pointed to receiving discrepant lessons in their teacher education programs from their teacher educators: «I think that explicit, honest communication about what Growth Mindset is and strategies for personally developing it would help. We received some mixed messages from our instructors». Teachers after their practicum craved specific mentoring as to what to do when their teaching is going wrong and were looking to their experienced colleagues from specific strategies that they could utilize.

### Self-Belief: Teacher efficacy

Teacher efficacy was not found to have significant differences between either American or Canadian pre-practicum and post-practicum samples. American and Canadian groups reported similar conceptualizations of their efficacy in the samples before practicum and those after. Thematic analysis of the open-ended responses from all four teaching samples did not illustrate attitudinal differences between pre- and post-practicum samples.

### Traits: Grit

Grit was found not have significant differences between either American or Canadian pre-practicum and post-practicum samples. American and Canadian groups reported similar levels of grit in the samples before practicum and those after. Thematic analysis of the open-ended responses from all four teaching samples did not illustrate attitudinal differences between pre- and post-practicum samples.

## 9. Discussion

This study contributed to the limited literature about pre-service teacher mindsets and motivations using a cross-sectional design to show that the effects of practicum occur similarly in multiple contexts as opposed to being a local issue. Mindsets and capacities, namely pre-service teachers' theories of intelligence and resilience were found to change during the relatively short, but intense experience

of practicum, whereas self-beliefs and traits, namely efficacy and grit, were found to not be malleable over the exact same period, a novel extension for the teacher education literature on pre-service teachers' practicum experiences.

The results show that practicum has a similar effect on both mindset and resilience in both American and Canadian settings. The implication is that practicum, across contexts is a shock [e.g. Avalos (2011); Harfitt (2015); Moir (1990)], however, this study refines this broad consensus in the literature to specifically consider that discrete theories of intelligence and resilience change rather than a nebulous sense of idealism – the changes are quantifiable and appear universal within the sample. The findings suggested that student teaching experiences promoted a more pragmatic, less idealistic perspective that is characterized by candidates seeking specific and practical resources. Teacher education programs have an opportunity to capitalize on this pre-service teacher sensitive period by imparting these strategies while the iron is hot.

This move towards the teaching centre, from more idealism to more pragmatism, seeking social support instead of «going it alone», and finding effective, tried, and tested means for maintaining emotional well-being may signal teachers switching from what they have been taught in teacher education to what worked in their classrooms. Beltman *et al.* (2011) and Harfitt (2015) finding noted similar findings but did not speculate on the mechanism. This study shows a potential latent mechanism for the shift toward pragmatism as being driven by reduction of incremental theories of intelligence and with increasing usage of resilience strategies, a novel contribution with implications for informing teacher education programs.

### Practicum as dispelling idealism

Theories of intelligence being more incremental (growth mindset) prior to practicum, yet more entity (fixed mindset) after practicum might signify that practicum experiences dispel much of the optimism and idealism that many pre-service teachers have. For many pre-service teachers, they have been in university lectures where their instructors have been preaching the benefits of a growth mindset and that students are capable of changing their abilities with effort and when they enter into practicum, the realities of teaching may surprise them (Avalos, 2011; O'Rourke *et al.*, 2014). The classroom is very different when you are a teacher, than from their other hat as a student of teaching (Chambers, Hobson and Tracey, 2010; Nickel, Falkenberg and Link, 2015). The sense from the participants is that a great many teachers, were exceedingly good students, as opposed to students who may be less invested in school indicating that they were expecting students to be more similar to their school-aged selves. Teachers are left reeling and looking for ideas that will enable them to promote incremental beliefs when students are amotivated. Student teaching experiences, which Georgiou (2008) called a «disillusionment process», tend to provide opportunities to challenge existing beliefs and to develop more pragmatic and realistic perceptions. Our study findings support this notion, while also giving a novel demonstration of this disillusionment as reflected in the mindset and resilience score differences.

Pre-service teachers tended to be idealistic and are enthusiastic about the potential of every student (Chambers, Hobson and Tracey, 2010; Soleas, 2016), hence, they are sometimes shocked by their experiences with students who for one reason or another do not live up to their potential, or simply do not want to. Akbari (2007) and Atkinson (2000) both highlight this same concern in that early teachers seek certainty rather than the intellectual tools to cope with the inevitable uncertainty that teachers have been taught by experience to expect. The reality sets in that while they may try really hard, they may not always be able to turn students' learning life around, a novel narrative depiction of the shock described elsewhere in the literature (Kutsyuruba, 2016; Moir, 1990; Nickel, Falkenberg and Link, 2015). This study confirms and extends the «disillusionment process» pre-service teachers experience, especially in relation to their mindset and motivational changes through practicum experiences by showing the changes in the dramatic score difference and attitudinally through the comparison of quotations.

### Practicum as making pre-service teachers more resilient

Post-practicum pre-service teachers reported a significantly higher level of resilience in both the managing emotional wellbeing and the seeking social support subscales. These new subscales measured the use of concrete strategies to handle challenges such as seeking social support and managing emotional well-being as opposed to more idealistic, but untested strategies. Student teaching experiences provided pre-service teachers the opportunities to experience concrete daily challenges and to develop strategies to increase their capacity to be resilient. This conceptualization of the changes in resilience during practicum supports the emergent portrayal of resilience in the literature as a built capacity rather than an entity trait that is dichotomous. In the light of a capacity-conceptualization of resilience, the rigours and realities of teaching provide a conveyor belt of opportunities to build resilience as teaching is messy and often times frustrations, mishaps, missteps, and mistakes occur (Fry, 2007; McCormack, Gore and Thomas, 2006; Ottenbreit-Leftwich et al., 2012). These events at the time, as characterized by the post-practicum participants described how they learned from their experiences to not dwell on the negative events, but rather to dust themselves off after a stumble and learn from it, lending credence to this idea of building resilience as a capacity (Beltman et al., 2011; Yeager and Dweck, 2012). In addition, the lack of changes in pre-service teachers' self-efficacy and grit, might imply that motivational characteristics that are more deeply rooted in one's beliefs and self-concepts are less likely to be changed quickly.

Additionally, that practicum was shown in this multinational sample to effect the mindsets and capacities of pre-service teachers, but not their self-beliefs or traits alludes to it taking more time and by extension experience than available in practicum to change these less incremental constructs in pre-service teachers.

### Limitations and Future Research

This study utilized cross-sectional data of pre-service teachers that had experienced practicum and those that had not to make claims across contexts and

demonstrate that it was practicum itself that was responsible. These findings of this study could be further corroborated with a pre-test and post-test design with the same sample of pre-service teacher to control for additional variables. As well, future research could perform interventions with these populations and see if attempts to bolster mindset or motivations are effective in reversing the negative effect or reinforcing the positive effects of practicum. Additionally, other measures such as autonomy-control orientation, assessment practices, or other relevant personality traits could be studied to continue the specific measurement of the effect that practicum has on the character of pre-service teachers.

## Implications for Teacher Education

In short, the findings of this statistical and open-ended responses suggest that pre-service teachers on practicum experience culture shock and enter into a survivor mode that shifts their focus from being idealistic to being more pragmatic both in terms of their approach to students as well as their own well-being. Pre-service teachers on their return from practicum or student teaching placements are looking for practical strategies as has been documented previously in the literature with calls for experiential, role-playing case studies (Soleas, 2015), structured opportunities for identity development (Henry, 2016), and time to ask questions that arise from reflection and introspection (Jones and Ryan, 2014; Le Maistre and Paré, 2010). The documented study has offered a solution to the needed content and skills of these case studies, opportunities, and reflective moments.

Teacher education programs could provide their pre-service teachers before and after their practicum experiences with practical strategies such as reflection activities they can do with their students (Choi, Land and Turgeon, 2005; Hudesman et al., 2013) or concrete formative assessment technique that they could use with their students to promote an environment where feedback praises effort rather than ability (Black and Wiliam, 2003, 2009) as advocated by Dweck in her work on incremental theory (Dweck, 1999, 2006, 2014). In addition to the practical strategies, pre-service teachers could be helped with specific discussions of case studies where incremental beliefs and practices of teachers have led to improvement of student outcomes [e.g., O'Rourke, Haimovitz, Ballweber, Dweck and Popović (2014); Rattan, Savani, Chugh and Dweck (2015)]. Pre-service teachers in this study held incremental beliefs however were looking for concrete demonstrations and evidence. Providing this evidence is likely to be helpful in fulfilling their need for evidence and stoking their teaching practice to be supportive of incremental beliefs.

Teacher education programs could also act on the need for pro-social resilience strategies as well as proactively provide strategies for helping teachers cope with the pressures before practicum. Although teacher education programs may already attempt to impart strategies before practicum, the findings of the study suggest that a focus on seeking social support and emotional-wellness behaviours may be particularly desired by teachers. Specifically, demonstrating that it is okay to recognize that one is overwhelmed and that it is good practice to reach out to peers when one is feeling overwhelmed. These behaviours can be demonstrated by teacher educators as a means to promote them in pre-service teachers who in turn can promote them

in students. Teacher education programs informed by the relative inability to change self-beliefs or personality traits over the course of practicum experiences might now focus their efforts more productively on mindset and capacities instead.

In light of these findings, teacher educators need to provide resources and guidance for pre-service teachers before and after their return from practicum, so that pre-service education classes can properly address the entity inducing effects of the student teaching experience on mindset while building upon the positive effects of the experience on resilience.

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