Use of video records of classroom practices to support teacher reflection in a professional learning network

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Abstract: This study discusses the use of video records of classroom practices in a professional learning network (PLN) in order to support teacher reflection and professional development. Select video recordings of participating teachers of the PLN were presented in both a small group and large group context. Members of the research team facilitated the discussions and guiding questions were also provided. Additionally, the teachers were asked to participate in a discussion regarding the video clips on an online discussion platform. Qualitative analysis such as verbal analysis and coding was used to analyze the discourse. Preliminary results show that the activity was successful in promoting and supporting teacher reflection through video analysis and hence suggesting the future direction of the PLN.

Introduction

Research consistently shows that teacher quality, competence, and effectiveness have powerful effects on student achievement, particularly in reading and mathematics (Bransford, Darling-Hammon, & LePage, 2005; Rivkin, Hanushek, & Kain, 2005). Encouraging teacher reflection is key to promoting change and growth in educational methods. The Creating, Collaborating, and Computing in Mathematics (CCC-M) project (Heo & Breuleux, 2015; Nong, Breuleux, & Heo, 2015) is a collaborative research project based on a university-school board partnership to design and build a professional learning network (PLN) of teachers. This project follows a participatory design approach (Heo & Breuleux, 2011b), which is an integration of design-based research (Brown, 1992; Collins, Joseph & Bielaczyc, 2004) and participatory design approach (Schuler & Namioka, 1993; Silva & Breuleux, 1994). The following study examines the sustainability of a research-practitioner relationship in promoting reflection through the use of video footage of classroom practices in the PLN. The aim of this study is to build our collective capacity as a research team to capture and use video records of classroom practices to support teacher reflection within the PLN.

Theoretical Framework

Participatory design based research

Design based research is an emerging educational research paradigm to develop and support learning environments. This approach is characterized by (a) the design of an intervention in the real world (*interventionist*); (b) in cycles of design, evaluation, and revision (*iterative*); (c) understanding and improving interventions (*process-oriented*); (d) the merit of design is measured in real contexts (*utility-oriented*); and (e) the design is based on theoretical propositions and field testing of the design contributes to theory building (*theory-oriented*) (Van den Akker et al., 2006). The design research approach relies on the idea of close collaboration between researchers and practitioners, in our case teachers (elementary and high school) and school board consultants in ICT and in mathematics. In addition, participatory design (Schuler & Namioka, 1993) emphasizes the engagement of users/participants in the design process. The involvement of participants (e.g., teachers and educational consultants from the school board in this project) fosters a better understanding of the needs, concerns and perspectives of the participants in a real context (Silva & Breuleux, 1994). Through their engagement in the participatory design research, the participants also develop their competence in action research (Cochran-Smith & Lytle, 1992; 2004) that is a strategy to identify a problem in teaching and learning, implement change, and reflect and document their professional practice throughout the self-inquiry process. Such an approach is conducive to fostering an effective professional learning network between educational practitioners.

Professional learning network

A community of practice has been defined as a group of people brought together by a shared passion or practice who interact regularly to learn more and deepen their knowledge on the set mutual interest (Wenger, 1998). In view of the projects objectives, a PLN was set up to foster the conditions through which sustainable professional development could occur. Setting up a PLN is to create "conditions for the growth of teachers' professional knowledge" (Leithwood, Jantzi, & Steinbach, 1999, cited in Stoll, Bolam, & Collarbone, 2002). It involves shared beliefs and understandings, interaction and participation, and interdependence (Stoll et al, 2006) as well as requires attention to building trust and authentic collaboration. In order to sustain such sharing within the PLN teachers must feel that they are in a supportive environment (Borko et al., 2008). In their research to develop a model of the determinants of knowledge sharing in professional communities, Lin, Hung, & Chen (2009) found that "trust significantly influences knowledge sharing self-efficacy, perceived relative advantage and perceived compatibility, which in turn positively affect knowledge sharing behaviour". Such behaviours and practices within the PLN are of particular importance when teachers are asked to share video clips from their classrooms with their colleagues for the purpose of reflecting upon and improving their practice.

Reflection in teachers

A classical definition of reflection comes from Dewey's (1933) descriptions and interpretations. Dewey (1933) views reflection as a holistic method the individual uses to assess a situation or analyze it retrospectively and draw potential conclusions. Schön (1983) elaborated upon the concept and differentiated between reflection in action and reflection on action. According the Schön, reflection requires not only intellectual rational processes but emotional and motivational ones as well. Thus, the process of reflection can be both an individual and collective activity where key elements can be identified and discussed. Depth and type of reflection could also be categorized. In their study, Jay & Johnson (2002) categorized reflection into three levels descriptive, comparative and critical. It is through effective, meaningful, sustained and profound reflection that evolution and change in professional practice can occur. Professional learning communities can create environments where on-going collective exploration, reflection, inquiry, sense making, and knowledge sharing can be fostered.

Use of video tools in teacher learning and reflection

Video cases that can capture real complex classroom settings and interactions have been used not only as data source for research in teacher education (Kersting, 2008) but also for teacher professional development as a tool for promoting teachers' reflection on their own and others' teaching practices (Santagata et al., 2007). In fact, Tekkumru Kisa & Stein (2015) demonstrated that teachers participating in a video-based professional development program indicated higher use of instructional activities that promote and sustain higher levels of cognitive reasoning in science students.

Research has shown that reflecting upon their teaching help teachers connect theory and practice more effectively (Koc et al., 2009). This, it is when the video recordings are embedded within an instructional framework that they have proven to be most beneficial. In their study Blomberg et al. (2014) contrasted a cognitive framework where explicit cues were provided to a situative one where the learners must attempt to collectively derive meaning from the video clip. Results showed that depending on the overall learning objective the context surrounding the video recording must be adapted.

Kersting (2008) used a video-based assessment approach to measure teachers' knowledge of teaching mathematics including mathematical content, student thinking, alternative teaching strategies, and overall quality of interpretation. In the study by Koc et al. (2009), pre-service and in-service teachers accessed online video cases depicting a real mathematics classroom and discussed about the teaching practice asynchronously in online forum. The results highlighted the potential value of the online video case discussions for the quality of teacher discourse and reflection. Moreover, the reflective skills developed within an instructional design with pre-service teachers have been shown to effectively transfer into the teacher's ongoing self-reflection during course field experience (Stockero, 2008).

In their study, Kang & van Es (2015) provide five guidelines towards the productive use of video in professional learning. Publicizing pedagogical methods, noticing them and sharing them is one of those five key

design principles. Borko et al. (2008) demonstrated the advantages of viewing footage from one's classroom as well as observing colleagues. Teacher's viewing video clips of their own classrooms are also able to evaluate their overall approach and generally recognize strengths and differences. While observing clips from colleagues, teacher's not only learned from their approaches but also recognized the similar struggles both they and their colleagues were facing. Furthermore, findings have shown that teachers viewing videos of colleagues feel higher motivational involvement and demonstrate higher levels of analysis of the situation depicted in the clip (Kleinknecht & Schneider, 2013). This suggests that teacher's watching footage from their own classrooms need to be more scaffolded in the reflection and analysis process.

Study Context: CCC-M Project

The goal of CCC-M project was to design and validate, within a partnership between university-based educational researchers (in the learning sciences) and school-based teachers, a professional learning network to develop and investigate digital literacy and disciplinary understanding in mathematics classrooms, with a focus on the transition between elementary and high school. This project aimed directly at improving the digital literacy of teachers and students in elementary and secondary schools.

In the span of a year, participating teacher are required to attend face-to-face meetings. In the first year of the project 5 face-to-face meetings occurred. In the second year 4 face-to-face meetings took place, in September, December, February and April. The teachers, 4 school board consultants as well as the research team are present at the meetings that take place in a conference room at the school board office. Between these meetings teachers are expected to maintain a discussion through the online platform Edmodo (https://www.edmodo.com/). Teachers are provided with paid time from which they are relieved of their teaching duties to participate in project activities.

Prior to each face-to-face meeting the research team meets with the 4 school board consultants to discuss the contents and objectives of the upcoming F2F. The overall progression of the project is discussed. These leadership meetings reinforce and promote a collaborative and cohesive research-practitioner relationship. The partnership flourishes as goals are negotiated and re-aligned. Each stakeholder's desires are assessed and prioritized. Thus, the research-practitioner team remains synchronized.

In the first year of the partnership between the university research team and the school board (2013-2014), teachers were asked to pair up with a peer for an observation exercise. The project asked teachers to visit their colleagues' classes to observe diverse instructional methods as well as classrooms settings. The purpose of this exercise was to have teachers open their classrooms to their colleagues to foster a culture of sharing. Additionally, it was hoped that this would encourage teachers to discuss, analyze, critique and reflect upon the differences in each other's practices. These foundations laid in the first year were a fertile starting point for the second year of the project where teachers were asked to open their classrooms to the entire professional learning network through video recordings.

In the second year of the project, the research team filmed classroom activities and edited the video recordings. Once particular clips had been selected these were shared with the school board consultants, the teacher in question as well as two other participating teachers. The two other participating teachers were designated lead teachers of reflection that agreed at the beginning of the year to participate in the process. Based on the context, this study will focus on the use of video records of classroom activities for supporting teacher reflection.

Methods

This study follows a design based research approach. The data collection occurs at face-to-face meetings as well as on an online discussion platform. Qualitative analyses have been performed on the data.

Participants

In the first year of the project 13 teachers were participating. This number dropped to 10 participants during the second year. Participants in this study include 5 elementary school teachers and 5 high school teachers all

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currently teaching mathematics in schools under the jurisdiction of a school board in the Montréal region. The teachers represent 11 of the 24 schools of the school board. The mean average of teaching experience is of 7.92 years. The mean average of years working for the school board is of 7.61 years. Of the 10 teachers, 2 are male and 8 are female. The 4 school board consultants selected the teachers based on expectancies of the project that they were thought to possess such as positive collaboration with peers, time commitment and most importantly display of leadership skills. The latter is particularly important as it is hoped that the teachers will share the acquired knowledge with their peers in their respected work environments. The purposive sample selected for the study aimed to limit drop out rates as well as increase chances of success in the research practitioner partnership.

Procedures for data collection

In year 2 (2014-2015), at the September face-to-face meetings teacher's who were interested and comfortable with the video-recording concept volunteered to welcome the research team into their classrooms. Video recording visits started in the month of October. According to each party's availabilities, dates were agreed upon where the research team was invited into the teacher's classroom. Consent forms of students signed by parents were obtained before hand. Only students with permission to be videotaped can be seen in the video clips. Teacher's conducted the lesson of their choice with no direct guideline made by the research team as to any techniques or particular methods we wanted showcased.

At both the December and February face-to-face meetings video clips selected and edited by the research team were presented to the whole group and the teachers freely discussed the clips without a specific guideline for reflection.

At the last face-to-face meeting in April two video clips were presented; one documenting an elementary math class and the other a high school math class. The clips did not surpass 6 minutes. The two video clips were first shown to the whole group. Prior to the visioning, a brief explanation of the lesson was provided as well as a handout of the example that was being worked on. Transcripts made by the research team were also handed out, as the audio quality was poor in some classes. Once the video clip had been properly framed, a paper to jot down observations was distributed. A brief and general discussion prompt was also included, "Please jot down any elements of the video clip that you find interesting or intriguing and that you would like to discuss." After each video clip a large group exchange ensued. Teachers were encouraged to share their comments, thoughts, observations and questions.

Once the two video clips had been viewed teachers were separated into groups according to the level at which they teach. Thus there were 5 teachers in the elementary group and 5 in the high school group. The high school group relocated to a conference room adjacent to the one where the face-to-face was occurring for sound purposes.

In their small groups elementary and high school teachers were asked to watch the elementary clip again. A member of the research team was present in each group as a facilitator. Additionally, teachers were encouraged and instructed to view the video at their own pace, pausing, rewinding and fast-forwarding to particular moment they found more pertinent or interesting. The video clips were made available on Vialogues (https://vialogues.com/), which is a video-based discussion platform, so that teachers could directly insert and share their comments on the video clip. Both sessions were videotaped and audio recorded. The purpose of the small group was to allow teachers to view the clip and discuss in more detail their observations.

Based on the video clips the research team also drafted a few questions to guide the discussion in the small group. The following instructions and question were posted on Vialogues for the teachers:

Discuss the following questions in your small groups. Please feel free to use the device the stop, rewind or fast-forward to moments in the clip you would like to comment on.

1. In your small group discuss further any thoughts you might have had while viewing the video clip.
2. Discuss any similarities you may have noticed with your own classroom or teaching methods
3. Discuss points in the video that you may have approached differently

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These prompts were the same for both elementary and high school. Depending on the clip and nature of the task more specific questions at particular time points were also. For example, in the elementary video clip the following two questions were posted: @ 00:56 what do you notice about the collaboration between the three students? If as a teacher you could intervene at this precise moment what would you do? How would you choose to intervene or perhaps not intervene? And @ 5:05 the students are trying to read the hidden number to solve the problem though this defeats the point of the exercise. How would you intervene at this moment?

For the high-school teachers the following question was posted: @ 3:00-3:30 Observe the group dynamics and collaboration between peers. How would you intervene after viewing this particular segment of the clip?

At the end of the exercise, teachers re-convened in the conference room. Additional clips will be posted on Vialogues during the month of May and the research team has asked the teachers to view these clips and continue commenting and discussing them via the online forum on Vialogues.

Analyses

The discourse from collected from the face-to-face meetings and the online discussion platform examined through qualitative methods of verbal analysis and coding. Further analysis of discourse was differentiated into categories such as time on time/classroom management, mathematical concepts, and small group dynamics.

Preliminary Results

The face-to-face meetings in December and February provided some valuable insight towards the design of the video-clip activity. Though video clips were presented at those two face-to-face meetings no official guiding discussion questions were provided. The conversation that followed the viewing remained superficial. It lacked in depth, reflection and critique of practice. This impelled the research team to provide a general framework through which profounder reflection could be channelled and richer conversation could ensue.

The video clips selected for the April face-to-face originated from the full lessons observed in the classrooms. As previously mentioned, select moments were chosen and edited into approximately 5-minute clips. The two clips presented in April focused on student group work. These video clips were selected based on the discussion opportunities that could potentially emerge. Moreover, the clips showcased instructional methods that were elaborated upon in the PLN such as encouraging math talk between students as well as small group dynamics.

The high school clip showcased three students working on a surface area problem. The teacher provided the students with a cereal box, wrapping paper and scissors. The students were asked to wrap the cereal box. Similarly, the elementary clip focused on three students working out a situational problem on proportions. However, the actual numbers were omitted to promote student math talk by encouraging them to solve the problem by mapping out the steps. The small group dynamics were similar in both clips where a clear leader overpowered the team. The guiding questions aimed to direct reflection towards similarities and differences teachers have within their own classrooms and also reflect upon how they would have reacted in the same situation.

Overall, the preliminary results and observations seem to suggest that the design of the activity was successful in prompting deeper discourse on the classroom atmosphere. In large groups the discussion flowed and interesting points were made. In smaller groups teacher continued to discuss the video. As teachers were grouped with colleagues teaching at the same level, suggestions to improve the overall activity and classroom environment were made. Interesting new ideas and suggestions for student involvement were also made.

More detailed analysis of verbal discourse and results will be discussed in the full paper.

Conclusions and Educational Implications

The following study evaluated the capacity of the research team in fostering teacher reflection through the use of video recordings of classroom practices. The overall design of the activity seems to have been effective in

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fostering teacher reflection. Such results are encouraging and provide useful insights into potential developments for year 3 of the CCC-M project. For the third year of the project it is hoped that teachers could slowly become more independent in the process of sharing practices through video clips. Teacher could use video recordings as a personal tool to observe, identify problematic areas and reflect upon their own practice. Additionally, teachers could record themselves and share clip with their colleagues in order to share and learn pedagogical practices, asking for advice, suggestions and tips that could help improve their professional practice.

This study could provide researchers with an interesting perspective on promoting teacher reflection through the use of video footage and within a professional learning network. As video recordings have come to be regarded as valuable tool to promote teacher reflection and professional development methods as to how to optimize the viewing of these videos remain unclear. Thus, this study could provide an interesting method that includes both a face-to-face and virtual platform in analyzing video clips of classroom recordings and encouraging reflection.

References

Alsawaie, O., & Alghazo, I. (2010). The effect of video-based approach on prospective teachers' ability to analyze mathematics teaching. *Journal of Mathematics Teacher Education, 13*(3), 223-241. doi: 10.1007/s10857-009-9138-8

Akker, J. J. H. (2006). *Educational design research*. London: Routledge.

Blomberg, G., Sherin, M., Renkl, A., Glogger, I., & Seidel, T. (2014). Understanding video as a tool for teacher education: investigating instructional strategies to promote reflection. *Instructional Science, 42*(3), 443-463. doi: 10.1007/s11251-013-9281-6

Borko, H., Jacobs, J., Eiteljorg, E., & Pittman, M. E. (2008). Video as a tool for fostering productive discussions in mathematics professional development. *Teaching and Teacher Education, 24*(2), 417-436. doi: http://dx.doi.org/10.1016/j.tate.2006.11.012

Bransford, J., Darling-Hammond, L., & LePage, P. (2005). Introduction. In L. Darling-Hammond & J. Bransford (Eds.), *Preparing teachers for a changing world: what teachers should learn and be able to do* (pp. 1-39). San Francisco: Jossey Bass.

Brown, A. L. (1992). Design experiments: Theoretical and methodological challenges in creating complex interventions in classroom settings. *The journal of the learning sciences*, 2(2), 141-178.
Cherrington, S., & Loveridge, J. (2014). Using video to promote early childhood teachers' thinking and reflection. *Teaching and Teacher Education, 41*(0), 42-51. doi: http://dx.doi.org/10.1016/j.tate.2014.03.004

Cochran-Smith, M., & Lytle, S. (2004). Practitioner Inquiry, Knowledge, and University Culture. In J. J. Loughran, M. L. Hamilton, V. K. LaBoskey & T. Russell (Eds.), *International Handbook of Self-Study of Teaching and Teacher Education Practices* (Vol. 12, pp. 601-649): Springer Netherlands.

Cochran-Smith, M., & Lytle, S. L. (1992). Communities for Teacher Research: Fringe or Forefront? *American Journal of Education, 100*(3), 298-324.

Collins, A., Joseph, D., & Bielaczyc, K. (January 01, 2004). Design Research: Theoretical and Methodological Issues. *The Journal of the Learning Sciences, 13*, 1, 15-42.

Curry, M. W. (2012). In Pursuit of Reciprocity: Researchers, Teachers, and School Reformers Engaged in Collaborative Analysis of Video Records. *Theory into Practice, 51*(2), 91-98. doi: 10.1080/00405841.2012.662858

Dewey, J. (1933). How we think: A restatement of the relation of reflective thinking to the educative process.

Frederiksen, J. R., Sipusic, M., Sherin, M., & Wolfe, E. W. (1998). Video portfolio assessment: Creating a framework for viewing the functions of teaching. *Educational Assessment, 5*(4), 225.

Heo, G.M., & Breuleux, A. (2011). Online communication and collaboration in a community of practice for teacher professional development. In H. Spada, G. Stahl, N. Miyake, N. Law, (Eds.), *Connecting Computer-Supported Collaborative Learning to Policy and Practice: CSCL2011 Conference Proceedings. Volume II — Short Papers & Posters* (pp. 856-7). International Society of the Learning Sciences.

Heo, G.M., & Breuleux, A. (2011). *Participatory design research in Building Community through Telecollaboration (BCT) Project*. Paper presentation at the Annual Meeting of the American Educational Research Association (AERA), New Orleans.

Heo, G. M. & Breuleux, A. (2015). Facilitating online interaction and collaboration in a professional learning network. In D. Slykhuis & G. Marks (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2015* (pp. 1170-1177). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).

Jay, J. K., & Johnson, K. L. (2002). Capturing complexity: a typology of reflective practice for teacher education. *Teaching and Teacher Education, 18*(1), 73-85. doi: http://dx.doi.org/10.1016/S0742-051X(01)00051-8

Kang, H., & van Es., E.A. (2015). *Articulating design principles for productive use of videos to facilitate professional learning towards ambitious teaching*. Paper presentation at the Annual Meeting of the American Educational Research Association (AERA), Chicago

Kersting, N. (2008). Using video clips of mathematics classroom instruction as item prompts to measure teachers' knowledge of teaching mathematics. *Educational and Psychological Measurement, 68*(5), 845-861. doi: 10.1177/0013164407313369

Kersting, N. B., Givvin, K. B., Thompson, B. J., Santagata, R., & Stigler, J. W. (2012). Measuring usable knowledge: Teachers' analyses of mathematics classroom videos predict teaching quality and student learning. *American Educational Research Journal, 49*(3), 568-589. doi: 10.3102/0002831212437853

Kisa, M.T., & Stein., M.K. (2015). *The impact of video-based professional development on instruction*. Paper presentation at the Annual Meeting of the American Educational Research Association (AERA), Chicago

Kleinknecht, M., & Schneider, J. (2013). What do teachers think and feel when analyzing videos of themselves and other teachers teaching? *Teaching and Teacher Education, 33*(0), 13-23. doi: http://dx.doi.org/10.1016/j.tate.2013.02.002

Koc, Y., Peker, D., & Osmanoglu, A. (2009). Supporting teacher professional development through online video case study discussions: An assemblage of preservice and inservice teachers and the case teacher. *Teaching and Teacher Education, 25*(8), 1158-1168. doi: 10.1016/j.tate.2009.02.020

König, J., Blömeke, S., Klein, P., Suhl, U., Busse, A., & Kaiser, G. (2014). Is teachers' general pedagogical knowledge a premise for noticing and interpreting classroom situations? A video-based assessment approach. *Teaching and Teacher Education, 38*(0), 76-88. doi: http://dx.doi.org/10.1016/j.tate.2013.11.004

Lin, M. J. J., Hung, S. W., & Chen, C. J. (2009). Fostering the determinants of knowledge sharing in professional virtual communities. *Computers in Human Behavior*, *25*(4), 929-939.

Liu, M.-h. (2012). Discussing teaching videocases online: Perspectives of preservice and inservice EFL teachers in Taiwan. *Computers & Education, 59*(1), 120-133. doi: 10.1016/j.compedu.2011.09.004

Masats, D., & Dooly, M. (2011). Rethinking the use of video in teacher education: A holistic approach. *Teaching and Teacher Education, 27*(7), 1151-1162. doi: http://dx.doi.org/10.1016/j.tate.2011.04.004

Nong, L., Breuleux, A., & Heo, G. M. (2015). Fostering a technology-rich professional learning community: A design-based research cycle. In D. Slykhuis & G. Marks (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2015* (pp. 1236-1244). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).

Rich, P., & Hannafin, M. (2009). Scaffolded video self-analysis: discrepancies between preservice teachers' perceived and actual instructional decisions. *Journal of Computing in Higher Education, 21*(2), 128-145. doi: 10.1007/s12528-009-9018-3

Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers, schools, and academic achievement. *Econometrica, 73*(2), 417-458.

Santagata, R., Zannoni, C., & Stigler, J. W. (May 01, 2007). The role of lesson analysis in pre-service teacher education: an empirical investigation of teacher learning from a virtual video-based field experience. *Journal of Mathematics Teacher Education, 10*(2), 123-140.

Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.

Seidel, T., Stürmer, K., Blomberg, G., Kobarg, M., & Schwindt, K. (2011). Teacher learning from analysis of videotaped classroom situations: Does it make a difference whether teachers observe their own teaching or that of others? *Teaching and Teacher Education, 27*(2), 259-267. doi: http://dx.doi.org/10.1016/j.tate.2010.08.009

Schuler, D. & Namioka, A. (eds). (1993). *Participatory design: Principles and practices*. Hillsdale: Lawrence Earlbaum Associates.

Silva, M. & Breuleux, A. (1994) The use of participatory design in the implementation of Internet based collaborative learning activities in K-12 classrooms, interpersonal computing and technology [online], 2(3), 99-128. Available: http://www.helsinki.fi/science/optek/1994/n3/silva.txt

Star, J., & Strickland, S. (2008). Learning to observe: using video to improve preservice mathematics teachers' ability to notice. *Journal of Mathematics Teacher Education, 11*(2), 107-125. doi: 10.1007/s10857-007-9063-7

Stockero, S. (2008). Using a video-based curriculum to develop a reflective stance in prospective mathematics teachers. *Journal of Mathematics Teacher Education, 11*(5), 373-394. doi: 10.1007/s10857-008-9079-7

Stoll, L., Bolam, R., McMahon, A., Wallace, M., & Thomas, S. (2006). Professional learning communities: A review of the literature. *Journal of educational change*, *7*(4), 221-258.

Stoll, L., & Louis, K. S. (2007). Professional learning communities: Elaborating new approaches. In *Professional learning communities: Divergence, depth and dilemmas*, 1-13.

The Design-Based Research Collective. (2003). Design-based research: An emerging paradigm for educational inquiry. *Educational Researcher*, 5-8.

Tripp, T. R., & Rich, P. J. (2012). The influence of video analysis on the process of teacher change. *Teaching and Teacher Education, 28*(5), 728-739. doi: http://dx.doi.org/10.1016/j.tate.2012.01.011

van Es, E., & Sherin, M. (2010). The influence of video clubs on teachers' thinking and practice. *Journal of Mathematics Teacher Education, 13*(2), 155-176. doi: 10.1007/s10857-009-9130-3

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge, U.K: Cambridge University Press.

Yadav, A., & Koehler, M. (2007). The Role of Epistemological Beliefs in Preservice Teachers' Interpretation of Video Cases of Early-Grade Literacy Instruction. *Journal of Technology and Teacher Education, 15*(3), 335-361.

Zhang, M., Lundeberg, M., Koehler, M. J., & Eberhardt, J. (2011). Understanding affordances and challenges of three types of video for teacher professional development. *Teaching and Teacher Education, 27*(2), 454-462. doi: http://dx.doi.org/10.1016/j.tate.2010.09.015

Dayan, L., Breuleux, A., Heo, G. M. & Nong, L. (2015). Use of video records of classroom practices to support teacher reflection in a professional learning network. In S. Carliner, C. Fulford & N. Ostashewski (Eds.), *Proceedings of EdMedia: World Conference on Educational Media and Technology 2015* (pp. 1100-1109). Association for the Advancement of Computing in Education (AACE).