

The Influence of Collective Asynchronous Discourse Elaborated Online by Pre-Service Teachers on Their Educational Interventions in the Classroom

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Abstract

Networked learning communities are growing and they offer new opportunities for reflection on practice in education. Many authors have studied the processes followed and the contents produced by such communities. On the other hand, few have observed how collective asynchronous discourse can be enacted in the classroom. This objective was pursued in the context of this exploratory research. Data was provided by asynchronous discourse written on the Knowledge Forum by five pre-service teachers during a 14-week practicum throughout the winter 2011 semester, as well as in situ observations from their university supervisor, while they were teaching students. Qualitative and descriptive quantitative analyses were conducted. In particular, results showed participants were highly concerned with quality of teaching when elaborating collectively in the electronic forum regarding ideas of interventions, and with the importance of properly handling the possible enactment of such ideas in the classroom while teaching.

Keywords: pre-service teachers, reflective analysis, networked learning community,

classroom interventions, professional collaboration

Résumé

Les communautés d'apprentissage en réseau se multiplient et elles offrent de nouvelles avenues pour réfléchir aux pratiques en éducation. De nombreux auteurs étudient les processus utilisés et les contenus produits par ces communautés. Par contre, peu se sont penchés sur l'utilisation de discours collectifs asynchrones dans une classe. C'est l'objectif poursuivi dans cette recherche exploratoire. Les données provenaient de propos asynchrones rédigés sur le Knowledge Forum par cinq futurs enseignants au cours d'un stage de 14 semaines durant le semestre de l'hiver 2011 ainsi que d'observations in situ de leur superviseur universitaire. Des analyses quantitatives descriptives et qualitatives ont été effectuées. Les résultats ont montré notamment que les participants au forum électronique se préoccupaient au plus haut point, lors de leurs échanges sur des interventions possibles, de la qualité de l'enseignement et de l'importance de mettre en œuvre, le cas échéant, ces idées en classe de façon adéquate.

Mots-clés : futurs enseignants, analyse réflexive, communauté d'apprentissage en réseau, interventions en classe, collaboration professionnelle

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Introduction

Since Schön's work (1983) concerning the reflective practitioner, reflective analysis has gained much importance in education, particularly in pre-service teaching (Beauchamp, 2015; Pedro, 2005; Sim, 2006). Schön remarked that there are close links between action and the multiple decisions a teacher continually makes and his or her ability to reflect on this action once he or she is out of context. For almost three decades, reflective analysis has been recognized as a key element for lifelong professional development (Tarrant, 2013; Zeichner, 1983). This analysis can be individual, and faculties of education promote such reflection in pre-service teaching by emphasizing student use of reflective journals and portfolios, but research has also stressed the relevance of collective reflection (Brookfield & Preskill, 2005; Cochran-Smith & Lytle, 1993; Tarrant, 2013). In particular, collective reflection is helpful for idea sharing, feedback, and negotiation of meaning purposes. To this end, professional learning communities offer a supportive context (Fullan, 1993; Lieberman, 1988; Louis & Kruse, 1995; McLaughlin & Talbert, 2001; Sim, 2006; Tarrant, 2013), and authors have recognized them not only as an efficient way to enrich educational interventions and practices but also as a means to prepare teachers for a changing world (Darling-Hammond & Bransford, 2005). The collective dynamic that such communities put forward allows participants to move into their zone of proximal development (Vygotsky, 1978). Reflective discourse supports them in this movement from externalization to internalization of knowledge.

Networked communities are growing and they offer new ways of reflecting on practice (Allaire, 2008; Laferrière, 2005; Lim & Cheah, 2003; Schellens & Valcke, 2006). Often, such communities are based on asynchronous written discourse, which allows them to support collaboration, flexibility of participation, preservation of data that can be revisited and improved upon later, and iterative negotiation of meaning (Christal, Ferneding, Kennedy-Puthoff, & Resta, 1997; Jeong & Frazier, 2008; Scardamalia & Bereiter, 1994; Zhao & Rop, 2001). Other authors have observed that online technologies such as electronic forums encourage collective reflection or knowledge building (Allaire, 2006, 2008; Killeavy & Moloney, 2010; Lockyer, Patterson, Rowland & Hearne, 2002; Osterman & Kottkamp, 2004; Naidu, 1997). The epistemic function of writing (Blaser, 2007), in particular for reflection purposes, is here too recognized to support internalization of knowledge.

Many authors have studied processes and contents of online and networked communities (Campos, 2003; Campos & Laferrière, 2002; Doering & Beach, 2002; Lewinson, 2005; Legault, 2000; Nizet & Laferrière, 2005; Schellens & Valcke, 2006; Wade & Fauske, 2004). Nonetheless, few have examined how collective asynchronous discourse can be enacted by individuals in the classroom. However, this step appears to be crucial, as such communities have gained importance for professional development, and this last main objective has sought to improve the quality of teachers' interventions in support of learners and their schools' success (Cumming & Owen, 2001; Day, 1999). Moreover, in pre-service teaching education, this raises the important question of linking theory, reflection, and practice. To this end, we conducted exploratory research where the main question was the following: How was the pre-service teachers' collective asynchronous discourse enacted in the classroom? Three objectives led to the findings that answered the question.

- Objective 1: To describe collective asynchronous online discourse and, in particular, to determine which ideas of interventions developed in the networked learning community.
- Objective 2: To observe pre-service teachers' classroom interventions while they were teaching students.
- Objective 3: To compare online discourse with classroom interventions.

Our main working hypothesis was that asynchronous discourse oriented toward real and authentic situations coming from the pre-service teachers' classroom would cause students to enact ideas from the online discourse. This study will contribute to understanding the usefulness of collaborative technologies in supporting pre-service teachers' actions in the classroom.

Reference Framework

We present here two central concepts in this study: collective asynchronous discourse, and dimensions of educational interventions. The first concept will explain how discourse is unfolding in a collaborative environment such as the Knowledge Forum. The second concept will allow us to identify ideas and interventions that contribute to school success, and thus to focus on which intern actions matter the most. Indeed, we want

to concentrate on what factors of student learning are most susceptible to influence by interns' enactments.

Collective Asynchronous Discourse

The concept of collective discourse used in this study alludes to Carl Bereiter's idea of progressive discourse (1994). In his article, Bereiter explains that one key element that distinguishes scientific community discourse is the commitment toward communal idea improvement. Four general principles guide such dynamics:

1. A commitment to work toward common understanding.
2. A commitment to frame questions and propositions in ways that allow evidence to be brought to bear on them.
3. A commitment to expand the body of collectively valid propositions.
4. A commitment to allow any belief to be subjected to criticism if it will advance the discourse.

Applied to this study, this means interns went beyond the usual individual ideas and practice improvement that are asked of them in traditional reflective journaling. There was a collective enterprise among the interns to try to better understand problems and situations that matter to them and their colleagues. Of course, such understanding can lead to individual learning and improvement, but the initial focus on the Knowledge Forum was on collective goals.

On the Knowledge Forum, collective discourse unfolds in an asynchronous way, meaning interns can contribute by writing at any time, without having to be connected at the same time. Contributions, called "notes," can be linked to other contributions when there is an explicit intention of idea improvement from the writer. Such discourse is said to be collective as, from one note to another, interns bring new elements that progressively contribute to more deeply understanding a situation. Allaire (2006) showed that interns tend to use seven different elements when contributing to collective discourse on the Knowledge Forum: problem/situation formulation; approval; personal ideas; scientific literature information; call into question; problem/situation reformulation; and synthesis of what has been already said.

Dimensions of Educational Interventions

In the context of this study, the concept of educational interventions referred to every action—be it verbal, written, gestural, or observational—completed by a pre-service teacher while he or she was in the classroom with his or her students. Obviously, many kinds of interventions happened during a single class.

In order to document ideas about educational interventions that are elaborated online as well as classroom interventions that fit with recognized ideas that contribute to school success, we referred to the five dimensions of educational interventions in our analysis that support students' learning. These were inspired by Wang, Haertel, and Walberg's (1993) large meta-analysis that Archambault and Chouinard (2009) reprised, albeit slightly differently. It is on this more recent version that we have based the following definitions. These dimensions are recognized as supporting the students' school success, which is the teachers' main objective. Given this objective, we thought the choice of such framework was consistent with global teaching interventions. Indicators for each dimension listed below are presented in Table 1.

1. Classroom Functioning (Wang, Haertel, and Walberg's Classroom Implementation Support) refers to variables that contribute to establishing an environment that is conducive to learning.
2. Quality of Teaching (Classroom Instruction) variables relate to the planning and the organization of pedagogical interventions.
3. Quantity of Teaching (Quantity of Instruction) is a category of intervention that refers to the period of time in which students engage in learning activities.
4. Classroom Management (Classroom Direction) is a category that includes types of interventions relating to the maintenance of the flow and the rhythm of learning activities.
5. The Category of Classroom Dynamics (Student and Teacher Social Interactions) includes types of educational interventions that promote a positive self-image and a sense of belonging in a class.

Table 1. Dimensions of Educational Interventions in Classroom Practices that Support Students’ Learning and Examples of Indicators (Archambault & Chouinard, 2009; Wang et al., 1993)

Dimensions	Examples of Indicators
Classroom Implementation Support (<i>Classroom Functioning</i>)	<ul style="list-style-type: none"> - Setting and communicating of rules and procedures - Setting of recurring and routine activities - Physical organization of the classroom - Development of students’ sense of personal responsibility
Classroom Instruction (<i>Quality of Teaching</i>)	<ul style="list-style-type: none"> - Planning learning activities according to curriculum - Presentation of learning goals to students - Diversification of learning activities - Activation and consideration of students’ prior knowledge - Consistency of feedback provided to students - Usage and teaching of learning strategies - Choice of teaching materials and tools according to curriculum - Teaching support offered to students
Quantity of Instruction (<i>Quantity of Teaching</i>)	<ul style="list-style-type: none"> - Management of learning activities’ duration - Time spent on tasks by students - Sufficient length of teachers’ intervention time
Classroom Management (<i>Classroom Direction</i>)	<ul style="list-style-type: none"> - Maintaining appropriate rhythm during learning activities - Limiting interruptions during learning activities - Ways of sustaining students’ attention - Sensitivity of the teacher to what occurs in the classroom - Transitions between learning activities
Student and Teacher Social Interactions (<i>Classroom Dynamics</i>)	<ul style="list-style-type: none"> - Type of social interactions encouraged in the classroom - Student-teacher interactions - Cooperation between students

One must note that these dimensions have not been observed as being mutually exclusive, and that more than one of these five types can sometimes apply to a single kind of intervention. In such cases, though, the predominant dimension was chosen for this analysis to avoid double coding.

Methodology

Context of Study

In the Province of Quebec, Canada, obtaining a bachelor's degree in secondary teaching requires four years of study. Students need to complete four practica (totaling about 700 hours of pre-service teaching), of which the complexity and length increase over time. Our study observed five female pre-service teachers who were going through their final practicum (January to April 2011), which lasted 14 consecutive weeks. They were teaching different disciplines: mathematics ($n = 1$), sciences ($n = 1$), and social studies ($n = 3$). A one-week spring break occurred in the middle of the practicum. We chose this practicum because it offered, from our point of view, sufficient duration permitting students to improve their practice and try out different ways of intervening in the classroom.

During each practicum, three main actors play a part in the process: the pre-service teacher, the associated teacher that welcomes the pre-service teacher into his or her classroom, and the university supervisor. The associated teacher and the university supervisor both periodically observe the pre-service teacher in the classroom, in order to give him or her formative feedback. We also did the same in the context of our study.

Among formal requirements, reflection on action is stated. Usually, pre-service teachers are asked to write individual reflective journals. In our context, we offered them instead the possibility to participate in a networked learning community (Laferrière, 2005) in order to transform the individual reflective dynamic into a collective one. All five pre-service teachers accepted this proposal. Next, they were asked to participate in the research project. We explained the general objective of the research and specified that accepting or refusing would not affect their practicum in any way. All pre-service teachers agreed to participate, and no ethical issues arose during the project. Associated teachers were also invited to join in the online discussions, but none chose to do so. The university supervisor moderated the electronic forum and participated in online discussions. Collective learning milestones (IsCoL, 2001) were the major pedagogical principles that enlightened the collective online dynamic. They were titled as follows: democracy and learning how to learn together; progressive dialogue; shared learning goals; building community; professional development; authentic problems; and individual diversity and

expertise. Students talked about these prior to the beginning of the practicum, in particular the importance of reflecting upon real ideas and authentic problems coming from school and classroom situations. The main use of these principles was to help interns contribute online in a way that met collective goals of understanding. In other words, milestones framed the online process of participation. The university supervisor thought it was important to do so as electronic forums are sometimes associated with debate space, whereas the intention of collective discourse is a joint enterprise.

The Knowledge Forum was the electronic forum that we chose to support asynchronous discourse. We asked pre-service teachers to contribute about two to three times per week, during all 14 weeks of the practicum. There were no prescribed topics. They were free to talk about what they wanted, as long as their discourse was related to the practicum. Most of the participation in the Knowledge Forum occurred at the end of the school day as a way to create distance from classroom action. Furthermore, even though the student teachers involved in this research were aware of the objectives pursued, we gave no particular instructions to them concerning in-class enactment of ideas discussed on the electronic forum. The university supervisor only commented about what he observed during classroom observations; he did not encourage or discourage any enactment of ideas coming from the Knowledge Forum and he did not explicitly relate his comments to what was written online in order to minimize pre-service teachers' social desirability.

Data Collection and Analysis

Data came from two main sources. The first source was comprised of notes written on the Knowledge Forum, including those composed by the university supervisor (research objective 1). For each new note, the idea(s) of the intervention was (were) identified and consigned to a File Maker Pro 11 database on a weekly basis. The second source of data was made up of observations noted by the university supervisor in each pre-service teacher's classroom (research objective 2). The observations were also entered into the database, in order to see which of these were new or which were recurring as compared to other information entered that same week. Four observations (75 minutes each) were completed for each one of the pre-service teachers during the 14-week practicum. The university supervisor wrote comments progressively in a personal log book throughout

the 75-minute period, as the pre-service teacher was interacting with students. During these observations, the university supervisor had in mind the core professional competencies (and their components) stated as being essential for the teaching profession as prescribed by the Ministry of Education of the Province of Quebec. This rationale¹ is currently used to organize pre-service teachers' training and evaluation. It includes 12 competencies, as outlined in Table 2. This framework was not used for research purposes in the current study. Notes taken by the university supervisor were codified using Archambault and Chouinard's framework (2009) to fit research objectives.

1 A full English version of this framework can be found here : http://www.mels.gouv.qc.ca/sections/publications/publications/antérieur/formation_ens_a.pdf

Table 2. Core Professional Competencies for the Teaching Profession in the Province of Quebec

<p style="text-align: center;">Foundations</p> <ul style="list-style-type: none"> • To act as a professional inheritor, critic, and interpreter of knowledge or culture when teaching students. • To communicate clearly in the language of instruction, both orally and in writing, using correct grammar, in various contexts related to teaching. 	<p style="text-align: center;">Professional Identity</p> <ul style="list-style-type: none"> • To engage in professional development individually and with others. • To demonstrate ethical and responsible professional behaviour in the performance of his or her duties.
<p style="text-align: center;">Social and Educational Context</p> <ul style="list-style-type: none"> • To adapt his or her teaching to the needs and characteristics of students with learning disabilities, social maladjustments, or handicaps. • To integrate information and communications technologies (ICT) in the preparation and delivery of teaching/learning activities and for instructional management and professional development purposes. • To cooperate with school staff, parents, partners in the community, and students in pursuing the educational objectives of the school. • To cooperate with members of the teaching team in carrying out tasks involving the development and evaluation of the competencies targeted in the programs of study, taking into account the students concerned. 	<p style="text-align: center;">Teaching Act</p> <ul style="list-style-type: none"> • To develop teaching/learning situations that are appropriate to the students concerned and the subject content with a view to developing the competencies targeted in the programs of study. • To pilot teaching/learning situations that are appropriate to the students concerned and to the subject context with a view to developing the competencies targeted in the programs of study. • To evaluate student progress in learning the subject content and mastering the related competencies. • To plan, organize, and supervise a class in such a way as to promote students' learning and social development.

In order to link online discourse to in situ observations (research objective 3), we used a pivot table database that we created using FileMaker Pro 11 (see Figure 1). This was the most efficient way that we found to identify how collective online discourse could possibly be enacted in pre-service teachers' interventions, in light of the

observations made by the university supervisor. The following data were entered in the pivot table:

- The title and content for each note.
- The date the note was written on the forum.
- The author of the note (pre-service teacher or university supervisor).
- The idea(s) of the intervention enunciated in the note.
- The dimension(s) of the intervention that correspond(s) to the idea(s) discussed in the note (using both Wang et al.'s [1993] and Archambault and Chouinard's [2009] frameworks presented earlier). The university supervisor's comments written during classroom observations that correspond to the intervention discussed in each note, as long as the note had been written prior to the observation.

Note's title	Date of creation	Week of practicum	Note's content	Author	Pre-service teacher	Idea(s) of intervention	Dimension(s) of inte...	M.S. (1) 20110118	C.A. (1) 20110125
Établir une relation	11-01-2011	9 jan au 15 jan	Ouais, tout un	Conseiller de stage	N/A	1- Chercher à	<input type="checkbox"/> Fonctionnement de		1-Salue les élèves
Seconde rencontre	13-01-2011	9 jan au 15 jan	Aujourd'hui était ma	Stagiaire	A.T.	1- Faire une mise	<input checked="" type="checkbox"/> Fonctionnement de		
Enfin j'ai trouvé mon	12-01-2011	9 jan au 15 jan	Bonjour tout le	Stagiaire	K.O.	1- Me faire	<input type="checkbox"/> Fonctionnement de		
Nouveauté de l'année	11-01-2011	9 jan au 15 jan	Après une très	Stagiaire	M.G.	1- Me faire	<input type="checkbox"/> Fonctionnement de		1-Observier la
Intéressant un peu	12-01-2011	9 jan au 15 jan	De quel outil s'agit-	Conseiller de stage	N/A		<input type="checkbox"/> Fonctionnement de		
Un peu plus de	12-01-2011	9 jan au 15 jan	L'outil dont il a été	Stagiaire	M.G.	1- Utiliser une ligne	<input type="checkbox"/> Fonctionnement de		
Coucou	12-01-2011	9 jan au 15 jan	Jour 2, complété!	Stagiaire	C.A.	1- Observer les	<input type="checkbox"/> Fonctionnement de		1-Observier la
Transition et attente	14-01-2011	9 jan au 15 jan	Je viens de	Stagiaire	M.G.	1- Expliquer	<input type="checkbox"/> Fonctionnement de		
Garder les copies	14-01-2011	9 jan au 15 jan	Un autre	Stagiaire	J.M.	1- Laisser aux	<input type="checkbox"/> Fonctionnement de		
Quelques petites	14-01-2011	9 jan au 15 jan	Ma semaine s'est	Stagiaire	K.O.	1- Être moins	<input type="checkbox"/> Fonctionnement de	1-Plan du cours	
Marilyne	11-01-2011	9 jan au 15 jan	C'est avec	Stagiaire	M.S.	1- Recevoir des	<input checked="" type="checkbox"/> Fonctionnement de		1-Observier la
Leader négatif	12-01-2011	9 jan au 15 jan	Moi aussi j'ai une	Stagiaire	K.O.	1- Soutenir le	<input type="checkbox"/> Fonctionnement de		
Besoin d'attention	12-01-2011	9 jan au 15 jan	J' imagine Maryline	Conseiller de stage	N/A	1- Conserver une	<input checked="" type="checkbox"/> Fonctionnement de		
Un élément positif	14-01-2011	9 jan au 15 jan	Qu'envisages-tu	Conseiller de stage	N/A	1- Remémorer à un	<input checked="" type="checkbox"/> Fonctionnement de		
Quelle période!	12-01-2011	9 jan au 15 jan	Aujourd'hui j'ai	Stagiaire	M.S.	1- Expliciter la	<input type="checkbox"/> Fonctionnement de		
Les premiers jours	13-01-2011	9 jan au 15 jan	Bonjour tout le	Stagiaire	J.M.	1- Me présenter	<input type="checkbox"/> Fonctionnement de		1-Circule d'une
Quelques explications	14-01-2011	9 jan au 15 jan	Tant mieux!	Conseiller de stage	N/A		<input type="checkbox"/> Fonctionnement de		
Premier cours	17-01-2011	16 jan au 22 jan	J'ai toujours eu de	Stagiaire	J.M.	1- Discuter de	<input type="checkbox"/> Fonctionnement de	1-Plan de cours	1-Salue les élèves
Premier cours officiel!	17-01-2011	16 jan au 22 jan	Ce matin, ce fut	Stagiaire	C.A.	1- Me présenter	<input checked="" type="checkbox"/> Fonctionnement de	1-Intervient	1-Observier la
Les subtilités du	18-01-2011	16 jan au 22 jan	Pas de doute, je	Stagiaire	K.O.	1- Utiliser l'humour	<input type="checkbox"/> Fonctionnement de		
Finalement, tout s'est	19-01-2011	16 jan au 22 jan	Aujourd'hui, je me	Stagiaire	C.A.	1- Me présenter	<input type="checkbox"/> Fonctionnement de		
Evaluation d'oral	19-01-2011	16 jan au 22 jan	Je crois que vous	Stagiaire	K.O.	1- Comparer les	<input type="checkbox"/> Fonctionnement de		
Bel exemple d'éthique	21-01-2011	16 jan au 22 jan	Tout simplement	Conseiller de stage	N/A		<input type="checkbox"/> Fonctionnement de		
Demi-succès	19-01-2011	16 jan au 22 jan	À mon sens, il	Conseiller de stage	N/A		<input type="checkbox"/> Fonctionnement de		
Intervention	19-01-2011	16 jan au 22 jan	J'ai une élève au	Stagiaire	K.O.	1- Intervenir en	<input checked="" type="checkbox"/> Fonctionnement de		
Premiers cours	18-01-2011	16 jan au 22 jan	Hier et aujourd'hui	Stagiaire	M.G.	1- Se présenter aux	<input checked="" type="checkbox"/> Fonctionnement de		
Toute qu'une fin de	21-01-2011	16 jan au 22 jan	Aujourd'hui tout se	Stagiaire	M.G.	1- Faire un bref	<input checked="" type="checkbox"/> Fonctionnement de		
Continuer de faire	24-01-2011	23 jan au 29 jan	Ce qui me frappe	Conseiller de stage	N/A	1- Amener les	<input type="checkbox"/> Fonctionnement de		
Même problème	21-01-2011	16 jan au 22 jan	Je te comprends	Stagiaire	J.M.	1- Inscrire au	<input checked="" type="checkbox"/> Fonctionnement de		
Une autre période	20-01-2011	16 jan au 22 jan	Cette semaine,	Stagiaire	A.T.	1- Envoyer les	<input checked="" type="checkbox"/> Fonctionnement de		1-Bonne utilisation

Figure 1. Pivot Table Used to Link Online Discourse to in situ Observations from the University Supervisor.

Our analysis combined qualitative procedures that were used to identify ideas of interventions elaborated online and dimensions of interventions that were then matched to the university supervisor's observations. This was done mainly by a research assistant, with a sample of about 20% of total content double-checked by the researcher. We achieved an inter-rater reliability of more than 80% using the Miles and Huberman's formula (1991). We also used descriptive statistics to identify the dimensions of interventions that were most frequently discussed online and, possibly, enacted in the classroom.

Results

First, this section will show basic quantitative data about the Knowledge Forum that was used during the practicum. During the 14 weeks, the five participants wrote a total of 98 notes ($M = 16.3$; $SD = 6.4$). We need to specify that this number includes seven notes that were written during the first two weeks of the practicum by a sixth pre-service teacher who ultimately decided to stop participating. We kept those seven notes in our analysis because they were read by other pre-service teachers and could have possibly inspired them in their teaching. The content of all the notes was related to the practicum's situations; there was no off-topic discussion. The main topics that students reflected on were the following: establishment of student–teacher relationships; classroom management, especially behaviour management; pedagogical approaches that support students' motivation and learning; and assessment. More specifically, the following two questions illustrate how the online discussions developed collective goals of understanding.

- How to prevent time lost during a revising period?
 - o Four people contributed to this discussion and elaborated on the following ideas: the need to teach strategies so secondary students will know how to conduct a productive revising period; the need to stimulate student discussion of what they understand at every stage of the teaching sequence, and not only during a revising period; and the flawed effect of copy-paste exercises on revising strategies.
- How can you use a movie to support learning efficiently?
 - o Five people contributed to the collective discourse in exploring this question and identified the following ideas: to prepare a sheet of questions related to the movie; to explain to students that watching a movie in the classroom is not only a learning strategy but also a reward; to present the intent of explicit listening to students prior to the movie watching; and to use a shorter movie as an introduction to a lesson.

The university supervisor contributed to the online discourse by writing 26 notes. His contributions can be divided into three main categories: bringing conceptual and theoretical ideas into the collective discourse; feeding the discourse with questions when students seemed to lack inspiration; and encouraging students to have different points of views on situations that seemed obvious to them. The build-on rate, that is, the percentage of notes linked by participants to indicate one idea is built onto another, was 42.2% (54 notes).

This percentage is underrepresented as compared to real construction links existing between ideas shared on the forum, since one student teacher experienced technical difficulties when she tried to use the build-on feature that permitted a participant's expressed thoughts to be linked to those of others.

Research Objective 1: Description of Collective Online Discourse, in Particular Ideas of Interventions that Were Elaborated Online in the Forum

The analysis of the 124 notes written by the networked learning community using the five dimensions of our framework, based on Wang et al. (1993), led to the identification of a total of 242 examples of interventions, of which 130 are different. The distribution between these five dimensions is seen in Figure 2, as calculated from the total number of examples of interventions in the discourse. A sixth dimension (others) was added to classify the few comments that were not related specifically to classroom interventions.

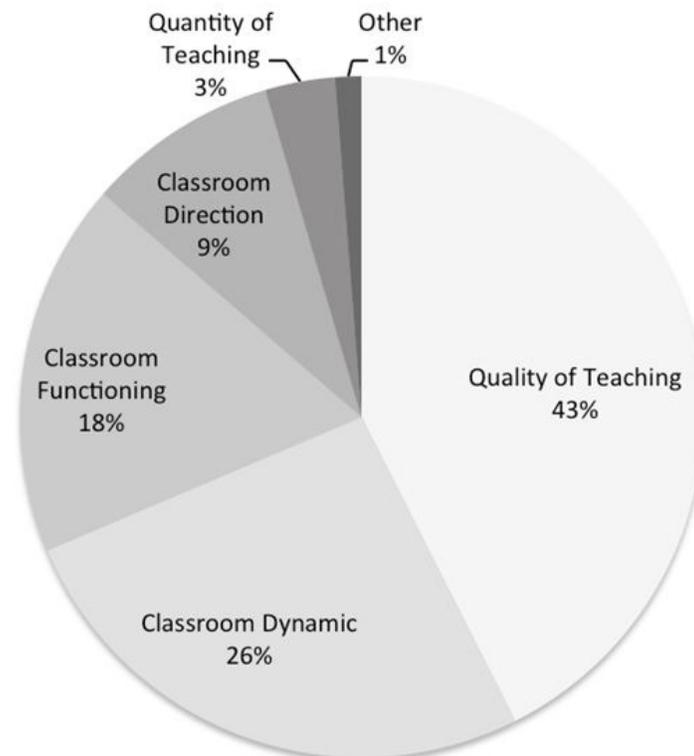


Figure 2. Dimensions of Interventions in Collective Asynchronous Online Discourse.

It is noteworthy that the dimension of classroom instruction (quality of teaching) was, by far, the one that characterized the most elaborated on collective discourse within the networked community. It constituted approximately 43% of all ideas for interventions. Classroom dynamics came in second, with 26% of the total ideas expressed in the electronic forum. Examples of ideas of interventions originating from the online discourse identified in Table 3.

Table 3. Examples of Ideas of Interventions Elaborated Online.

Dimensions	Ideas from Online Discourse
Classroom Implementation Support (Classroom Functioning)	Remind students about classroom rules and functioning.
	Write the assignment to be done during class on the blackboard.
	Give responsibilities to students.
	Have a plan B in case of unexpected events.
	Hold students to consequences announced in case of bad behaviour.
Classroom Instruction (Quality of Teaching)	Briefly review contents of preceding course at the beginning of class.
	Propose experiment-based learning contexts.
	Give clear instructions on how to complete an assignment.
	Compare correction results with those of the associated teacher for the same assignment or exam.
Quantity of Instruction (Quantity of Teaching)	Tell students how much time they have to complete a task.
	Check to see if students are effectively working on the assignment that was given to them.
	Gradually take over the associated teacher's tasks during the final practicum.
Classroom Management (Classroom Direction)	Let students keep their examination copies until the end of a class, even if they have completed it.
	Stop speaking to indicate unhappiness with students' behaviour in a non-verbal way.
	Make unplanned decisions in the course of action, as required.
Student and Teacher Social Interactions (Classroom Dynamics)	Have faith in a student even if other teachers have indicated inappropriate behaviour.
	Quickly learn students' names at the beginning of the practicum.
	Wait for students to calm down before handing out a corrected exam.
	Verbally encourage students.
Other	Request information about school dynamics, functioning, etc. from school personnel.
	Tell the school's principal that a student is presenting signs of dropping out.

The distribution of dimensions of interventions in ideas elaborated online throughout the practicum can be seen in Figure 3.

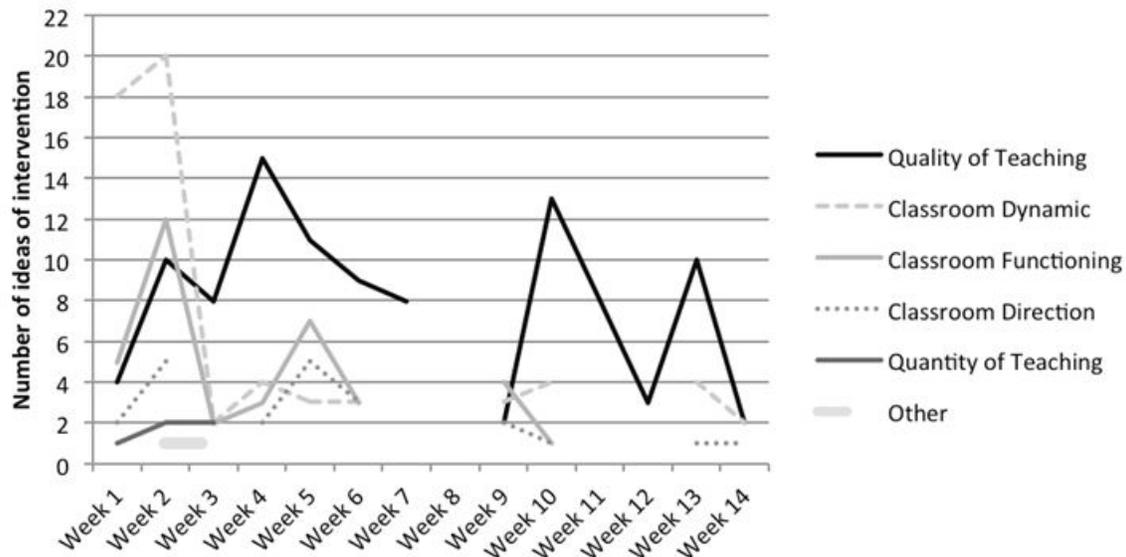


Figure 3. Distribution of Dimensions of Interventions in Ideas Elaborated Online throughout the Practicum.

The first striking observation that can be made concerns the preoccupation with the quality of teaching throughout most of the practicum. The hiatus in activity observed during the eighth week can be explained by the spring break, as no participant went online at that time. Another observation can be made about the distribution of discourse concerning classroom dynamics during the three different phases of the practicum: at the beginning, after the spring break, and at the end. This observation corresponds roughly with times when pre-service teachers needed to establish an interpersonal relationship with the students (in the beginning), to restore it (after the spring break), and to conclude this relationship (at the end of the practicum) (Archambault & Chouinard, 2009). A third observation can be made about the concentration of ideas concerning classroom functioning during the first few weeks of the practicum and after the spring break. This supports the argument in classroom management literature about the importance of establishing rules and procedures right from the beginning, and the need to remind students of these rules after a long period of not having been in contact with them (Cothran, Hodges Kulinna, & Garrahy, 2003). Finally, although we see that there were not many ideas of

educational interventions discussed concerning the dimension of quantity of teaching, those that the pre-service teachers mentioned were discussed at the beginning of the practicum. This corresponds with difficulty pre-service teachers often experience during their first teaching periods in anticipating the duration that is necessary for presenting learning activities.

Research Objectives 2 and 3: Observation of Classroom Interventions and a Comparison with Ideas Elaborated Online

This section discusses the match between ideas of classroom interventions elaborated online and those observed by the university supervisor during his visits to the pre-service teachers' classrooms while they were teaching students. Overall, during his 20 classroom observations (a total of 25 hours), the university supervisor noted 442 comments about pre-service teachers' intervention practices. On average, during his four visits to each pre-service teacher, the university supervisor observed that 142.4 ideas of educational interventions matched ideas discussed online by the networked learning community ($SD = 44.8$). Figure 4 shows the distribution of per pre-service teacher interventions.

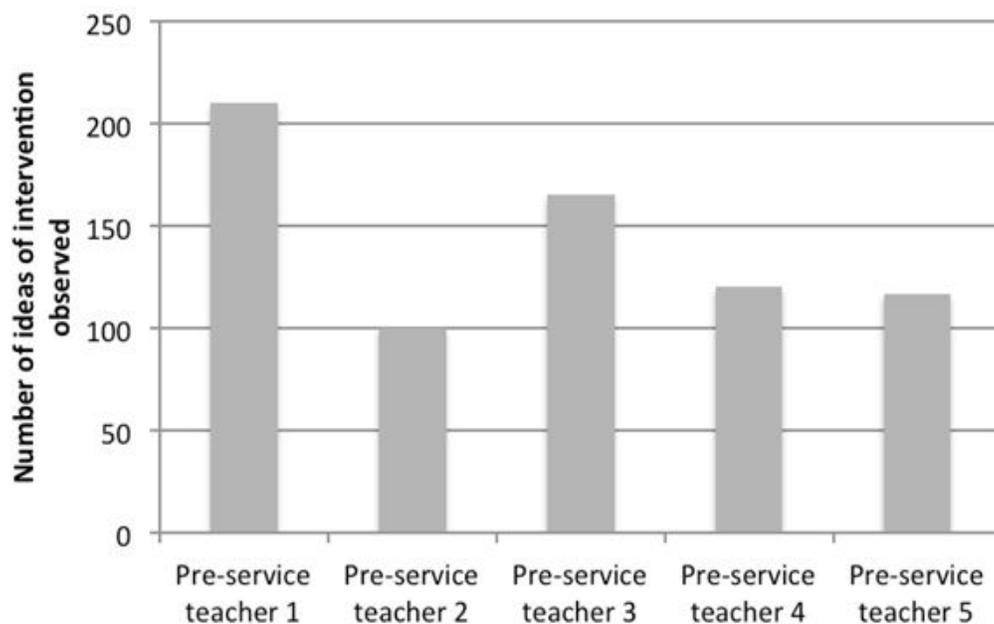


Figure 4. Match between Ideas Elaborated Online and the University Supervisor's Observations for Each Pre-Service Teacher's Interventions.

It is to be remarked that at least one hundred individual types of intervention observed by the university supervisor matched ideas that came from the collective asynchronous online discourse. It seemed that pre-service teachers 2, 4, and 5 had enacted almost the same number of ideas, whereas pre-service teachers 1 and 3 distinguished themselves from the others by using a far greater number of ideas. Figure 5 illustrates the match between ideas elaborated online and the university supervisor's observations for each dimension of intervention.

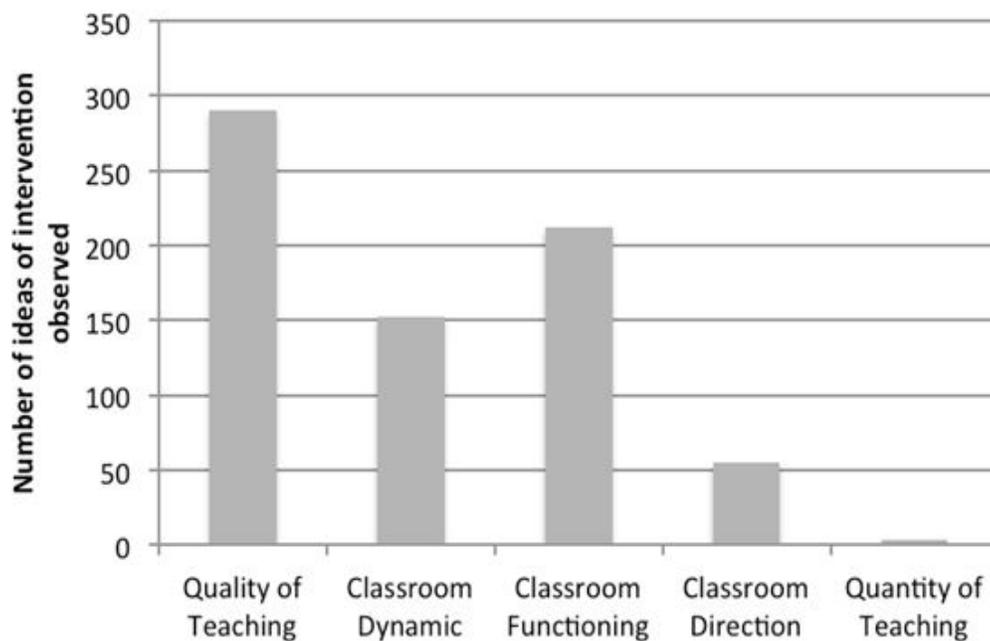


Figure 5. Match between Ideas Elaborated Online and the University Supervisor Observations for Each Dimension of Intervention.

We observed that online ideas about the quality of teaching were, by far, the ones that the pre-service teachers enacted the most in the classroom. Classroom functioning came in second, and the classroom dynamics ranked third. Surprisingly, classroom direction ranked fourth, with only 55 different kinds of interventions observed by the university supervisor, whereas this dimension counted for 26% of all ideas elaborated on by the networked learning community. Since educational interventions concerning classroom direction was often spontaneous, it is possible that, in the heat of the moment, student teachers relied more on innate behaviour than the ideas discussed at greater length online.

Figure 6 shows the match between ideas elaborated online by the pre-service teachers and the university supervisor's observations over time.

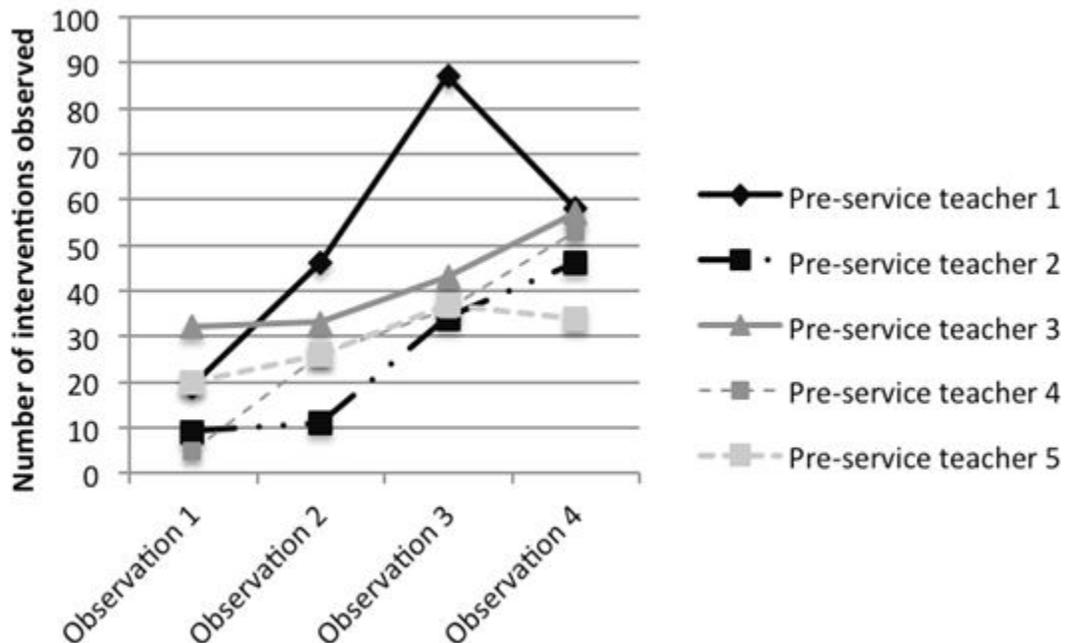


Figure 6. Match between Ideas Elaborated Online and University Supervisor's Observations Over Time.

It is to be noted that, for almost all the pre-service teachers, there was an increase over time in the number of ideas taken from online discourse that were enacted in the classroom. This leads us to think that while it seems possible to enact classroom ideas in the very short term, a prolonged period of time appears to be a variable that contributes to a certain form of maturing regarding the transformative process of discourse in action.

Discussion

The first conclusion that one may draw from the current study relates to events that pre-service teachers wrote about in the Knowledge Forum. The way that dimensions of educational interventions unfolded throughout the practicum indicate that what pre-service teachers experimented with in their classroom fed much of the asynchronous online discourse, as supported by a previous study (Allaire, 2006). Indeed, there was a close

relation between the moment when some events were discussed and the challenges pre-service teachers faced during this practicum. This seems interesting from a professional development perspective, as literature recommends grounding discourse in current practice (Darling-Hammond & Bransford, 2005; Darling-Hammond & McLaughlin, 1995; Fullan, 1993; Lieberman, 1996; Shulman, 1986). We believe that because the university supervisor had not recommended any particular topics of discussion, this confers an intentional and authentic quality to the reflexive approach. This is a guiding principle which is important to recommend because allowing these student teachers to choose their own subjects has seemingly contributed to the development of autonomous reflexive thought (Schön, 1983). In fact, this leads future teachers to identify by themselves the important questions for their own professional development, rather than to have their professional training conform to external expectations.

In addition, the key element demonstrated by this study was that collective ideas elaborated on the electronic forum seemed to inspire pre-service teachers' actions in the classroom in important ways. This is a major finding because it illustrates that online professional collaboration has true potential to influence individual practice, contrary to Madeira's (2010) statement on the matter that declared that the repercussions of using the online community are not obvious enough to monitor. The fact that our conclusion is supported by evidence coming from outside observations differentiates this research from preceding studies that had reached similar findings by using evidence based only on self-reported data. That being said, such outside observations emanating from the university supervisor could be a limitation in themselves, as he did not have access to certain sources of ideas (readings, face-to-face discussions with the associated teachers, etc.) that perhaps could have influenced pre-service teachers. However, another part of the data that we gathered questioned pre-service teachers about the types of classroom intervention that were truly inspired by the online discourse of the learning community. This part of the study showed that, from a pre-service teacher's point of view, the Knowledge Forum was an important source of ideas for their practicum (Allaire, 2011). Regarding this aspect of our study, documenting such inspirations could be relevant in the future if such ideas allow pre-service teachers to better teach their students and more efficiently reach their pedagogical intentions. At this point in our research, it can be supposed that this will prove to be the case because the more the practicum advanced during the 14-week period, the greater the quantity of ideas from the electronic forum we observed in the pre-service

teachers' classroom interventions. However, further investigation is required in order to acquire more precise data on this matter.

Furthermore, considering the diversity of disciplinary fields (social studies, mathematics, and science) of the pre-service teachers involved in this study, the high percentage of ideas concerning quality of teaching in the electronic forum and the enactment of these ideas in practice is encouraging. This fact has suggested that, beyond disciplinary specifics, the transfer of ideas is possible in a setting of professional multidisciplinary collaboration. This means that it is not necessary to form homogenous groups of student teachers according to their chosen field in order to make participation in a networked learning community fruitful in regards to practice. In particular, diversity among participants has brought different teaching strategies to collective discourse. The example about the effective use of a movie is a good one. The topic was introduced by the pre-service intern teaching social studies, but it inspired another pre-service intern to think about using this strategy for mathematics, a discipline in which movies are not usually used, according to her.

Another outcome to teacher training that emerged from this research is that it does not seem necessary to formally prompt student teachers to enact or to try to enact ideas that were elaborated online. This seems to occur naturally, depending on the relevance that student teachers determine according to the unique opportunities and constraints of the context of their practicum. Although this has not yet been studied, it could prove relevant to the professional development of student teachers by informing them of ideas that have been successfully enacted in class. Furthermore, they could be encouraged to deepen their reflection on action by following up on the implementation of ideas that have inspired them.

It would also appear that the university supervisor's participation in the collective asynchronous discourse offers an interesting and non-intimidating way to transmit ideas to student teachers, thus permitting them to improve their professional practice. The collective and distributed characteristics inherent to a networked learning community (one elaborates on another's ideas; one doesn't answer only to one specific individual) can be seen as a strategic opportunity to influence student teachers' progression without targeting a specific individual, the way feedback would following in-class observation of a student-teacher. This latter kind of observation sometimes causes the person in question to resist change because of its individual nature and that fact that it may be interpreted as

a shortcoming or a problem to be resolved. When using an electronic forum, the university supervisor has the possibility to share ideas with the group, instead of addressing a particular student teacher. Although it appeared to be a useful way to have some student teachers update part of their practice, this does not mean we should rely solely on this method. One-on-one feedback with each pre-service teacher remains an important way to provide him or her with specific comments.

Moreover, although it was not a formal part of the study, the university supervisor noticed that the pre-service teacher who manifested the best performance in his or her practicum (in regards with 12 competencies evaluation) was the one that seemed to have enacted the most ideas from the electronic forum. On the other hand, the one who performed the least was the one who enacted the least ideas. Of course, we need to interpret this result very carefully. More investigation in similar and different contexts is required to confirm or affirm it. For now, such a result tends to reinforce the existing relationship between action and reflection on action (Karolewicz, 1998; Schön, 1983). In the context of this study, we must be careful about such hypothesis because the classroom context and the presence of associate teachers were different from one student teacher to the other.

A further area of research that could help student teachers experiencing difficulties with reflection on action would be to verify whether or not greater emphasis placed on the use of scaffolds included in the Knowledge Forum software had a positive effect on their situation. This suggests using prompts (e.g., Bereiter and Scardamalia's [1982] concept of procedural facilitators) that have been defined as the basis for desirable reflexive behaviour. In the context of the research that we have already completed, little explanation was given concerning the importance for pre-service teachers to use these. We are considering addressing this lack of awareness in study participants in a future round of studies. Moreover, we think that a new scaffold, to be included among those already available and encouraging the pre-service teachers to think about an idea that they have tried out in class—it could be labelled “I tried out one of our ideas and...”—would be a worthwhile subject to explore.

There is a need to point out some limitations of this study. One is about the size of the sample, which is small. The findings of this exploratory report have convinced us of the relevance to pursue this line of research with new student teachers to see if the results already obtained can be duplicated. However, from a pedagogical viewpoint, this is not

without raising the question of scalability. The theory behind what Stahl (2006) calls group cognition suggests that the elaboration on the quality of ideas happens in a limited number of groups rather than in a larger number of groups. If the reflexive approach advocated by the implementation of a networked learning community benefits the supervisory context of student teachers that generally involve fewer students, this is not the case with courses that include a greater number of individuals. It could be interesting to observe how ideas are enacted when a greater number of people are involved.

Next, the discussion presented here of how online discourse was enacted in the classroom was necessarily a partial one, as it was based on only four observations (five hours) of each pre-service teacher over the entire practicum (14 weeks). A fuller discussion of pre-service teachers' points of view about their own enactment is available in a different paper (Allaire, 2011). Furthermore, what was documented here is an assemblage of the most explicit ideas. It was not possible to document more implicit ideas, as meanings constructed by someone else were not always clear and simple to identify. Indeed, a whole semantic network is involved during the process of the construction of significance. As John Dewey (1938) has remarked concerning the unpredictable nature of learning, it is understood that it is more than likely that a range of other ideas besides those coming from the electronic forum come into play in the deliberative judgement that rules all classroom interventions. Some authors even assert that the use of external ideas increases when information and communication technologies (such as the Knowledge Forum) are involved (Sandholtz, Ringstaff, & Dwyer, 1997; Warschauer, 1999).

In conclusion, we offer two other pertinent lines of research that the present study leads us to contemplate. One of the presuppositions that governed our current research design required that the practicum period be sufficiently long so that student teachers could enact ideas they discussed and elaborated on through the electronic forum. It would be interesting to see what happens when a shorter practicum period is the backdrop of an investigation. This might help us to better understand the time required to enact an idea. It may also be relevant to compare ideas of interventions discussed on the electronic forum and enacted in the classroom with those that are recommended in educational literature.

As a concluding remark, this study shows that ideas discussed using collaborative technologies can guide pre-service teachers in the classroom. Our study gives evidence that group reflection conducted online is translated into action, thus helping to link theory, reflection, and practice.

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