SPANNING BOUNDARIES: TEACHER NEWSLETTER

The goal of this project is not to provide the reader with the latest PK-20 research. I will, at times, summarize articles published in the last 12 months, yet the intent is to share what I think are relevant, practical, high impact concepts from existing PK-20 research. Not all research presented in this newsletter is of equal methodological rigor. You might question the validity and reliability of some of the shared papers, yet this does not suggest that interesting and potentially useful ideas cannot be derived from questionable empirical practices. This belief is founded on what I think is the purpose of education research—it is not, as Marc Tucker writes, intended to be a prescriptive recipe to follow, but rather a set of ideas strung together to create effective systems for learning[1]. You will see a lot of "might", "can," "maybe," "suggest," and other words that emphasize *possibility*, not certainty.

The SB Newsletter contains research briefs. Some of the links will take you to the full article, others to the abstract. As discussed in the SB Manifesto, this process requires *joint work*. Should you be interested in learning more about a specific article, you will need to access it via other means. You can also contact us to talk more about it. Importantly, some papers are harder to summarize in two pages and require you to explore the original text to get a full understanding of the relevant concepts.

Some concepts will feel obvious. You might, as a classroom teacher, be using some of the techniques explained in the provided research. I experienced this as I combed through research on classroom instruction and organizational change. These papers added much needed conceptual depth and language to the work I had been doing. I hope they do the same for you.

Each article is one page, front and back. I want to save as many trees as possible, but interacting with a hard copy might increase your engagement.

Finally, future newsletters will not have as extensive an intro page. I felt it important to explain my "why" so that the reader better understands what I'm trying to do.

Happy Reading!

Matt Schneidman

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The second issue of the SB Teacher Newsletter combines relevant and practical research with strong theoretical foundations. The TPACK framework in the first article can support the integration of technology into the K12 learning environment; the second suggests that the skill of reflective praxis is critical to a successful teaching practice; the third explores how teachers can infuse political conversations into their classrooms. The second and third papers can be used together. The mediational means of reflective practice described in the Lampert-Shepel and Murphy article can be also be applied to students, providing them critical tools to reflect on controversial political topics. The three papers are:

- Mishra, P., Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017-1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x
- Lampert-Shepel, E., & Murphy, C. (2018). Learning to reflect: Teachers' mastery and development of mediational means and psychological tools of reflective practice. *Journal of Cognitive Education and Psychology, 17*(3), 278-299. http://dx.doi.org/10.1891/1945-8959.17.3.278
- McAvoy, P., & Hess, D. (2013). Classroom deliberation in an era of political polarization. *Curriculum Inquiry, 43*(1), 14-47. https://doi.org/10.1111/curi.12000

TPACK (full-text linked here) builds upon the Garrison, Anderson, and Archer (2001) article from the first SB newsletter to provide educators yet another lens to consider how best to utilize technology in a Covid and post-Covid world. Mishra and Koehler's 2006 article—cited more than 10,000 times and iterated upon by the original authors and other academics[2]—does not represent a "silver bullet" for teachers. You will not find a *quick* strategy to use Google Docs in a writing class or Khan Academy in a Math class. Instead, you are provided template to reflect and act upon (1) the benefits and limitations of technology; (2) the relationship between technology and content and technology and pedagogy; and (3) your philosophy on the use of classroom technologies. Use this activity to help with this process.

In Learning to Reflect (full-text possibly linked here), Lampert-Shepel and Murphy build upon the work of Lev Vygostky, Paolo Freire, and Barbara Larrivee[3] to show that reflective practice is a much more robust activity than the traditional forms of "reflection" most educators are asked to engage in. It is instead a complex higher psychological function that requires constant practice and refinement. Lampert-Shepel and Murphy explore how teachers in the US and Russia theoretically and practically conceptualize the practice of reflection and provide a set of six mediational means (tools) that teachers can use to develop reflective practice.

The research that informed Classroom Deliberation in an Era of Political Polarization (and expanded on in The Political Classroom) was conducted from 2005 to 2009. It is hard to argue that political polarization has decreased since that time—levels of polarization might be even higher now. McAvoy and Hess provide in-depth theory to suggest that classroom deliberation in the K12 space might lower the temperature and act as a critical ingredient to the success of a thriving democracy. Their findings and recommendations can be used by teachers and school leaders interested in creating opportunities for students to engage in democratic practices and discuss controversial issues that impact them both as adolescents and future adults.

A FRAMEWORK FOR TECHNOLOGY INTEGRATION

Title: Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge
Authors + Year: Punya Mishra & Matthew J. Koehler (200)
Keywords: Educational Environment. Educational Technology. Pedagogical Content Knowledge. Technology Integration.

Overview

In their highly cited 2006 paper, Mishra and Koehler ("M&K") propose a conceptual framework for the integration of technology into the PK-20 classroom[4]. The framework was the product of over five years of research on PD focused on capturing the knowledge required to thoughtfully integrate technology into the K12 classroom. It is an amalgamation of technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK), which as a triad (or Venn diagram of three intersecting circles) intersect to form Technological Pedagogical Content Knowledge, or TPACK. TPACK can function as a theoretical, pedagogical, and methodological framework for teachers, education leaders, and academic researchers to analyze and enhance the infusion of technology into the classroom environment.

Theory

M&K synthesize the work of multiple K12 researchers[5] to develop the TPACK framework. Pedagogical knowledge (PK) and content knowledge (CK) have at times been viewed as two bifurcated (yet related) skill sets[6]. CK is understood as knowledge of the actual subject matter to be taught, whereas PK is a "deep knowledge about the processes and practices or methods of teaching and learning and how it encompasses, among other things, overall educational purposes, values, and aims"[7]. Shulman argued that treating PK and CK as distinct and unrelated areas of expertise ignored the complexities of the act of teaching[8]. He proposed a new framework—Pedagogical Content Knowledge (PCK)—to emphasize the "necessary relationship" between pedagogy and content. PK and CK were no longer isolated from one another, implying that "teaching is a highly complex activity that draws on many kinds of knowledge. […] Expertise in teaching is dependent on flexible access to highly organized systems of knowledge"[9].

The evolution of technology and its widespread infusion into the field of K12 education adds another dimension of complexity to the teaching experience—tech no longer has a "transparent" presence in the classroom[10]. And yet, technology was (and often still is) viewed as separate from PK, CK, or PCK. This results in professional development workshops that focus on hardware and software skills but ignore the intersection of pedagogy, content, and technology. "Teachers will have to do more than simply learn to use currently available tools; they also will have to learn new techniques and skills as current technologies become obsolete"[11].

M&K introduced Technological Knowledge (TK) into the PCK framework. They distinguish between two types of TK: knowledge about standard tech (books, chalk, blackboard) and more advanced tech (Internet and digital video). Technological-Pedagogical Knowledge (TPK) is "knowledge of the existence, components, and capabilities of various technologies as they are used in teaching and learning settings, and […] how teaching might change as a result of using particular technologies"[12]. TPK is an understanding of the range of tools and the ability to choose the *right* tool. Technological-Content Knowledge (TCK) is "knowledge about the manner in which technology and content are reciprocally related"[13]. Technological Pedagogical Content Knowledge (TPACK) represents the intersection of all three components. It is not typically held by subject matter experts with limited tech skills or highly proficient technological practitioners with little knowledge of subject matter or pedagogy. In an ideal learning environment, the teacher has comprehensive knowledge of all three domains.

Separating PK, CK, and TK from one another is an "analytic art [that is hard to] tease out in practice"[14]. There is an "essential" tension between these three components: "Teaching and learning with technology exist in a dynamic transactional relationship […] between the three components in our framework; a change in any one of the factors has to be 'compensated' by changes in the other two"[15]. In recent years, M&K have added another component to TPACK to highlight the importance of context[16]. Context includes the students' background and

interests, local setting, and the political environment (among other factors). “There is no single technological solution that applies for every teacher, every course, or every view of teaching”[17].

What It All Means…and What Can I Do With This

TPACK is a potentially valuable framework for practitioners at all levels of the PK-20 continuum. M&K highlight its usefulness for (1) teachers interested in better integrating technology into their classrooms; (2) school and district administrators thinking about how to support teachers with technology; (3) policymakers considering the kinds of technological tools and funding sources practitioners might need; and (4) researchers focused on analyzing the use of technology in classrooms (C).

What can a teacher do? The standard approach is to acquire basic competency with hardware and software, yet as the critique and response to the critique (below) emphasize, this approach is fraught with peril. “Knowing how to use technology is not the same as knowing how to teach with it”[18]. Developing TPACK is an approach that might help teachers better integrate technology into their practice. Teachers should understand that *“technologies often come with their own imperatives that constrain the content that has to be covered and the nature of possible representations”*[19]. Not all technology was developed for the PK-20 space. On the contrary, M&K point out that “most software tools available [...were] designed for the world of business and work, not education” (p. 1032). Much has changed since 2006—the edtech industry has grown significantly[20]—yet what might be the most widely used software tool in 2020, Zoom, was NOT developed for the PK-20 space. TPACK can be used as a planning tool to (1) challenge the viability of recommended classroom technologies and (2) analyze pedagogical decisions that result in the infusion of these technologies into the learning environment (this activity should help with that). Teachers should be asking: Why is a technology right for a specific lesson? How and why does it fit the content and the pedagogy? What might the limitations of that technology be? Educators might also consider developing TPACK by experimenting with various classroom technologies throughout the course of a single lesson, a unit, or a school year (the activity should help with this also).

Possible Critique

(1) Should teachers be expected to keep up with the rapid pace of technological change (in addition to their other responsibilities)? Shouldn’t the tech director or curriculum director (or both) be telling teachers what technologies are best? (2) This is not as much a critique as it is an assessment of progress since M&K published this study in 2006: How much has changed since 2006, especially if one was analyzing this issue in February 2020 (pre-Covid). Prior to Covid, how much were teachers considering the implications of the integration of technology into their classrooms? A teacher doesn’t need to use TPACK—any model that recognizes the intersection of technology with pedagogy and content can be useful. Technology is still often about the hardware and the software (the “stuff”)—*what* technology a school should have rather than how that technology should be used. The directionality is backwards—the how should inform the what rather than the what informing the how.

Response to the Critique

The critique of limited time and resources is real. I do not want to understate the role of the tech director or curriculum director—on the contrary, they can and should play a central role in curating potential classroom technologies. However, educators that do not question the pedagogical utility of the technologies they are given are potentially outsourcing their classroom success. I recognize this may be a bit patronizing, and I am aware that teachers are already being asked to do so much, but technology is here to stay. Developing TPACK is a way to continue to exercise ownership over one’s classroom and its outcomes.

Although the digital divide has been written about for over 20 years, Covid has exposed widespread inequities in access to technology—both the stuff itself and how it is used. Basic access to hardware and software is a necessary yet limited step. The solution is not just to buy a bunch of iPads or Chromebooks. The question must first be, “What do we want to do with those devices?” Once that question has an answer, the hardware and software can follow. Whether TPACK is used to inform that decision making process doesn’t concern me—there are other conceptual tools to use. What does concern me is the absence of such a framework.

REFLECTIVE PRACTICE TO TRANSFORM INSTRUCTION

Title: Learning to Reflect: Teachers' Mastery and Development of Mediational Means and Psychological Tools of Reflective Practice
Author(s) + Year: Elina Lampert-Shepel and Colette Murphy (2018)
Topic: Reflective Teaching. Team Teaching. Cultural Historical Activity Theory.

Overview

> "More than ever, the craft of teaching requires the acceptance of ambiguity, and engagement in active meaning making. In the context of growing diversity, moral uncertainty, conflicting intellectual demands and views on teaching and learning, teachers' reflection as a mere ability to implement the prepackaged curriculum is insufficient to support meaningful educational practice"[21].

Lampert-Shepel and Murphy ("L&M") argue that a much more robust form of "reflection"—what they refer to as reflective practice—is an essential ingredient to a robust learning environment. They work to understand how teachers develop this critical skill through the creation and mastery of what they call "*mediational means*" of reflection—specific *tools* or processes that teachers engage in to support their reflective practice. Only through the development of these mediational means can teachers master reflection and serve as "agents of their own practice"[22].

Theory

L&M use cultural-historical psychology to conceptualize reflective practice as a higher psychological function (HSF)—a "conscious, intentional, and purposeful" process that is developed socioculturally. Reflective practice is "the ability [of a teacher] to regard oneself or one's own action as the other, as the subject of purposeful change"[23]. As a process, it can be supported by "mediational means"—cultural tools that can inhibit or enhance one's ability to reflect. A tool can be a writing prompt or a protocol for reflective conversations with a peer. Because these tools are cultural (as well as political and historical), they vary based on context and perceived purpose and usefulness. Importantly, the development of reflective practice as an HSF represents a "qualitative shift, a transformation rather than an accumulation"[24], suggesting the presence of an *emergent process* rather than a state. 1 + 1 in this situation does not equal 2—the whole is *other* than the sum of its parts.

Findings

Reflective action operates as the unit of analysis—it is the "thing" being studied. Teachers participating in the study identified specific situations that facilitated the beginning of reflective action: an unresolved classroom situation, a student struggling academically or behaviorally, or a challenging interaction with a parent or a colleague. These events inspired a sense of "puzzlement"—an experience challenging enough to "break trial and error" and engage in reflective action. During this time, teachers moved to what L&M call the "ideal plane of action," where they used specific tools ("mediational means") to examine and ultimately transform their practice. They found that educators engaged in six forms of mediational means: (1) reflective dialogue; (2) text/narrative/story; (3) schema/plan-book/note-pad; (4) inquiry/observation/example; (5) performance/ creative activity; (6) metaphor[25]. Teachers were largely unaware of the tools they were using. They also developed an unconscious comfort level with one or two mediational means, and used these exclusively regardless of their contextual fit, suggesting that they did not engage "purposefully" with these tools nor did they have a "full understanding of their limitations and opportunities"[26].

L&M also observed the transformative potential of "reflection in co-teaching." They identified three modes of this form of reflection: (1) co-reflection, or reflection on action; (2) co-planning, or reflection for action; and (3) co-practice, or reflection in action. Part of this practice involves co-teachers reflecting on the "appropriation of the coteaching process in order to improve their own and each other's creative practice, such that their *conscious shared contribution* to design, implementation, and evaluation results in enhanced learning and teaching for all"[27]. Teachers worked together to develop tools to support their own practice and the practice of their colleagues. Co-reflection/peer collaboration itself became a mediational mean.

What It All Means…and What Can I Do With This

"Reflection" is a common educational practice—it's something that teachers, administrators, and students are frequently asked to do. However, the typical enactment of this practice is often limited in scope and impact. Going off to a corner and reflecting for a few minutes on a specific topic or idea is not what L&M have in mind. Reflective practice is instead a "systematic, rigorous process of inquiry-based *thinking with action,* which requires collaboration with others. Its development is onerous, complex, and at times uncomfortable for both pre- and in-service teachers"[28]. It is *not* easy and requires a significant time commitment. Yet because it is a "part of the craft of teaching, teachers *must* learn how to reflect on practice, the array of mediational means of reflection, and ways of developing psychological tools of reflection"[29]. It is the most important skill for educators to master to become true agents of their own practice[30]. To do this, teachers should be aware of the various mediational means and have opportunities to experiment with and develop each tool. A teacher can have a preferred mediational mean, yet they should practice using all tools so that they can apply whichever tool best fits a specific event.

What to do with this? L&M have offer seven mediational means to support the development of reflective practice: (1) reflective dialogue; (2) text/narrative/story; (3) schema/ plan-book/ note-pad; (4) inquiry/ observation/ example; (5) performance/ creative activity; (6) metaphor; and (7) co-reflection. Can you think of a previous "puzzling" experience that facilitated more in-depth reflection? If so, did you use one of these seven tools? Of the seven, is there one that you prefer? Is there one that you have practiced more? In what situations might you use each tool? L&M suggest that knowing how to employ each of these tools is critical to a successful practice. What can you do to develop the skills to master each of these tools? What would that look like? Who in your building can you collaborate with to support the development of various mediational means? How could you use these tools with students to both develop their reflective practice as well as your own?

Although this article is focused on enhancing teachers' reflective practice, it might also be used to support the development of students' reflective practice. For example, the mediational means described by L&M could be used by students to navigate the kinds of controversial political conversations described by McAvoy and Hess in the proceeding article.

Possible Critique

Where will teachers find the time to reflect? Who is going to help them develop tools for reflective practice? Do some/most/any administrators have the skills to support this process? Have they mastered the various mediational means themselves? If reflective practice is, as L&M say, an onerous and at-times uncomfortable process, why should teachers be asked to do it, considering all the other things they have going on?

Response to the Critique

> "Learning how to make meaning of everyday practice using the lenses of various philosophical and theoretical frameworks, and learning how to create, develop, and conceptualize their own practice is important for teachers to become the agents of their professional learning activity through the mastery of the reflection as a higher psychological function. Teachers who are engaged in the continuous inquiry into their teaching and learning have a better chance to create, develop, and sustain the inquiry in their classroom, so vitally important for learning and development of all students in their classrooms"[31].

Is there a higher purpose than this? If a teacher thinks reflective practice is as important as L&M say it is, they should work with their administrators to find the time to master this critical andragogical and pedagogical technique.

POLITICAL CONVERSATIONS IN THE K12 CLASSROOM

Title: Classroom Deliberation in an Era of Political Polarization
Author and Year: Paula McAvoy & Diana Hess
Keywords: Social Sciences. Democracy. Teaching Methods. Democratic Deliberation.

Overview

American politics over the last 15+ years has been plagued by increased polarization—a reality that K12 students will inherit[32]. McAvoy and Hess (M&H) argue that it is during periods of extreme political polarization that teachers should strive to create "political classrooms" that provide students a "meaningful, challenging, and authentic democratic education"[33]. However, a critical ingredient to a successful political classroom—deliberative discussion—is rare[34]. The typical high school social studies class consists of recitation and lecture, with few opportunities for discussion and deliberation[35]. M&H believe that schools have an obligation to transform the traditional social studies classroom and embrace their position as political institutions that develop skills critical to sustaining a thriving democratic electorate. To do this, teachers should create opportunities for students to engage in deliberative democratic practices. Their study of the social studies curriculum at a suburban high school provides a blueprint for educators to do just this by infusing critical conversations about controversial political topics into their classrooms.

Theory

"Researchers and practitioners have identified classrooms as one of the most promising sites for teaching the skills and values necessary for deliberative democratic life"[36]; deliberative discourse establishes a democratic disposition "in which people see each other as political equals, value other points of view, weigh evidence, and become more informed about the political issues they will confront in the public sphere"[37].

M&H make a distinction between discussion and deliberation. Discussion is a form of shared inquiry used to establish common understanding through the process of listening, questioning, and working through ideas. Deliberation is a specific type of discussion, one that aims at deciding on a plan of action that will resolve a shared problem. It is centered on the questions, "What should we do about this?" and "How should we live together".

Findings

M&H identify a series of best practices that allow teachers to develop an open classroom climate: (1) Students discuss and deliberate controversial political issues; (2) students are asked to prepare in advance; (3) most of class participates in the discussion—the teacher is not satisfied by hearing from the same few students; and (4) students direct comments toward their peers, not just to the teacher[38].

They also provide four recommendations for teachers interested in addressing controversial political topics in their classrooms:

1. *Selecting the Right Issues:* "Teach about issues that are authentic and powerful representations of perennial issues that embody conflict between fundamental values (such as security vs. freedom)"—issues that "will never be fundamentally resolved"[39]. These issues create opportunities for students to engage in bigger questions about how to live together in a society.
2. *Distinctions That Matter*: Sort through the noise to see the difference between open and closed empirical questions and open and closed policy questions. *Open empirical questions* are questions that can be answered with evidence but are still open to scientific debate due to conflicting or insufficient evidence (e.g. does food irradiation cause public health problems?). A *closed empirical question* has been sufficiently answered with evidence (e.g. does smoking cigarettes cause cancer?). An *open policy question* concerns a policy for which there are multiple and competing views (e.g. should the US re-engage in the Paris Accords?). A *closed policy question* is one that is currently settled and considered noncontroversial (e.g. should women in the US have the right to vote?). Open and closed conversations

have a place in the classroom but should be taught differently. Closed questions are better addressed through lecture, closed questions through classroom deliberation[40].

3. *Embracing Ideological Diversity*: Take advantage of ideological differences (especially because schools are a *relatively* low stakes environment). Teachers should recognize inter- and intrapersonal differences by engaging students in best practice deliberations.
4. *Avoid Political Proselytizing*: M&H recommend that teachers avoid "purposely trying to cause students to adopt one's own view *on open policy questions*"[41].

What It All Means…and What Can I Do With This

Your reaction to M&H's research likely depends on the question addressed in the Overview: If you do not think schools are political institutions, you might not find this article useful. If you think they are, you might ask how best to engage students in political conversations. M&H make the obvious yet profound point that schools have TEACHERS. Yes, teachers are a *feature* of the schooling system. Why not use them as such? Teachers need training on how to facilitate conversations on controversial topics, and M&H's suggestions above can act as a foundation for that training. They argue that teachers should not view their classrooms as "'pure' deliberative spaces in which any position, no matter how offensive or wrong it may be, should be allowed. Instead, they should see their classrooms as 'regulated deliberative spaces' and explicitly teach and enforce appropriate behavior"[42]. Teach students how to deliberate in a safe way, because as Ms. Heller—a teacher in the study—acknowledged, students are still talking about this stuff at the lunch table, "and if [they] are still talking about it…this at least gives them an appropriate context and a structure with which to sort of deal with some of those charged issues and maybe get an understanding of both sides of the issue"[43].

It is important to note that political conversations can happen in all classrooms—the 2008 Biesta paper in this month's Leadership newsletter suggests that Math class could be a good forum for important political conversations[44]—yet it will likely happen most frequently in social studies class.

Possible Critique

(1) If the ability to engage in civil discourse is the primary skill, what are the subcomponents of this competency? Are reflective practice and media literacy part of this broader skill? What about self-deliberation? (2) Is it fair that we're asking students to be better than our political leaders? How can we expect students to model deliberative democracy in a highly polarized political culture that "does not appear to value deliberation at all"[45]. As I read this, I wondered if the "adults" on TV acted differently as high school students? Is there something rotten at the core of the American political system? If yes, it seems important not just to teach kids how to deliberate but also how to transform systems, something that might be hard for them to imagine considering that many are immersed in a largely antiquated system (schooling). (3) Research suggests that increased political knowledge can make individuals more reluctant to engage in ideas that contradict their policy positions[46]. If this is true, how beneficial is an informed electorate? (4) Should deliberation start with politics? Why not sports? Or movies?

Response to the Critique

(1) Deliberative democracy has a potentially important role in the K12 classroom, but I question if this is the place to start. I am less convinced of the claim that everyone should be political. I think more people should vote, but I do not believe that the ability to address political disagreements is necessary for the typical American. My guess is that M&H would agree and consider skills such as media literacy or reflective practice to be subcomponents of the broader concept of democratic deliberation. Regardless, the last four years should make an educator think about how to teach kids to distinguish between fact and fiction, truth and conspiracy theory. (2) M&H reference Stanley's distinction between the *transmission* of the political world and the *transformation* of the public sphere[47]. Schools should be asking students not to transmit but to transform, to imagine what *ought* to be rather than to perpetuate the status quo. (3) This requires a much longer conversation. (4) Scaffolding is a common pedagogical tool. One can think about the Zone of Proximal Development (ZPD)[48] to understand what kinds of civil conversations students might be able to engage in. The ZPD might start with conversations about books, movies, sports, or music and eventually move into seemingly more contentious political issues.

Notes

[1] Tucker 2019.
[2] Mishra 2019. Mouza et al. 2017. Rosenburg & Koehler 2015.
[3] Freire 1997. Larrivee 2008. Vygotsky 1998.
[4] Mishra & Koehler 2006.
[5] Ball & McDiarmid 1990. Cochran, King, & DeRuiter 1993. Glaser 1984. Leinhardt & Greeno 1986. Shulman 1986, 1987.
[6] Ball & McDiarmid 1990. Shulman, 1986.
[7] Mishra & Koehler 2006, p. 1026.
[8] Shulman 1987.
[9] Mishra & Koehler 2006, p. 1020. See also Leinhardt & Greeno, 1986. Spiro et al. 1988.
[10] Because M&K identify pencils and textbooks as forms of technology, they would argue that teachers have always been forced to integrate tech into their classrooms. However, these tools are not often viewed as "technologies" and have therefore have been rendered transparent.
[11] Ibid, p. 1023. This quote has very different meaning than it did prior to Covid. It is unclear if much progress has been made since 2006—there are significantly more devices in classrooms, yet one should question whether these devices have transformed or improve instruction. Is tech replacing traditional tools or iterating on those tools? For example, replacing a hardcopy textbook with a PDF of that textbook shared on an iPad is changing what exactly?
[12] Ibid, p. 1028
[13] Ibid, p. 1028.
[14] Ibid, p. 1029.
[15] Ibid, p. 1030.
[16] Mishra 2019.
[17] Mishra & Koehler 2006, p. 1029.
[18] Ibid, p. 1033.
[19] Ibid, p. 1025 emphasis mine.
[20] Wan 2021.
[21] Lampert-Shepel & Murphy 2018, pp. 278-279.
[22] Ibid, p. 280.
[23] Ibid, p. 279.
[24] Ibid, p. 281.
[25] Two examples of metaphors are: "Reflection is a brush of the archaeologist with the help of which he manages to remove the dust of time from the discovered object to reveal the meanings concealed by many occasional happenings" and "One image I always have on my mind is that of life as a river, then reflection is like looking at this river from the bank of the river, or jumping above. I see reflection…and I observe it with children too…I will jump from the river, make a picture, a quick shot, and jump back" (Lampert-Shepel & Murphy 2018, p. 287).
[26] Ibid, p. 289.
[27] Ibid, p. 290. Teachers in this study commented that reading teachers' texts about their practice prior to observing their classroom was helpful.
[28] Ibid, p. 290.
[29] Ibid, p. 297 emphasis mine.
[30] Ibid.
[31] Ibid, p. 297.
[32] See Klein, 2014. McAvoy & Hess 2013. McAvoy & Hess 2015.
[33] McAvoy & Hess 2013, p. 16.
[34] Ibid.
[35] Ibid.

[36] Dewey 2004. Gutman 1987. Hanson & Howe 2011. Parker 2003.
[37] Ibid, p. 19.
[38] To learn more about this, you can listen to Fishing for Problems Episode 9 with Dr. Paula McAvoy.
[39] Both quotes from McAvoy & Hess 2013, p. 36.
[40] McAvoy & Hess 2013: Teachers do NOT need to be neutral if specific views (such as the human influence on climate change) are not grounded in empirical findings. It doesn't mean that they cannot acknowledge that other beliefs exist. It is the responsibility of teachers to provide empirical basis for issues and refute politically and economically motivated erroneous claims.
[41] Ibid, p. 42.
[42] Ibid, p. 24.
[43] Ibid, p. 25.
[44] Biesta 2008.
[45] McAvoy & Hess 2013, p. 25.
[46] See Kahan et al. 2013. Klein 2014.
[47] Stanley 2010.
[48] Wertsch 1984.

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