

# **Studying the intersections of real, virtual and 'best practices' in becoming a mathematics teacher through professional learning communities**

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**Abstract:** In traditional teacher education field experiences, working as part of the triad of intern (student teacher), cooperating (mentor) teacher, and university faculty advisor can be a challenge for all involved. The intern often becomes disconnected from the university as she/he embarks on the 'practical' learning in the school classroom, while the faculty advisor feels like an outsider and token aspect of the intern's professional development in their process of becoming a teacher. In the research being discussed in this presentation, the faculty advisor (also the researcher) created a digitally-enhanced internship experience, featuring a teacher-intern-faculty advisor (TIFA) learning community. Over a four month period (the internship semester), this learning community consisted of three (3) TIFA triads who engaged in several face-to-face lesson study sessions, web-based conferences sessions, and collaborative video analysis of teaching episodes. The research goals were two-fold: (1) to understand more about 'best practices' (i.e. meaningful and sustainable practices based in blended learning environments) for teacher education field experiences and becoming a mathematics teacher, and (2) to critique the network of relations and discursive practices that support (and (re)produce) traditional practices in teacher education programs.

## **Introduction**

Teacher education programs currently project an image of being the 'place' where theory finds a comfortable and clear transition to practice and where pedagogical ambiguities and complexities are erased through teaching tips and techniques. Teacher educators struggle with the tensions implicit in this image, as they toggle between traditional school discourses and the challenging call from educational research to critique and problematize conformity to dominant 'technique-oriented' discourses. The goal of this paper is to provide an overview of a research project that attempts to challenge and disrupt notions of teacher education programs as places to 'train' and 'prepare' teachers, where field experience is often viewed as the 'supervised' enactment of these preparation techniques. By creating a multi-dimensional model for the internship (field) experience, the project described in this paper strengthens theory-practice transitions in secondary mathematics teacher education and integrates more reflexive, critical approaches to learning to teach, and teaching to learn, mathematics.

In the research being discussed in this paper, the faculty advisor (also the researcher) created a digitally-enhanced internship experience, featuring a teacher-intern-faculty advisor (TIFA) professional learning community. Over a four month period (the internship semester), this learning community consisted of three (3) TIFA triads who engaged in several face-to-face lesson study sessions, web-based conferences sessions, and collaborative video analysis of teaching episodes. At each of these real and/or virtual community sessions, data was gathered through video, focus group discussions and individual interviews. The research goals were two-fold. Firstly, the research sought to understand more about 'best practices' (i.e. meaningful and sustainable practices based in blended learning environments) for teacher education field experiences and becoming a mathematics teacher. Secondly, the research data was analysed through the lens of Bourdieu's social field theory with a goal of critiquing the network of relations and discursive practices that support (and (re)produce) traditional

practices in teacher education programs. This paper focuses primarily on the first goal, describing the creation and facilitation of this learning community internship model.

## **Review of Literature**

The field of teacher education is being researched extensively from diverse perspectives. The study of theory-practice transitions from university courses to school practicum has been a prominent one, including those interested in making the transition a smoother one (Jaworski & Gellert, 2003; Nolan, 2006) as well as those resisting the existence (or at least the language) of a theory-practice dichotomy (Zeichner, 2010). Teacher education field experience research reports on, and attempts to address, the prevalent disconnect between university courses ('theory') and school-based practicum ('practice') (Bergsten, & Grevholm, 2008; Malderez, Hobson, Tracey, & Kerr, 2007). A portion of this pool of research de-emphasizes theory/practice and university/school binaries by proposing models for field experience based in close university-school collaborative approaches (Reynolds, Ferguson-Patrick, & McCormack, 2013; Van de Ven, 2011), and professional learning communities (Beck & Kosnik, 2006; Ferguson & Lindo, 2013).

With respect to the research on different models for field experience, Bullough, et al. (2002) suggest "[t]here is a growing need for experimentation with configurations of field experience and for the generation and study of new models to determine their effectiveness" (p.69). In traditional teacher education field experiences, working as part of the triad of intern (student teacher), cooperating (mentor) teacher, and university faculty advisor can be a challenge for all involved. The intern often becomes disconnected from the university as she/he embarks on the 'practical' learning in the school classroom, while the faculty advisor feels like an outsider and token aspect of the intern's professional development in their process of becoming a teacher.

The complexity of field experience means that there is little overall agreement on many issues: the role of the cooperating teacher, the role of supervision, and even the role of practicum in general. It is a time when new ideas and imaginings are needed in teacher education and field experience supervision. Britzman (2009) offers suggestions for how to (re)imagine supervision and its role in teacher education, proposing that we think of supervision "as a dialogue made from the exchange of words on the nature, tension, surprise, anxiety and mishap of interpreting the constructions of practice and as effecting the practitioner's transformation" (p. 389).

## **Internship Project Description and Context**

In my university's four-year undergraduate teacher education program, the culminating field experience is a four-month internship (practicum, field) experience in schools. Each prospective teacher (intern) is paired with a cooperating (mentor) teacher in the school and assigned a university supervisor (faculty advisor). Each faculty advisor works with approximately four interns over the internship semester, when they are expected to visit, observe and conference with each intern three-five times during this four-month internship. From my perspective, the model is problematic and 'deficient' in several ways. Primarily, I believe that a mentorship relationship between faculty advisor and intern (and, hopefully, cooperating teacher) based on only 3-5 visits over four months is not adequate to bring about any substantive learning in/from practice, nor to disrupt and challenge the view that teacher education programs merely train and prepare prospective teachers for the *real* experience of school classrooms.

My response to this problematic and deficient model for field experience supervision was to initiate a research project to explore the possibilities of a blended real and virtual model for faculty advising (supervision) during field experience. This paper emerges out of

that research project funded through a SSHRC Insight Grant Research Program (entitled *Reconceptualizing Secondary Mathematics Teacher Education: Critical and Reflexive Perspectives*). In the project, I conduct an experimental internship model for secondary mathematics teacher education field experience, which includes the integration of a co-mentorship learning community model (Mulholland, Nolan, & Salm, 2010), an enhanced lesson study approach to professional development (Gorman, Mark, & Nikula, 2010), and a digital 'e-advisor' component to intern supervision (Nolan & Exner, 2009), including the use of multiple technologies such as desktop video conferencing, video flip-cameras, and online collaboration and discussion forums. I refer to this experimental internship model as the Teacher-Intern-Faculty Advisor (TIFA) Learning Community Professional Development model. The TIFA learning community consists of three (3) interns, their cooperating teachers, and me as faculty advisor (and researcher and teacher educator). The model requires all participants (interns, cooperating teachers, and faculty advisor) to engage in lesson study experiences, to videotape mathematics lessons, to participate in an online learning community and to meet 4 times (one day each) during the 4-month internship semester for professional development activities (for example, lesson study and video analysis) and, as part of the research component, for interviews and reflective focus groups.

### **Research methodology and theoretical framework**

The full study informing this paper challenges and disrupts traditional discourses of teacher education programs and associated field experience, tracing the intersections of identity, agency and reflexivity in mathematics teacher education using Bourdieu's sociological theory (Bourdieu, 1977, 1990; Bourdieu & Passeron, 1977). It does so from with a self study methodological framework. As a methodology, self-study can be defined as the intentional and systematic inquiry into one's own practice (Loughran, 2007). In teacher education, self-study is powerful because of the potential to influence prospective teachers, as well as impact one's own learning and practice as a teacher educator. Drawing on self study approaches in my research highlight my conviction that the boundaries between research, teaching, and learning are blurred (Nolan, 2005). By studying my own professional practice, I am in a better position to reflect on the relationships between research, teaching, and learning and to interrogate the discourses shaping my roles and practices as a teacher educator. I accept that a key "aim of self-study research is to provoke, challenge, and illustrate rather than confirm and settle" (Bullough & Pinnegar, 2001, p. 20).

In this brief paper it is not possible to delve into self study data nor to draw on specific concepts of Bourdieu's social field theory to analyze and interpret data (Bourdieu's concepts are highly theoretical and require substantial background discussion before using them). Instead, I direct the reader to other publications where I outline Bourdieu's social field theory concepts specific to the larger research study (Nolan, 2010, 2012).

### **Methods, Data, and Discussion**

My self-study research project involved multiple and diverse forms of data, focussed on both reflective researcher journals and the reflective contributions of 'others' involved in the story (mainly prospective teachers as interns). Data collection for this self-study included interviews and focus groups with interns and cooperating teachers, conducted both in person and through video conferences. As researcher, I kept a self-study researcher journal to better understand and reflect on my role as a faculty advisor. For the purposes of both data collection and to enact my role as a faculty advisor, I used multiple technologies (such as desktop video conferencing, video flip-cameras, online chat and discussion forums, and collaborative authoring/editing through Wiki spaces) with the goal of creating and sustaining a professional development relationship between myself and my interns. I also used these

technologies as a means of disrupting traditional notions of teacher education as 'training' and 'preparing' teachers and field 'supervision'.

In 2009, I began to experiment with alternative internship models by introducing what I referred to as a 'digital internship' project (Nolan & Exner, 2009). My role as a faculty advisor expanded beyond the traditional 3-5 visits into a professional development model that integrated virtual communication into my work with interns. For example, in the model I used Skype to pre-conference with interns prior to visiting them at their schools. Through this advance contact with interns, I was able to engage in a productive and collaborative discussion on his/her lesson, prior to the actual day it was being taught, so that the intern could adapt and change the lesson based on our conversation. Secondly, the model required interns to take several brief teaching videos that could be viewed and reflected upon, both by the intern his/herself and also by me as a faculty advisor. The videos served to disrupt the notion that the role of the faculty advisor (or, supervisor) was to sit at the back of the classroom to observe lessons from start to finish in order to provide valuable feedback on mathematics teaching and learning. Finally, in the model I invited all interns to participate in a video conference to discuss the overall internship experience and the process of becoming a mathematics teacher. This experimental model continued with these three extended features for a few years, until research funds were received to expand the model to include cooperating teachers in the professional learning community. Part of this expansion included the design and implementation of professional development days at the university. During these professional development days, all participants (three interns, three cooperating teachers and faculty advisor) engaged in lesson study and video analysis as part of our TIFA learning community.

As mentioned previously, data was gathered through interviews and focus groups, asking both interns and cooperating teachers to discuss how (or if) the TIFA learning community had an influence on them, as being and/or becoming teachers. Due to limited space and scope of this paper, I present only two example quotations drawn from the lengthier focus group transcript to represent the significance and influence of this experimental internship model.

I'm finding it's really — like the whole internship process — this is my first time I've had an intern... But I know this is making me a better teacher. And I'm thinking about things I'm saying. And just talking about teaching and everything. It's been great. It's been awesome. And watching the videotape and this whole process today just kind of looking and you know kids are thinking a little bit too. So sometimes you just cut off your own little world. It's just nice to watch a video and see what other people are doing in their class. I think this is phenomenal. (Cooperating Teacher 1, Oct. 2013)

Yeah, I agree. I think as becoming a teacher, it's beneficial watching your own videos because, you know, you post conference, you talk about it and then you go back and see what you just talked about... but it's also extremely beneficial watching other people's videos because there's the classroom management techniques or there's the questioning techniques or just seeing from a different perspective another classroom setting or atmosphere. I think that's extremely beneficial especially as a new teacher to see what classes you could have or different classroom atmosphere looks like. (Intern 1, Dec. 2013)

### **Closing Thoughts**

As the model has evolved over the years, I have faced many challenges in designing and implementing this TIFA professional learning community internship model. Despite these

challenges, it is clear that the model's intent to integrate *the real* and *the virtual* in the education of prospective teachers is itself a 'best practice' that should be taken seriously in working to challenge and disrupt notions of teacher education programs as places to 'train' and 'prepare' teachers. It is important to keep in mind that a critical goal of teacher education "is not to simplify the experience of those learning to teach, but to complicate their experience to the point where they are forced to think, forced to encounter the Other in ways that shock thought and disrupt habits." (Marble, 2012, p. 29)

## References

- Beck, C., & Kosnik, C. (2006). *Innovations in teacher education: A social constructivist approach*. New York: SUNY Press.
- Bergsten, C., & Grevholm, B. (2008). Knowledgeable teacher educators and linking practices. In B. Jaworski, & T. Wood (Eds.), *The mathematics teacher educator as a developing professional* (pp. 223-246). The International Handbook of Mathematics Teacher Education, Volume 4. Rotterdam: Sense Publishers.
- Bourdieu, P. (1977). *Outline of a theory of practice* (Trans: R. Nice.). Cambridge: Cambridge University Press.
- Bourdieu, P. (1990). *In other words: Essays towards a reflexive sociology*. (Translation by Matthew Adamson). Cambridge: Polity Press.
- Bourdieu, P., & Passeron, J. (1977). *Reproduction in education, society and culture*. London: Sage.
- Britzman, D. (2009). The poetics of supervision: A psychoanalytical experiment for teacher education. *Changing English: Studies in Culture and Education*, 16(4), 385-396.
- Bullough, R., & Pinnegar, S. (2001). Guidelines for quality in autobiographical forms of self study research. *Educational Researcher*, 30(3), 13–21.
- Bullough, R., Young, J., Erickson, L., Birrell, J., Clark, D., & Egan, M. (2002). Rethinking field experience partnership teaching versus single-placement teaching. *Journal of Teacher Education*, 53(1), 68-80.
- Ferguson, J., & Lindo, L. (2013). Practicum PLUS: An alternative design for pre-service teacher engagement. *Education Canada*, 53(4), 23-25.
- Gorman, J., Mark, J., & Nikula, J. (2010). *A mathematics leader's guide to lesson study in practice*. NH: Heinemann.
- Jaworski, B., & Gellert, U. (2003). Educating new mathematics teachers: Integrating theory and practice, and the roles of practising teachers. In A. Bishop, M.A. Clements, C. Keitel, J. Kilpatrick, & F. K. S. Leung (Eds.), *Second International Handbook of Mathematics Education (Part Two)* (pp. 829-875). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Loughran, J. (2007). Researching teacher education practices: Responding to the challenges, demands and expectations of self-study. *Journal of Teacher Education*, 58(1), 12-20.
- Malderez, A., Hobson, A., Tracey, L., & Kerr, K. (2007). Becoming a student teacher: Core features of the experience. *European Journal of Teacher Education*, 30(3), 225-248.
- Marble, S. (2012). Becoming-teacher: Encounters with the Other in teacher education. *Discourse: Studies in the Cultural Politics of Education*, 33(1), 21-31.
- Mulholland, V., Nolan, K., & Salm, T. (2010). Disrupting perfect: Rethinking the role of field experiences. In Falkenberg, T., & Smits, H. (Eds.) (2010). *Field experiences in the context of reform of Canadian teacher education programs* (pp. 317- 326). Winnipeg, MB: Faculty of Education of the University of Manitoba.
- Nolan, K. (2005). Publish or cherish? Performing a dissertation in/between research spaces. In R. Barnett (Ed.), *Reshaping the university: New relationships between research*,

- scholarship and teaching* (pp. 119-135). UK: Society for Research into Higher Education and Open University Press.
- Nolan, K. (2006). A socio-cultural approach to understanding pre-service mathematics teachers' negotiated journeys through theory/practice transitions. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, 6-11 April.
- Nolan, K. (2010). Playing the field(s) of mathematics education: A teacher educator's journey into pedagogical and paradoxical possibilities. In M. Walshaw (Ed.), *Unpacking Pedagogy: New Perspectives for Mathematics* (pp. 153-173). Charlotte, NC: Information Age Publishing Inc.
- Nolan, K. (2012). Dispositions in the field: Viewing mathematics teacher education field experiences through the lens of Bourdieu's social field theory. *Educational Studies in Mathematics* (ESM), [Special Issue on *Contemporary Theory*, edited by T. Brown & M. Walshaw], 80 (1/2), 201-215. DOI: 10.1007/s10649-011-9355-9.
- Nolan, K. & Exner, A. (2009). Exploring the *real* possibilities for *virtual* conferencing during student teacher field experiences. In A. Vilas, A. Martin, & J. Gonzalez (Eds.), *Research, Reflections and Innovations in Integrating ICT in Education* (vol. 1, pp. 611-615). Badajoz, ES: Formatex.
- Reynolds, R., Ferguson-Patrick, K., & McCormack, A. (2013). Dancing in the ditches: Reflecting on the capacity of a university/school partnership to clarify the role of a teacher educator. *European Journal of Teacher Education*, 36(3), 307-319.
- Van de Ven, P-H. (2011). Reflections from a 'Dutch' perspective. In M. Mattsson, T. Eilertsen, & R. Rorrison (Eds.), *A Practicum Turn in Teacher Education* (pp. 189-210). Rotterdam: Sense Publishers.
- Zeichner, K. (2010). Rethinking the connections between campus courses and field experiences in college- and university-based teacher education. *Journal of Teacher Education*, 61(1-2), 89-99.