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Tradition & Discovery

Submission Guidelines

PREFACE

We have three distinct foci for this issue: essays on what we are calling "the new positivism," an essay on Polanyi and the Society of Explorers, and two book reviews. Most of this will be self-explanatory, but I will let Collin Barnes, guest editor, speak to the first of our foci—and I want to thank him for his hard work in bringing that material to press.

I also want to welcome Stan Scott to *TAD* editorial board. Stan is retired from the University of Maine Presque Isle where he taught literature and philosophy.

Do remember to keep up with upcoming events at www.polanyisociety.org.

Paul Lewis

A WORD FROM THE GUEST EDITOR

In this issue of *Tradition & Discovery* we have collected several papers on what appears to be a new emphasis on evidence-based assessment practices and industrial production paradigms in the evaluation of undergraduate college students (Marty Moleski), the preparation of American school teachers (Tim Simpson), and the education of primary and secondary school youth in Wales (Nigel Newton). Our contributing authors raise powerful Polanyian objections to these activities, and they propose possible avenues for reform through the thought of Harry Broudy and Michael F.D. Young. Whether the nomenclature of "new positivism" applies in the field of psychology, where arguably many educational assessment practices find their roots (recall E.L. Thorndike), is less certain. As the fourth article in the series explains, while psychologists know better now than in the past recognize the role personal judgments play in interpreting their findings, they still treat such decisions primarily as barriers to knowledge.

The authors' contributions to this issue are greatly valued. We hope they both inspire readers to reflect and assure them that in some quarters of education and psychology today, Polanyi's thought remains at work.

Collin Barnes

NOTES ON CONTRIBUTORS

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Janos Liska (janos.liska@gmail.com) used to teach at the Budapest University of Technology and Economics and Rajk László College for Advanced Studies. He now teaches yoga, seeking to understand how schools and academia could become so boring, whether technology could really change politics, and why breathing slower still seems to matter more.

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A POLANYIAN APPRAISAL OF OUTCOMES ASSESSMENT:
DEFENDING THE ART OF KNOWING AGAINST POSITIVIST PEDAGOGY

Martin X. Moleski, SJ

Keywords: higher education, outcomes assessment, total quality management, Michael Polanyi, tacit knowing, positivism, connoisseurship

ABSTRACT

While it is sensible to measure that which can be measured, outcomes assessment is completely out of step with Polanyi's understanding of personal knowledge. Current assessment practices represent the revival of positivism in higher education. They ignore the tacit dimension of all knowledge, hinder the development of connoisseurship, and reinforce the power of the administrative class.

The roots of "outcomes assessment," a plague that has rapidly spread through our system of higher education in the United States, seem to lie in the success of "total quality management" in industrial processes. The paradigm is simple and extremely appealing: define your goals; adopt methods to reach them; measure the outcomes of the process; continue to refine the methods and measure outcomes until the product meets the standards set for it. Incremental improvements based on measurable outcomes is the secret to the success of a multitude of industries, going back to 1798, when Eli Whitney promoted the use of interchangeable parts for muskets. I love technology, and I am an eager consumer of all kinds of things that have been made cheaper, faster, and better by the power of total quality management, but I am opposed, root

and stock, to the thought that higher education can and should be made subject to this paradigm.

Our ongoing industrial and technological revolution prospers from quality controls because the materials and processes used can be measured very precisely. The comparison of products to design specifications is trivial. If a beer can meets the design standards, but does not work, then the specifications need to be rewritten. Costs and benefits can be easily calculated from a statistical analysis of the inputs and outputs of the plant. Once tolerances have been determined, routines can be devised for the production lines that neither require nor allow any creative genius. Adherence to the prescribed operations is all that is needed to produce the desired outcomes.

Students are not interchangeable parts. They are not standardized billets of aluminum that can be expected to respond uniformly to uniform procedures. They differ from one another both by nature and by nurture. What works wonders with one will fail miserably with others. No teacher can control the variables that affect a student's performance in class. We cannot guarantee the quality of students who enter the class; we cannot impose uniform methods of studying the assigned material; we cannot measure all of the educational outcomes for any one student, let alone the unpredictably diverse group that sticks with a course from beginning to end.

From the first time I heard the proposal that we should apply industrial techniques to the educational system, I have been appalled that anyone could seriously imagine that it would be wise and worthwhile to do so. I am thunderstruck by the speed with which this attitude has infected the educational establishment. I do not have any hope that the spread of the contagion will be checked in my lifetime. In my view, the emperor has no clothes, but his nakedness has not robbed him of his power to punish those who say they cannot see the beauty of his raiment. When I asked an administrator why we should comply with the culture of assessment being imposed on us from above, his reply was, "They will hurt us if we don't do what they say." I understood that he, in turn, would hurt me if I did not do what he commanded. I made the mistake of giving him a Nazi salute and saying rather loudly, "Heil, Hitler!" I then learned through personal experience that when dealing with people who are willing and able to inflict pain on underlings, it is not wise to mock them publicly.

From my first year in college, I wanted to be a college professor. I loved the classroom environment and felt changes taking place in me through the dialogue with my teachers. Every semester, without fail, I would feel connections between my courses as I wrote my term papers and prepared for the final exams. Of course, I liked some professors and classes better than others, and I behaved more responsibly in some classes than others. I did not act or react in a predictable fashion to the material presented to me. In the eighteen years of study that I enjoyed from the first college class that I took as a student until the first college class that I taught, I found that seeds planted by my teachers would unexpectedly bear fruit years later. It took me five years to grasp the problems

posed by the similarities and differences in the synoptic gospels; eight or ten years to come to terms with the two stories of creation in Genesis; and about twenty years to finally see the point that a guru had made in a one-day seminar on meditation. I have heard it said that when the student is ready, the teacher appears. In my case, when I was ready, the teachings returned.

When I began to teach in my turn, I expected that my students would, like me, take what they liked from my courses and heave the rest. I hoped that they might also, like me, see good fruit springing up years later from the time we had spent together, but I did not expect to plant seeds one day and harvest apples the next. I asked the students to memorize a lot of information in all of my courses—names, dates, times, places, and definitions that could be tested objectively—but my purpose in doing so was to feed their creative unconscious with the kind of material that can produce insight. This was always an uphill struggle, one that became worse with the development of tools like Google. The internet is a magnificent reservoir of information, and I use it all through the day, but the information that changes our lives is inside us, where we can ruminate on it and make unforeseen connections through insight. Learning by heart is what prepares us to think things through for ourselves. I was content to let students slide through my courses, doing minimum work and earning a minimum grade, if they wished. I designed the grading system to make it easy to get a C but a real achievement to earn an A. As a general rule, if students absorbed 50% of the objective material, they could get a "gentleman's C" by attending class, participating in discussions, and completing all of the writing assignments.

My goal as a teacher was to provide my students a living model of how to read, write, and reason like a professional theologian. Polanyi says that "All knowledge is tacit or is rooted in tacit knowing" (*M*, 61; *KB*, 195; *SFS*, 10), that "we know more than we can tell," and that, consequently, our words mean more than we can say (*TD*, 4). What this suggests to me is that I do not possess a perfectly "clear and distinct" account of what I know or how I know it, which, in turn, suggests that I will never be in a position to control what my students learn from me or how they learn it.

> To learn by example is to submit to authority. You follow your master because you trust his manner of doing things even when you cannot analyze and account in detail for its effectiveness. By watching the master and emulating his efforts in the presence of his example, the apprentice unconsciously picks up the rules of the art, including those which are not explicitly known to the master himself. These hidden rules can be assimilated only by a person who surrenders himself to that extent uncritically to the imitation of another. A society which wants to preserve a fund of personal knowledge must submit to tradition (*PK*, 53).

Reading, writing, and reasoning are all arts, not sciences. I rely on tacit powers in order to exercise these skills, and I expect my students to do the same: "For just as, owing to the ultimately tacit character of all our knowledge, we remain ever unable to say all that we know, so also, in view of the tacit character of the meaning, we can never quite know what is implied in what we say" (*PK*, 95). This means that I do not know exactly what I am teaching or exactly how the students learn, but I trust that doing the same kinds of things my teachers did for me will be equally educational for my students. As Polanyi says of himself, "*I believe that in spite of the hazards involved, I am called upon to search for the truth and state my findings*" (*PK*, 299; emphasis in original). This is a good motto for professors.

The culture of assessment is based on a very different model of teaching. I believe it is an instance of the "ideal of scientific detachment" that Polanyi saw as a destructive force "in biology, psychology, and sociology…and far beyond the domain of science" (*PK*, vii). The theory of those obsessed with assessment is a form of positivism. As one of my colleagues put it, "For them, if it wasn't assessed, it didn't happen." Total quality management in education means defining exactly what will be taught in advance of beginning the course, shoving that exact content down the throats of every student, then designing methods to determine how closely the material regurgitated by the students matches what was fed to them. The end result is a fraction or series of fractions that express the discrepancy between input and output.

There are, of course, many avocations which require mechanized learning. I do not want to fly with copilots who have mastered only 50% of the instruments in the cockpit or who decided to ignore some of the less interesting laws of aerodynamics or navigation in their studies. For pilots, surgeons, engineers, electricians, and other technicians, I want the pass/fail line set at 95%, and I have no objection to the assessment of instructors on the basis of how many of their students reach that threshold. When it comes to skills that make the difference between life and death, I am dead set against academic freedom. Test such students to within an inch of their lives, early and often. They need to be able to recall how things work under stress, and there is no substitute for stress rehearsals in their training. There are also introductory courses that are necessarily slanted toward memorization of vast quantities of material in mathematics, physics, chemistry, biology, pre-med, and the like, because it is not possible to begin the discussion of the interesting areas of research until the basic vocabulary of the field has been mastered.

What is ideal for those well-defined and very technical fields is the stuff of nightmares and the kiss of death for the humanities. Outcomes assessment demands that every course be reduced to the bare bones of what can be clearly defined and measured. The only thing that matters to the obsessors is what can be quantified in one academic term. There is no room in their worldview for "an understanding which we cannot put into words and which is continuous with the inarticulate faculties of animals" (*PK*, 90).

For Polanyi, education does not eradicate the tacit dimension, but expands it: "Other intellectual skills of a high order are acquired similarly in the course of a continued formal education; and indeed our mute abilities keep growing in the very exercise of our articulate powers" (*PK,* 70). This is true even of technicians, of course. After winning their certificates, they must put what they have learned into practice. There is a huge difference between a newly-graduated pilot and one with thousands of hours of flight experience, a difference that cannot be measured by testing retention of information—both should know the material covered in their instruction manuals—but that is demonstrated by the manner in which they cope with novel and unexpected situations in flight.

The outcomes obsessors focus on only part of the life of the mind at the expense of the whole. They seem to be suffering from physics envy:

> The avowed purpose of the exact sciences is to establish complete intellectual control over experience in terms of precise rules which can be formally set out and empirically tested. Could that ideal be fully achieved, all truth and all error could henceforth be ascribed to an exact theory of the universe, while we who accept this theory would be relieved of any occasion for exercising our personal judgment: we should only have to follow the rules faithfully. Classical mechanics approaches this ideal so closely that it is often thought to have achieved it. But this leaves out the element of personal judgment involved in applying the formulae of mechanics to the facts of experience (*PK,* 18-19).

Polanyi advocates the development of personal powers of judgment that cannot be reduced to rules and regulations or measured by objective tests. He insists that "connoisseurship" is essential to "the art of knowing":

> Wherever connoisseurship is found operating within science or technology we may assume that it persists only because it has not been possible to replace it by measurable grading. For a measurement has the advantage of greater objectivity, as shown by the fact that measurements give consistent results in the hands of different observers all over the world, while such objectivity is rarely achieved in the case of physiognomic appreciations. The large amount of time spent by students of chemistry, biology and medicine in their practical courses shows how greatly these sciences rely on the transmission of skills and connoisseurship from master to apprentice. It offers an impressive demonstration of the extent to which the art of knowing has remained unspecifiable at the very heart of science (*PK,* 55).

If knowing is an art (*PK*, 55, 64, 71, 88, 153) then we need artistry in teaching, not the pedagogy of the pedants. "An art which cannot be specified in detail cannot be transmitted by prescription, since no prescription for it exists. It can be passed on only by example from master to apprentice" (*PK*, 53).

In designing courses, I always did think ahead about what materials to use to spur learning in my classes. I looked for examples of problems, some solved and some as yet unresolved, that would demonstrate the nature of theological reflection. I was deliberately acting as a connoisseur of the Catholic theological tradition. "While the athlete or the dancer putting forward their best, act as critics of their own performances, connoisseurs are acknowledged as critics of the goodness of specimens. All personal knowing appraises what it knows by a standard set to itself" (*PK*, 63). I am satisfied that other professors in other disciplines act in the very same way in order to show their students how to think like scientist or a psychologist or a historian.

> Although the expert diagnostician, taxonomist and cotton-classer can indicate their clues and formulate their maxims, they know many more things than they can tell, knowing them only in practice, as instrumental particulars, and not explicitly, as objects. The knowledge of such particulars is therefore ineffable, and the pondering of a judgment in terms of such particulars is an ineffable process of thought. This applies equally to connoisseurship as the art of knowing and to skills as the art of doing, wherefore both can be taught only by aid of practical example and never solely by precept (*PK*, 88).

For me, if a syllabus is approved by a professor's peers, then the odds are excellent that the tradition of that discipline will be transmitted to the next generation.

I have nothing but hostile opinions to offer as a theory of why the most miserable form of pedantry has become the dominant paradigm for higher education over these last thirty years or so. I have heard it said that part of the drive comes from business executives on our boards who have seen good results in industry from total quality management. Some of my colleagues attribute it to the "No Child Left Behind" legislation, which attached punishments and rewards to measurable outcomes in public schools. My own guess is that the total quality model appeals to administrators at all levels because it promises them control over the classroom without requiring them to be connoisseurs themselves. When the outcome of teaching can be reduced to the fraction of output divided by input, any moron can look at the numbers and say, "You can do better than that." The measure is all that matters. This gives administrators the opportunity to fire poorly-performing professors without looking at anything other than the telltale number.

The reduction of teaching to a number also empowers the accrediting agencies. By imposing this system on all of the member institutions, the agencies have found a way to exercise real control over university life. They can now demonstrate that they have made a difference in the curricula of our universities. The fact that universities came into existence, flourished, and produced western civilization as we know it without the benefit of any accrediting agencies means nothing. "If it wasn't assessed, it didn't happen."

This is essentially a religion. The assessors are not assessed. No administrator has to meet the standards that the administration imposes on teachers unilaterally. They give lip-service to the culture of assessment, but do not endure the hardship themselves. They clothe themselves in the white robes of empiricism and grasp the scepter of positivism. They demand proof from their subjects without providing any proof that their requirements are reasonable. Of course, measuring what can be measured is good advice, but reducing the field of higher education to the measurable is insane.

> Though I dissent from this ideal in its absolute form, since I hold that the elimination of personal knowledge from science would destroy science, I acknowledge the decisive achievements of empiricism in opening the way to modern science. Nor do I deny, of course, that science is constantly in danger from the incursion of empty speculations, which must be watchfully resisted and cast out; but I hold that the part played by personal knowledge in science makes it impossible to formulate any precise rule by which such speculations can be distinguished from properly conducted empirical investigations. Empiricism is valid only as a maxim, the application of which itself forms a part of the art of knowing (*PK*, 153).

To me, the spread of the cult of assessment is an example of a moral inversion in which "moral passions…decked out as scientific statements" lead to a "fanatical cult of power" (*PK*, 231). The government has placed accrediting agencies in charge of the universities; the accreditors have imposed one model of pedagogy on all schools; the administrators of the universities have placed themselves in charge of the curriculum. As the meme says, "All your base are belong to us." "Modern scientism fetters thought as cruelly as ever the churches had done" (*PK*, 265).

By contrast with "the objectivist urge to depersonalize our intelligent mental processes" (*PK*, 257), Polanyi affirms the central role of personal judgment: "Our theory of knowledge is now seen to imply an ontology of the mind. Objectivism requires a specifiably functioning mindless knower. To accept the indeterminacy of knowledge requires, on the contrary, that we accredit a person entitled to shape his knowing according to his own judgment, unspecifiably" (*PK*, 264). I much prefer the ancient

system of trusting professors accredited by the judgment of professors to teach responsibly. The presumption of innocence, good will, and competence has been replaced by a Napoleonic premise that professors must prove, in every course and in every term, that they have taught something definite to someone.

> Objectivism has totally falsified our conception of truth, by exalting what we can know and prove, while covering up with ambiguous utterances all that we know and cannot prove, even though the latter knowledge underlies, and must ultimately set its seal to, all that we can prove. In trying to restrict our minds to the few things that are demonstrable, and therefore explicitly dubitable, it has overlooked the a-critical choices which determine the whole being of our minds and has rendered us incapable of acknowledging these vital choices (*PK*, 286).

For the obsessors, only that which can be shoved into students and extracted again is of any importance. Nothing else matters to them: "The ideal of strictly objective knowledge, paradigmatically formulated by Laplace, continues to sustain a universal tendency to enhance the observational accuracy and systematic precision of science, at the expense of its bearing on its subject matter" (*PK*, 149). This mentality leads to the construction of the kinds of courses that students justifiably hate: "A result obtained by applying strict rules mechanically, without committing anyone personally, can mean nothing to anybody" (*PK*, 311).

I do not have any hope of stemming the tide of misguided objectivism in our culture or in the accrediting agencies. I do not think the obsessors will pay the slightest bit of attention to objections raised by a tiny voice in the great crowd of their subjects. The emperor has no clothes, but he is persuaded that he is clothed in glory, and that is all that matters.

REFERENCE

Polanyi, Michael. 1962. *Personal Knowledge*. Chicago: University of Chicago Press..

POLANYIAN INSIGHTS ON "PROFESSIONAL" TEACHER PREPARATION

Timothy L. Simpson

ABSTRACT

To demonstrate the power and scope of Polanyi's thought, this paper will establish the importance of Polanyi's abundant insight for the accreditation of educator preparation programs in higher education. This inquiry will begin with a brief summary of the role and purpose of accreditation of educator preparation programs, highlighting the positivist presuppositions driving the current assessment process. With the aid of Harry Broudy, a close student of Polanyi, the essay will identify the implications of those presuppositions for educator preparation programs. Broudy's analysis suggests that, despite claims to the contrary, the current assessment process fails to produce a professional teacher. In contrast, inspired by a rejuvenated perspective informed by Polanyi's monumental elucidation of the tacit dimension, assessment of educator preparation programs may instead cultivate a truly professional teacher for our schools. The closing section of this study will provide an outline of such a renaissance.

While it is widely understood that Michael Polanyi is a penetrating philosopher of science who offers a revolutionary epistemology and theory of meaning, I believe with David Rutledge that it is even more profitable to view Polanyi "as a visionary who, despite *not* fitting neatly into the academic discipline of philosophy, nevertheless presents insights about basic problems that illuminate wide areas of intellectual life" (Rutledge 1991, 5). To demonstrate the power and scope of Polanyi's thought, this

paper will establish the importance of Polanyi's abundant insight for the accreditation of educator preparation programs in higher education.

This inquiry begins with an overview of the nature and purpose of accreditation of educator preparation programs (EPPs), highlighting the positivist presuppositions driving the current assessment process. With the aid of Harry Broudy, a renowned philosopher of education and close student of Polanyi, the essay reveals that these presuppositions create an attenuated conception of teaching and the teacher. Indeed, Broudy's analysis suggests that, despite claims to the contrary, the current accreditation process fails to produce a *professional* teacher—a term whose unique meaning for Broudy will be discussed more fully in section three. In contrast, inspired by a rejuvenated perspective informed by Polanyi's monumental elucidation of the tacit dimension, educator preparation programs may instead cultivate a truly *professional* teacher for our schools. The closing section of this study will provide an outline of such a renaissance.

CAEP Assessment and its Positivist Presuppositions

In 2013, the Council for the Accreditation of Educator Preparation (CAEP) formed to become the "new, sole specialized accreditor of educator preparation" (CAEP 2013). Cochran-Smith, et. al. maintain that "CAEP was designed to be a 'watchdog' of teacher quality and accountability by marshalling professional control of teacher education, while maintaining 'external objectivity' regarding individual programs" (Cochran-Smith 2018, 76). "CAEP's approach to accreditation," claims Mary Brabeck, Chair of CAEP Board of Directors, "will further professionalize the field" (CAEP 2013).

Unique to CAEP's "new direction" to revolutionize educator preparation is its "evidence based accreditation" (CAEP 2016b, 5-6). CAEP's "new direction" is elucidated in their diagnosis of the problem in educator preparation and their prescription for it. CAEP diagnoses the problem of educator preparation as a prior focus on "process oriented system of accountability" (Brabeck and Koch 2013), which lacked valid and reliable evidence for assessing appropriate outcomes. This focus was exacerbated by the fact that programs were unable and/or unwilling to move away from "theoretical, academic preparation" (Ibid.). CAEP's prescription for this problem was to establish accreditation as an evidence-driven accountability mechanism that was grounded in the assumption that more rigorous standards and systematic collection and analysis of valid and reliable evidence would ensure high quality candidates and programs (CAEP 2015). So, whereas in the past educator preparation programs failed to collect, analyze, and utilize "quality" evidence to ensure candidate and program quality, CAEP insists on it.

Critical to this "new direction," then, is the notion of "quality" evidence. The "CAEP Evidence Guide" states that non-quantifiable evidence is acceptable, but it

prefers observable, measurable, objective performance as evidence (Ibid.). In "Report Highlights: Building an Evidence Based System for Teacher Preparation," a key supporting document for CAEP's "Evidence Guide," of the thirteen (13) Key Effectiveness Indicators, indicating that an educator preparation program produces effective teachers, "9 are clearly statistics gathered from tests, numbers and percentages of students, and surveys, including 'value-added' statistics" (Teacher Preparation Analytics 2014 as cited in Schwarz 2015, 110). CAEP itself contends, "[C]ertainly, where available and appropriate, quantitative data will be powerful and it is expected that much of the information an institution advances in support of its claims for capacity and educational effectiveness will be in numeric form" (Western Association of Schools and Colleges 2013 as cited in CAEP 2015, 6). Additionally, CAEP demands that any evidence must be "valid, reliable and fair (free from bias)" and must meet "accepted research standards" (Ibid., 8). In short, CAEP's notion of "quality" evidence reveals that we know only what we can formulate in explicitly observational terms and we are certain we know it only if we can use an empirical test to validate it. Otherwise, we possess no "quality" evidence of knowing.

CAEP's understanding of "quality" evidence betrays the positivist presuppositions driving assessment of EPPs. Broadly put, positivism, in the tradition of Comte to 20th century logical positivists, holds that what we can know is observable, empirical, and measurable evidence and that we can know it only through scientific or empirical observation (Kneller 1984). Further, such knowledge should be gained from a value-free, impersonal, and objective approach to the evidence. Ideally, positivism contends that through such a series of observations we may identify a causal relationship between two facts. Like positivism, CAEP wants instructional and program objectives stated in observable, measurable form. It prefers evidence that is valid, reliable, and fair which means that it is evidence gained through objective and empirical means. CAEP, like positivism, assumes that through such methods it will draw a causal relationship between the EPP teachers and program practices and the quality of its candidates and program. Without empirical data and scientific observation required by CAEP's "culture of evidence," CAEP contends that the EPP cannot claim to know if it is producing a quality teacher candidate and causing high impact learning in P-12 classrooms.

Impact of CAEP's Positivist Presuppositions on EPP's

CAEP's positivist presuppositions significantly impact EPPs in several, perhaps unexpected and unintended, ways. Such presuppositions shape 1) what the EPP teaches, 2) what the EPP accepts as learning, 3) how the EPP teaches, and 4) the expectations of teaching by teacher candidates.

CAEP asserts that EPPs must ensure that candidates develop an understanding of content and pedagogical knowledge (CAEP 2016a, Standard 1). However, if it is

assumed, as CAEP does, that only that can be tested which can be stated and measured objectively, then only that shall be taught which can be stated and measured objectively. CAEP accepts non-quantifiable and non-objective evidence, but they clearly prefer observable and measurable evidence. Thus, any content knowledge taught, such as knowledge of content standards, must be in propositional form. A premium, then, is placed on teaching facts, definitions, rules, and principles, stated in explicit, objective form. The case is similar for pedagogical knowledge. CAEP requires that teacher candidates know and use "evidence based strategies of instruction" (CAEP 2015, 18). Such strategies or operations are taught as formulas for memorization and replication.

CAEP's positivist presuppositions also influence a notion of learning. With a high premium on teaching measurable information, there is an emphasis on the teacher candidate reinstating, or literally re-stating, the original learning pretty much as learned in response to definite cues. CAEP seems to assume that "only school inputs that can be replicated are properly said to have been learned, and that inputs which cannot be replicated need not and perhaps should not be taught" (Broudy 1970, 92). Thus, CAEP's assessment of EPPs reinforces a theory of knowledge that regards learning primarily as storing and fixing associations among inputs. We may, using Harry Broudy's formulation of "uses" of schooling, identify CAEP as adhering to a "replicative" use of schooling (Broudy 1981). A successful EPP, then, is one that certifies that teacher candidates can replicate learning inputs on demand as transmitted.

A focus on teaching and learning information further drives the EPP towards adoption of an instructional mode. What instructional mode is most successful for imparting and imprinting information? To ensure that facts and strategies are learned for rote recall, a didactic mode of instruction is preferable (Broudy 1972a, 5-6). "By didactics is meant the style of teaching that organizes materials in systematic segments: presentation of the task, illustrations of desired outcomes, testing trial responses, drill, correction of trial responses, and end-of-course testing" (Broudy 1983, 5-6). For example, multiplication tables, spelling words, events and dates of history, solving equations, are all included under didactics. In sum, this mode of instruction is designed to ensure facts, formulas, and processes are imprinted in the student for immediate recall on demand. When not employing a didactic mode, teacher candidates must demonstrate adoption and execution of "evidence based strategies of instruction." The best evidence, according to CAEP, that a teacher candidate is successful "involves forms of assessment in which candidates are asked to perform tasks similar to those they will face in their initial employment as education professional" (CAEP 2015, 18). In other words, when not adopting a didactic mode, teacher candidates are replicating research based practices in the classroom to ensure the replication of learning objectives.

What is more, CAEP's requirement that EPPs demonstrate that teacher candidates "cause a high impact on all P-12 students" further reinforces adoption of a didactic

mode and replication of strategies by said candidates (CAEP 2016a, Standard 2). By "high impact," is meant a statistically significant increase in student scores on standardized tests (CAEP 2015, 30, see fn 30). Because standardized tests used in schools share the same positivist presuppositions on content and learning as CAEP, that is, they expect recall of objective, measurable information, teacher candidates must also ensure measurable, objective evidence in student learning. Like the EPP teachers, P-12 teacher candidates are led to embrace modes of instruction to ensure demonstration of high impact learning. Thus by example and exhortation CAEP reinforces adoption of the replicative use of schooling and a didactic mode of instruction.

Deprofessionalization of Teaching: Craft v. Profession

CAEP contends that its "evidence-based accreditation" will ensure that EPPs produce professional teachers. CAEP's positivist presuppositions appear to support implementation of a replicative use of schooling and a didactic mode of instruction. Is the impact of CAEP's positivist presuppositions on teaching creating a *professional* teacher? Or, ironically, might CAEP's adherence to those presuppositions deprofessionalize the teacher and teaching?

We are aided in our analysis of these questions by Harry Broudy. Broudy was a renowned philosopher of education in the mid-twentieth century who wrote and presented extensively in a wide variety of venues addressing a diverse array of educational policy and practice issues. A primary focus of his scholarship was the concept of teaching and teacher education. He provided commentary on the first National Council of Accreditation of Teacher Education (NCATE- a forerunner of CAEP) statement on teacher education (Broudy 1959) and was requested to comment on American Association of Colleges of Teacher Education (AACTE) teacher education policy recommendations (Broudy 1967a; Broudy, 1972a). A leading motive of Broudy's work was defining and defending teaching as a profession against what he believed was a diminution of the profession. To that end, he explored the distinction between a "craft" and a "professional" conception of teacher education and teaching (Broudy 1956, Broudy 1962, Broudy 1965a, Broudy 1965b, Broudy 1967a, Broudy 1972a, Broudy 1972b, Broudy 1980, Broudy 1983). We shall explore that distinction here to aid our assessment of CAEP's impact on EPPs.

Broudy acknowledges that craft and profession share much in common. Both require a level of mental engagement, a measure of manual proficiency, and a degree of skill and energy to complete a task. For Broudy, though, a defining element of craft is rule following. He offers an example of a plumber (Broudy 1988, 8-9). In life, the plumber is tested by both his ability to *replicate* what he has learned formally and to *apply* relevant selections from that instruction to the set of tasks that make up his vocation. Broudy states,

The plumber is a craftsperson who has learned the standard tasks and solutions as an apprentice to a master plumber. Drilled in the procedures for correcting a specific set of predicaments in plumbing equipment, he applies the procedure to each instance of that class. There is the class of predicaments that might be labelled 'stopped up drains,' and if this trouble is recognized as an instance of the class, then the rule of procedure for stopped-up drains is put into practice (Ibid).

On Broudy's view, the craft teacher operates in much the same way. Like the plumber, a craft teacher is also tested by both her ability to *replicate* what she has learned (e.g. content and pedagogical knowledge) and to *apply* relevant selections (e.g. "evidence-based strategies of instruction") from that instruction to the set of tasks that comprise her vocation. Drilled in the strategies for instruction for correcting a specific set of teaching-learning problems, she applies the strategy to each instance of that class. For example, there could be a class of predicaments labelled "unruly child" or "mixing up of 'x' and '+' in math facts" and if this trouble is recognized as an instance of a class, then the rule learned for that class is put into practice.

Broudy acknowledges that such a craftsman may be skilled, efficient, and successful and that the advantages of such a preparation program are not lightly dismissed. After all, he argues, "the best proof that T can do X is that he is already doing it" (Broudy 1975, 27). In addition, the performance of a teacher can be judged as successful at any given moment via observation or student assessment. Further, Broudy contends that if we could train, in his words, "technicians" to perform most classroom functions by following rules, then we could significantly increase the school's productivity. Thus, for Broudy, to identify teaching as a craft is not to denigrate it, but to recognize it for its unique and useful quality of rule following.

While acknowledging the skill and advantages of a craft teacher, Broudy asserts that such teachers are limited to technical proficiency. They perform rule-governed and nearly automatic, prescribed behaviors. For this reason, Broudy often equates a craft teacher with "technician," "didactical machine" or "paraprofessional," but not a professional (Broudy 1972a, 12-14: See also Broudy 1980, Broudy 1983).[1] Broudy exposes the limitations of a craft teacher through his discussion of the plumber. He states, "If the rule [used by the plumber] does not work, [a rule] for another class of difficulties may be tried, but there is a limit to the plumber's repertoire of procedures" (Broudy 1988, 8). Eventually, all procedures could be exhausted and the difficulty remain. Likewise, there is a limit to the class of difficulties possessed by the plumber used to identify a difficulty. What if the plumber cannot account for the cause of a problem? How would he know which procedure to use? It is conceivable that not all difficulties experienced by a plumber are within his scope of classifications. What then?

If the techniques and classes of the plumber are exhausted, then, for Broudy, "a higher authority" must be invoked. The higher reaches of application and classification, he argues, "entail understanding of principles and theory that generate hypotheses as to the causes of the difficulty as well as suggestions for coping with [it]" (Ibid., 8-9). Who possess such understanding? In this case, the sanitary engineer; or, in Broudy's terms, a professional.

For Broudy, the difference between a craft and professional is the role theory has for each, and in the degree to which theory and practice are united in the person (Broudy 1956, 178). A professional, as opposed to a craft, possesses a theoretical foundation that unites with practice. What exactly Broudy means by theoretical foundation and its advantage begins to emerge through the following question: "Why then, despite, these advantages [of a craftsmen's skill gained through apprenticeship training], did law, medicine, engineering, and education move from apprenticeship training to the establishment of formal institutions to prepare practitioners?" (Broudy 1975, 27). Because, for Broudy, formal institutions provide the theoretical knowledge to both address and advance beyond the limitations of a craft. "Medicine," claims Broudy, "was a craft so long as it was confined to trial-and-error knowledge. It became a full-fledged profession when biology, chemistry, physiology, and bacteriology provided a theoretical foundation for its practice" (Broudy 1956, 178). Such disciplinary knowledge gives the doctor a broader conceptual context by which to diagnose ailments and prescribe solutions. It is the knowledge the doctor "thinks with" and "judges with" but may not utilize directly to remedy the patient. Similarly, Broudy maintains that "there is no alternative to a program of teacher education in which theory that enables the practitioner to be rational about rules plays a prominent part. But what sort of theory is available for this purpose?" (Broudy 1972b, 54). Broudy rejects the idea of "applicational theory," such as the application of, say, "Skinnerian theory of operant conditioning to the designing of teaching machines or to the maintenance of discipline in the classroom" (Ibid., 55). He believes that the amount of empirical theory that can be applied to practice in education in this way is "pitifully small" (Ibid.). Instead, Broudy advocates for what we can term "interpretive theory." From "interpretive theory," however, Broudy argues "no rules for pedagogical practice can be deduced" (Ibid., 56). Consequently, its usefulness is endlessly questioned by teachers, administrators, and policymakers, such as CAEP, as it provides no toolkit for immediate classroom application. However, Broudy believes this kind of theory is useful in another sense. The most plausible defense of interpretive theory is that it provides "context of practice" rather than rules for practice (Ibid). He remarks,

> Thus, an understanding of the sociology of poverty does not directly give rules for healing the diseases of the poor, but the dietary prescriptions that a physician might give to the poor will be more

enlightened if he does understand the sociology of their condition. Knowledge of social context, therefore, affects the general strategy of education, of appraising the teaching situation in many dimensions, and for making decisions that take account of these dimensions (Ibid., 56-57).

For Broudy, then, even though it does not prescribe rules, it is nonetheless useful because it sites "educational problems in their appropriate context—psychological, historical, philosophical, societal. Together with the cognate content of selected academic subjects, these supply the ideas and attitudes one teaches *with*, not *to*, pupils" (Ibid., 58). The entire teaching style of a teacher may be influenced in unspecifiable ways by the layers and shades of meaning that the study of theoretical knowledge builds into the background of the teacher. Broudy, betraying the influence of Michael Polanyi, states, "For, paradoxically, some studies function not because they are retained as learned, but rather because we forget selectively, so that only a framework of cognitive and evaluative categories remain to shape perception and feeling without themselves being perceived" (Broudy 1975, 33). For Broudy, then, the teacher with theoretical knowledge who can interpret or contextualize the educational situation addresses and advances beyond the limitations of a craft teacher because she thinks with, feels with, judges with, knows with, and teaches with a theoretical knowledge that perceives the educational endeavor from a broader, richer perspective and, thus, is able to generate hypotheses to the causes of teaching-learning difficulties and recommend paths for addressing those difficulties.

With a working distinction between craft and professional, we may return to evaluate CAEP's impact on the teacher. Is CAEP producing a *professional* teacher? With the aid of Broudy's analysis, this essay contends that CAEP produces a teacher more closely resembling a craft teacher than a professional teacher.

First, CAEP rejects the knowledge essential to a professional. Recall that for Broudy a professional possesses a body of theoretical knowledge and unites that theory with practice in the act of teaching. CAEP, however, identifies "theoretical, academic coursework" as a primary cause of the past poor performance of EPPs. Further, it replaces it with coursework in content and pedagogical knowledge for replication in conjunction with replication of strategies to improve student test scores.

Second, a professional's knowledge does not meet CAEP's standard for "quality" evidence. For CAEP "quality" evidence means observable, measurable performances. Can theoretical knowledge translate to observable, measurable performances? For example, can InTASC Standard #2, "understanding of individual differences," be an observable, measureable performance? (Council of Chief State School Officers 2011, 8). It would seem that some measure of theoretical knowledge is necessary for understanding an individual and their differences. Are there observable performances that

could demonstrate this understanding? Unless you transform such understanding into facts and definitions, then it seems difficult to imagine such understanding becoming an observable, measurable performance. Of course, when you transform understanding to facts and definitions, which CAEP does, you reduce theory to information. Thus, a professional's distinctive knowledge is denied as a legitimate source of evidence of a quality teacher.

Third, by rejecting theoretical coursework in educator preparation and rejecting theoretical knowledge as legitimate evidence of a quality teacher, CAEP rejects the interpretative theory of the professional for applicational theory of the technician. Recall that for Broudy the professional's knowledge of theory provides rich, context-building to view the teaching-learning transaction. Such interpretation affords deeper appreciation for the human complexities of the situation, but is not a source of rules for direct, immediate application. CAEP's support for replicative learning and application of prescribed strategies produces a teacher more akin to a didactical machine that follows rules. What matters most is executing canned strategies to raise student test scores not deep, contextual knowledge of the situation to diagnose problems and reflect on solutions in the teaching-learning transaction.

In sum, CAEP threatens the professional status of teaching by supporting the view that educator preparation should consist only of a) subject matter to be taught and b) practice in teaching it. On this view, "teacher education should be reduced to 'knowings that' to be taught and some 'knowings how,' to teach it, but there would be no room for 'knowings with,' i.e. for knowledge that would not necessarily be transmitted to pupils but which would be necessary to construct contexts for the teaching-learning transaction" (Broudy 1970, 96). "Yet," argues Broudy, "on the possibility of such knowledge for 'teaching with' rests the validity of the argument for genuinely professional teacher education" (Ibid.). In search of an epistemology and conception of knowledge that explains and supports "knowing with" and "teaching with" Broudy turns to Michael Polanyi. Polanyi's revolutionary notion of the tacit dimension provides a plausible justification for *professional* teacher education and the *professional* teacher.

Tacit Dimension as Justification for a Professional Teacher and Teacher Education[2]

When Broudy challenged the positivist presuppositions in educational thinking, he found a fellow explorer in Michael Polanyi. A principal objective guiding Polanyi's work was to break the dangerous hold of positivism upon the modern mind. Given CAEP's positivist predilections, Polanyi remains salutary today. Indeed, no small part of Polanyi's "popularity comes from the fact that Polanyi's epistemology furnishes the critics of positivist theories of knowledge with powerful ammunition by an authentic card-carrying scientist" (Broudy 1984, 22).

At the heart of Polanyi's revolutionary epistemology is the tacit dimension which seeks to demonstrate that all knowing, from perception to the most advanced scientific discoveries, "must be a personal act and involve a personal judgment and commitment, in contrast to the explicitness, critical testing and impersonality" required by positivism (*SM* 18, Allen 1978, 168). In the *The Tacit Dimension*, Polanyi begins his explication of it with the simple but profound insight that "we know more than we can tell" (*TD* 4). From there he articulates the logical and dynamic structure of tacit knowing that accounts for that insight (*TD* 9-10). As many readers of *TAD* well know, the basic structure involves two things or two kinds of knowing. The first kind is focal knowing. Focal knowing is attending directly to something. It is the focus of our gaze or our attention. It is what we have before our mind and can be explicitly identified and described. The second is tacit knowing. The tacit is what we attend from to something else. We know the object in front of us or that which we are attending to by relying on our awareness of something else to attend to it. In this case, the tacit element is like a clue or a sign that points beyond itself to something else. It is that tacit element of which we have knowledge that we may not be able to tell. Such knowledge must be applied and the details integrated into a complete performance. This integration of focal-tacit can take place only through a personal act which is necessarily unspecifiable and is hence a tacit integration. For Polanyi, all knowing has this structure; all knowing involves the from-to functional relationship.

All knowing entails a context that operates to concentrate our attention towards something else. Such a context might be an experience, theory, idea or view. Whatever it is, we see the focal object 'in terms of' that tacit element. We cannot escape the influence or shaping of the tacit element; it is essential to knowing. As a matter of fact, the cultivation of the tacit element enables us to enrich our lives and deepen our ability to recognize and assimilate new experiences.[3] And yet, for Polanyi, the tacit functions despite being beyond immediate explicit recall for identification and description. For example, consider how we engage in "skills which while we know that we know how to do the things in question, we cannot specify in terms of details how we do those things" (Allen 1978, 169). Broudy explains Polanyi's point through the example of a physician reading a medical journal focusing on the chemistry of the body. If you asked the physician to recall specific chemistry terms, facts and formulas, the physician is unlikely able to do so. Yet, the physician would be able to follow the gist of the article. Why? Because the facts and formulas regarding chemistry were explicit learning inputs in chemistry class but they transformed from a focal knowing, i.e. explicit knowledge, to schema or maps that the physician sees with or, in this case, reads with. What was known explicitly still functions in the act of knowing but is not immediately recallable as it functions from the tacit dimension.

Assuming the tacit dimension is real and functions as described briefly above, then it gives a theoretical grounding for Broudy's notion of a professional teacher and teacher education.[4] According to Broudy, the validity of the argument for a genuinely professional teacher rests on the possibility of knowledge that would not necessarily be transmitted to pupils but which would be necessary to construct contexts for the educational endeavor. Polanyi's tacit dimension shows that we use tacit knowledge as subsidiary clues to interpret a situation. In addition, it shows that during this act of interpretation we cannot recollect and be aware of our tacit knowledge focally, for we are using such knowledge tacitly. As a result, teachers know more than they can tell in the act of teaching. Teachers operate with tacit knowledge informed by various inputs such as theories and experiences that shape how they interpret themselves, their students, and their interactions. In this way, Polanyi's tacit dimension supports Broudy's contention that a professional teacher possesses knowledge to teach with, but not to, students.

If all knowing involves tacit knowing, then all teachers, including craft and professional teachers, teach with a measure of tacit knowledge. What separates the professional from craft teacher is not simply that one uses tacit knowing and the other does not, but rather the richness, breadth, and depth of what Broudy terms "the allusionary base" from which to draw from for interpretation (Broudy 1988, 25). If, as Polanyi shows, the tacit dimension informs what we see and how we interpret it, then expanding the resources for seeing and interpreting better enables us to understand and respond to situations appropriately. Further explanation and justification are needed, but I believe Broudy's professional teacher possesses what Polanyi identifies as the "educated mind" (*PK* 102).

For Broudy, to achieve a richer, broader, and deeper allusionary base, teacher education must include what CAEP excludes, namely academic, theoretical coursework. Inspired and supported by Polanyi's tacit dimension, Broudy outlines a teacher education curriculum (Broudy 1962, Broudy 1967b). For Broudy, every profession is defined by its problems of practice. Like medicine or law, Broudy contends, that education also has unique problems of practice. He identifies four general problems: 1) aims or objectives of education; 2) curriculum; 3) organization of education; and 4) teaching-learning. Before a teacher can address a problem of practice, she first must know what the problem is. A study of the major problems allows her to better identify the problem before her and identify resources appropriate to that problem to address it. Resources, suggests Broudy, come from studying these problems from the perspective of general professional studies for interpretative use (more commonly known today as "Foundations of Education"). These studies are not meant for simple recall nor immediate application. Instead, these studies afford understanding of the primary problems of education in deeper detail. Within general professional studies, argues Broudy, are

four dimensions—history, philosophy, sociology and psychology. The first two are considered "humanistic" and the last two are "scientific" studies of education. But all of them address educational problems from unique vantage points providing the teacher multiple contexts to appreciate the problem confronting them. These dimensions offer images, concepts, and ideas that can be vehicles used for interpretation. Studying the problems within each dimension intensifies, refines and broadens the teacher's capacity to perceive, clarify, and judge the teaching-learning situation. From an enhanced capacity to see 'in terms of' the teacher's ability to respond flexibly to the moment increases. CAEP's narrow understanding of "quality" evidence excludes unnecessarily the professional teacher's robust allusionary base to teach with and reduces teaching to mere technique. If we were to follow CAEP, the increasing capability of instructional technology poses a real threat to the teaching profession. If we truly want professional teachers equipped with interpretative powers, then, according to Broudy, EPP's must ensure a thorough grounding in the academic, theoretical study of the academic disciplines and general professional studies known as foundations of education courses supported by Polanyi's tacit dimension.

Conclusion

This essay sought to demonstrate the power and scope of Polanyi's thought by establishing the importance of the tacit dimension in relation to teaching and teacher education. The current assessment of educator preparation programs unnecessarily restricts teaching to a technical, mechanistic process due to its positivist roots. Polanyi's revolutionary epistemology reveals the limits to that approach. With the aid of Broudy, a close student of Polanyi, and inspired by the tacit dimension, we attempted to formulate a truly professional teacher and outline a professional teacher education program. It should be clear now that Polanyi has much to contribute towards this goal. In addition, I hope we see that there is much more to be explored and I invite others to join me in that exploration.[5]

ENDNOTES

[1]Given the importance of 'craft' for Polanyi, I believe it is unfortunate that Broudy chooses that term to compare to professional. I believe that Broudy does not appreciate Polanyi's use of that concept and is on safer grounds when he uses the term 'technician' rather than craft to contrast with professional.

[2]In this section, I explore the potential contribution of the tacit dimension to a rationale for teaching and teacher preparation. This is an application investigated by Harry Broudy in the 1960s, 70s and 80s, but then ignored by educational theorists. (For an exception, see Jon Fennell's essay "Polanyi and the Secular Age: The Promise of Broudy's 'Allusionary Store'" in *Philosophy of Education 2016*, https://ojs.education.illinois.edu/index.php/pes/article/view/5236/1632). My paper intends to remind Polanyi and education scholars of the potential of Polanyi to illuminate major educational

questions. This essay is a step forward on my path to a growing appreciation of Polanyi. The astute Polanyi scholar will quickly recognize my novice understanding of Polanyi. I did not want my lack of understanding, however, to impede my growing appreciation of his importance and so I accepted the invitation by TAD. As a fellow explorer, I welcome additional guidance in understanding the revolutionary work of Polanyi.

[3]Here I am alluding to Polanyi's "educated mind" in *Personal Knowledge* (1958, 102-104).

[4]I believe Collin Barnes' observation, in personal correspondence, is correct that Broudy not only needs Polanyi's epistemology, but also the ontology that flows from it. I believe Broudy assumes that there needs to be a more nuanced, comprehensive conception of the person whose entire composition and dynamic existence cannot and should not finally be reduced to measurement. That point is for further study, but space does not permit here.

[5]I want to thank Jon Fennell, Chris Beckham and, especially, the guest editor, Collin Barnes, for their thorough, careful review of this essay and insightful recommendations. This essay is better due to their assistance. All errors, misjudgments, and omissions remain mine alone.

REFERENCES

Allen, R T. 1978. "The Philosophy of Michael Polanyi and its Significance for Education." *Journal of Philosophy of Education* 12: 167-177.

Brabeck, Mary and Christopher Koch. 2013. "Why the New Teacher Ed. Standards Matter."

Accessed July 3, 2018. https://www.edweek.org/ew/articles/2013/09/18/04brabeck_ep.h33.html.

Broudy, Harry S. 1956. "Teaching – craft or profession?" *The Educational Forum* 20, no.2: 175-184.

_____. 1959. "Abstracts of Recent Addresses: The NCATE Statement on the Teacher Education Curriculum." *Journal of Teacher Education* 10, no. 1: 107-12.

_____. 1962. "The Education of Teachers of Teachers." *Journal of Teacher Education* 13, no. 3: 284-91.

_____. 1965a. "Criteria for the Professional Preparation of Teachers." *Journal of Teacher Education* 16, no. 4: 408-15.

_____. 1965b. *Education As a Field of Professional Study*. Portland, OR: Northwest Regional Educational Laboratory.

_____. 1967a. *The Continuing Search for Criteria*. AACTE Evaluative Criteria Reference Paper, No. 3. Washington, D.C.: American Association of Colleges for Teacher Education.

_____. 1967b. "The Role of the Foundational Studies in the Preparation of Teachers." In *Improving Teacher Education in the United States*, edited by Stanley Elam, 1-22. Bloomington, IN; Phi Delta Kappa.

_____. "On Knowing With." In *Proceedings of Philosophy of Education Society 1970*, edited by H. B. Dunkel, 89-103. Carbondale, IL.: Philosophy of Education Society.

_____. 1972a. *A Critique of Performance Based Teacher Education*. Performance Based Teacher Education Series, 4. Washington, DC: American Association of Colleges for Teacher Education.

_____. 1972b. *The Real World of Public Schools*. New York, NY: Harcourt Brace Jovanovich.

_____. 1975. "PBTE/CBTE—Do They Mean What They Say?" In *Regaining Educational Leadership: Critical Essays on PBTE/CBTE, Behavorial Objectives and Accountability*, edited by Ralph A. Smith, 24-34. New York, NY: John Wiley & Sons, Inc.

_____. 1980. "What Do Professors of Education Profess?" *The Educational Forum* 44, no. 4: 441–51.

_____. 1981. "The Uses of Schooling and Their Evaluation" *Capstone Journal of Education 2*, no. 1: 5-13.

_____. 1983. "Whys and Wherefores of Competency Based Teaching." *The Journal of Classroom Interaction* 18, no. 2: 2-6.

_____. 1984. "Review of Beyond Empiricism: Michael Polanyi Reconsidered." *Tradition and Discovery: The Polanyi Society Periodical* 12/2: 22–28.

_____. 1985. "The Uses of Schooling in Professional Life." *Tradition and Discovery: The Polanyi Society Periodical* 13, no. 2: 4–9.

_____. 1988. *The Uses of Schooling*. New York, NY: Routledge.

Cochran-Smith, Marilyn, et. al. 2018. *Reclaiming Accountability in Teacher Education*. New York, NY: Teachers College Press.

Council for Chief State School Officers. 2011. *Interstate Teacher Assessment and Support Consortium (InTASC) Model Core Teaching Standards: A Resource for State Dialogue*. Washington, DC: Author. Accessed December 17, 2018. https://ccsso.org/sites/default/files/2017-11/InTASC_Model_Core_Teaching_Standards_2011.pdf

Council for the Accreditation of Educator Preparation. 2013. "New Accreditation Standards Adopted to Ensure Quality in Educator Preparation." Accessed June 7, 2018. http://caepnet.org/about/news-room/statements-press-releases/new-accreditation-standards-adopted

_____. 2015. "CAEP Evidence Guide." Accessed May 24, 2018. http://caepnet.org/~/media/Files/caep/knowledge-center/caep-evidence-guide.pdf?la=en

_____. 2016a. "2013 CAEP Standards". Accessed June 20, 2018. http://caepnet.org/~/media/Files/caep/standards/caep-standards-one-pager-061716.pdf?la=en

_____. 2016b. "CAEP Accreditation Handbook, Version III March 2016." Accessed June 20, 2018. http://caepnet.org/~/media/CAEP%20Accreditation%20Handbook_March%202016.pdf?la=en

Kneller, George F. 1984. *Movements of Thought in Modern Education*. New York: J. Wiley.

Polanyi, Michael. 1958. *Personal Knowledge: towards a Post-critical Philosophy*. Chicago: University of Chicago Press.

_____. 1966. *The Tacit Dimension*. Garden City, N.Y.: Doubleday.

_____. 1969. *The Study of Man*. Chicago: University of Chicago Press.

Rutledge, David W, et. al. 1991. "The Tacit Victory and the Unfinished Agenda." *Tradition and Discovery: The Polanyi Society Periodical* 18, no 1: 5–17.

Schwarz, Gretchen E. 2015. "CAEP Advanced Standards and the Future of Graduate Programs: The False Sense of Techne." *Teacher Education Quarterly* 42, no. 2: 105-17.

Teacher Preparation Analytics. 2014. "REPORT HIGHLIGHTS: Building an Evidence-Based System for Teacher Preparation." Edited by Michael Allen, Charles Coble, and Edward Crowe. Accessed July 8, 2018. http://caepnet.org/~/media/Files/caep/accreditation-resources/tpa-report-highlights.pdf?la=en

Western Association of Schools and Colleges. 2013. "2013 Handbook of Accreditation." Accessed April 12, 2018. https://www.wscuc.org/resources/handbook-accreditation-2013

A POLANYIAN PERSPECTIVE ON THE PLACE OF KNOWLEDGE WITHIN THE CURRICULUM

Nigel Newton

ABSTRACT

A new national school curriculum in Wales that parallels reforms in other countries and regions is in the process of being implemented. Several issues debated in the context of these reforms relate to the effectiveness of a school's curriculum to help young people develop skills and dispositions believed to be necessary for participation in the modern economy. Others are concerned about the loss of core subject related knowledge linked to academic disciplines. Wrestling with these questions motivated me to consider how Polanyi's thought could point the way to addressing these issues, particularly his concept of commitment and argument for a hierarchically structured view of reality. In this paper I explore these issues by drawing from the sociologist Michael F.D. Young's work on 'powerful knowledge' as a way to frame my consideration of the curriculum debates from a Polanyian perspective. Young argues that providing access to knowledge should be seen as the primary goal of school curriculums and argues that the best route to achieving this is through academic subjects. The paper will show how this argument is strengthened by consideration of insights from Polanyi.

Introduction

Curriculum reform across several more economically advanced countries and regions, including Wales, New Zealand, and British Colombia, have been described by their respective governments as providing a 'radical' response to changes brought about by globalization and digital technologies. Encouraging greater educational engagement and participation are also aims, with many young people seen at risk of dropping out of education too early. Teacher training, school organization, and student qualifications will be affected by the reforms as will the place of knowledge in school curriculums. In this paper, I will begin by exploring some of the ways these influences have been conceptualized and led to tense curriculum debates. Next I'll explore the sociologist Michael Young's theory of 'powerful knowledge' and discuss its relevance. This theory shares Polanyi's concern with the preservation and pursuit of truth (Polanyi 1936). The paper will conclude by exploring how consideration of Polanyi's ideas mediated through Young's theory of knowledge within the curriculum are relevant to present curriculum discussion.

Defining Curriculums and the Shape of Current Debates

Evaluating the reform of any curriculum is complex because of differing definitions and models of design. For instance, several reforms in the aforementioned countries have drawn from definitions aimed at bridging tensions between academic subjects-based versus vocationally orientated skills/competencies-based curricula. These reforms also seek to balance these two approaches, along with aiming to promote civic values and the development of desirable personal qualities (e.g., confidence or curiosity) in young people.

In the UK, curriculum debates continue to confront tensions arising from the breakdown of a post-war consensus on the value of a tripartite educational system (Moore 2014). This was grounded in a belief that some people were more gifted academically, others practically and that some only required basic levels of numeracy and literacy in order to find worthwhile employment. Despite a shift in consensus during the 1970s towards a state school system that was the same for all pupils ('comprehensive schools'), beliefs about innate ability have continued to influence educational practice through school-based setting of students, along with differing pathways to achieve secondary-level qualifications. Consequently, questions about the balance between skills and knowledge, for example, often reflect different attitudes towards the relative value of segregation based on academic profile versus unsegregated school systems.

The OECD (Organization for Economic Co-operation and Development), which has played an influential role in several educational reforms, reduces the different positions to two models of curriculum, *process* and *product*, which they conceive as reflecting the influence of two binary factors: teacher/student control and content/

skills. Divided in this way, curricula are viewed as either vehicles for delivering certain *products* and *outcomes* or a description of *experiences* and *processes* considered valuable to a child's development. These models are clearly incomplete and omit curricula that reflect teacher control where the focus is on skills related to specific vocations, such as in apprenticeships, or curricula where students control choices of content (e.g., student-directed research). Product models are subject-focused and emphasize specific educational outcomes evaluated through examinations; process models, on the other hand, tend to encourage greater pupil autonomy and are evaluated through projects and course work that provides opportunities for active learning and the cultivation of competencies.

Knowledge within Curriculums

As suggested above, knowledge has become a particularly contested concept within curriculum debates. Often its role is framed as reflecting a transmission pedagogy leading to examination-based outcomes or it is understood as something students need to construct themselves through self-directed activities. Different types of knowledge appear to be implied and attempting to describe these is difficult. In fact, one of the problems with discussion of curriculum reform is that terms such as 'knowledge' and 'skills' are interpreted differently by those on opposing sides of the debate.

However, Aristotle's three kinds of intellectual virtues prove useful as short-hand to refer to the kind of intellectual engagement implied in different kinds of curricula. These are *episteme*, from which we derive epistemology, which I will use to designate curriculum focused on helping students acquire theoretical and conceptual knowledge; *techne*, our root for technology and technique, will refer to curricula which places more emphasis on students' development of skills, particularly relating to vocational domains; and *phronesis*, traditionally translated as practical wisdom, I will use to identify kinds of knowledge linked to personal dispositions and competencies. *Episteme* can be viewed as context independent knowledge and it dominates our thinking about knowledge in relation to academic subjects. *Techne* is recognized as valuable to understanding in specific fields, despite its context dependence, because we see there are skills and know-how that require hands-on, practical knowledge.

Episteme, which we can see as closely related to academic disciplines, does not necessitate a pedagogy of transmission where pupils only have to absorb and remember factual statements rather than actively learn and understand concepts. Theoretical and conceptual knowledge derived from academic disciplines is constantly being reformulated and decontextualized by good teaching that takes into account students' social contexts (Vygotsky 1987; Bernstein 2000). However, subject-based teaching, more closely linked to academic disciplines, does acknowledge boundaries between everyday experience and curriculum knowledge, and aims to provide students with access to knowledge beyond their ordinary experiences. This is not to say that what is relevant

to them is totally ignored but it is put to use only in the service of acquiring *episteme* through appropriate pedagogy (Rata 2016). The problem with *phronesis* and *techne* is that they tend to be context-dependent, particular, and more changeable. Basing a curriculum on them leaves children vulnerable to the instabilities of their encounters with reality in everyday life, rather than allowing them to apprehend and understand the world beyond. Consequently, what can be represented as encouraging more active construction of knowledge through skills and competencies may in fact leave some students constrained by their circumstances (Bernstein 1996).

As a former teacher, I was broadly supportive of curriculum reforms that appeared to promote learner-directed study and activity-focused pedagogies, but reflecting on Polanyi's thought compelled me to reconsider this stance. Polanyi recognizes the embodied, active nature of personal knowing but also conceives of encounters with reality within a hierarchical ontology (Jha 1997). New knowledge deriving from discovery is grounded in prior knowledge and will be verified within academic communities. Jha also makes the important point that for Polanyi theoretical knowledge, *episteme*, is important in relation to the justification of knowledge, while *phronesis* and *techne* are important to discovery (Jha 2002, 299). This point draws attention to the place of discovery, something overlooked in much curriculum discussion. The relevance of this was brought into clearer focus through my reading of the sociologist Michael F. D. Young. In his important book about curriculum theory, *Bringing Knowledge Back In* (2008, 110-111), Young discusses Polanyi's "The Republic of Science," arguing that the conception of the university he presents can be used as the basis of reconceiving the relationship between the state and teachers in education practices. Young argues that the core value of schools should be the "acquisition and transmission as well as the creation of knowledge" (102). Aspects of Young's analysis are worth reviewing as a background to applying Polanyi's thought to the curriculum debate.

'Powerful knowledge' and Young's Future 1, 2, 3

Michael F. D. Young is a curriculum theorist who has spent a long career reflecting on curriculum design and its impact on social justice. Recently he has moved away from an earlier advocacy of child-centered approaches to curricula shaped by a socially constructed view of knowledge that saw traditional school subjects as representing 'knowledge of the powerful.' In place of this, Young developed a framework that makes a social realist view of knowledge central to a defense of subject-based education as the best means for ensuring equitable access to 'powerful knowledge,' i.e. the very knowledge those in power value the most highly (Young & Muller 2010; Young et al. 2014). Following Durkheim and Vygotsky, Young suggests that it is important to maintain a distinction between everyday knowledge and skills, which tend towards addressing 'how' questions, the kinds of knowledge children encounter in their everyday lives, from the specialized knowledge they are provided access to through a school curriculum,

which addresses 'what' questions, enabling pupils to "grasp alternatives" beyond their experience. If we apply the Aristotelian terms here, Young's everyday knowledge resembles *phronesis* and *techne*, while specialized knowledge, linked to academic disciplines, resembles *episteme* (Young 2013). One of the most effective means to maintain this distinction is through the boundaries created by school subjects.

Young argues that the place of this knowledge (*episteme*) in the curriculum is rarely given the priority status it deserves and attempts to blur the boundaries between school subjects risk diluting students' access to it. Attention is given to assessment and outcomes, which shape much of the debate about teaching, while knowledge is neglected. Yet it is the access to knowledge a curriculum can provide that is the distinctive educational component of schooling, and should be distinguished from assessment systems and from pedagogy: "It is the knowledge that teachers want students to acquire that defines the curriculum, how they do this is what we refer to as pedagogy and how they reflect on whether they are successful is why assessment is always part of any teacher's pedagogy" (2014, 43).

Trends towards increasing student 'choice' and 'child-centered' pedagogies, often a key component of process curriculums, are potentially problematic because children do not know what they should study, and placing them at the center of curriculum decision-making is to deny them the guidance of knowledge experts, namely teachers. Describing his involvement in South African post-apartheid education, Young notes that freeing teachers from an imposed curriculum appeared liberating, but was not good. Teachers did not know what to teach or how to support students' choices. Without a curriculum plan, progression in acquiring knowledge was limited (Young 2008).

How the boundaries between subjects, and the knowledge they relate to, are maintained and expressed can be viewed through consideration of three modes of curriculum. Young describes these as Future 1, Future 2 and Future 3, implying that curricula express an educational purpose that points to what children will take with them from school into adult life.

In Future 1 (henceforth F1), knowledge is assumed as part of a canon of uncontested information and its acquisition provides a route to university for high achievers. This mode of curriculum is associated with transmission pedagogy and is more closely aligned with the product model. It assumes that there is knowledge that is offered to all, but which benefits only a few (Young & Muller 2010). Those who do not progress in acquisition of this knowledge can be directed towards vocational routes, hence the recent push for apprenticeships in the UK, for example. One of Young's criticisms of this is that knowledge is conceived as something fixed historically. We could say that *episteme*, with its connection to concepts and theory, has been reduced to facts divorced from the disciplines that continue to verify and explore different aspects of reality (2014, 63).

In Future 2 (henceforth F2), knowledge is constructed in response to pupils' needs and interests. This approach can be seen as primarily designed to improve educational performance of low achievers, encouraging them to continue in education, thus improving social inclusion. There is a focus on competencies, while skills-based subjects and boundaries between all subjects are weakened to provide a more vocational focus (2014, 60). This approach leads to the "[p]romotion of facilitative rather than directive teaching" (Young & Muller 2010, 18) and is influenced by the social constructivist and 'child-centered' pedagogies discussed above; here *techne* and *phronesis* are given greater priority. This type of curriculum is similar to the process model where outcomes are also less clearly defined. Young views the adoption of this curriculum as influenced by an instrumental view of education, where there is "no pursuit of knowledge for its own sake" (2014, 61). He describes how there has been a focus on so-called 21st Century skills, emphasizing young people's development of competencies like critical thinking and creativity and how they "manage" knowledge. This is seen as a means to improve employment skills and contribute to economic prosperity. F2 leads to a differentiated curriculum, one aimed at providing access to university, another into full-time work. This, Young argues, along with apparent rejection of elitism, seems attractive to many teachers (2014, 61).

Finally, Young argues that the Future 3 (henceforth F3) idea of knowledge differs from F1 in that it locates knowledge in specialist communities, it is fallible and through its connection with disciplines located in universities can be challenged. This kind of curriculum reflects a greater concern to develop *episteme* than *phronesis* or *techne* in students. Unlike F2, it is not arbitrary knowledge but that "bound by epistemic rules." F3 sees school subjects as the most reliable tool for providing students with access to knowledge and allowing them to gain understanding of the world beyond their everyday experience (2014, 67-68). State schools, Young argues, often want a differentiated curriculum where there are alternative vocational courses for under-performing children. But this is a mistake, for if we start from the premise of the equality of citizens, then all "children as future citizens…have the same educational rights." The curriculum should be seen as "a guarantor of equality," ensuring access for all children to the "best knowledge" or, as he defines this, "powerful knowledge" (2014, 69-71). In this sense, it is also the best means to ensure school education is equitable.

Young and colleagues also discuss the way subjects are organized within communities that provide identity for teachers (Lambert 2014, 162). When the integrity of subjects is neglected, teachers lose important support mechanisms and this will ultimately impact pedagogy (Yates & Millar 2016). It may also be questionable the extent to which teachers can maintain their own intellectual commitment to the pursuit of knowledge when choices about the content they are required to teach become more diffused and fragmented. We must not forget that teachers also educate by their example, including showing enthusiasm for specific fields of study and investigation linked

to academic disciplines. When they are viewed more as facilitators of students' interests than as those who induct young people into modes of conceptual thinking linked to disciplines it may become more difficult for them to foster in their students a sense of the importance of commitment and the possibilities of "intellectual treasures and creative joys" further ahead (*SFS*, 44).

A Polanyian Perspective on Curriculum Reform

Above I have discussed some broad themes relating to a number of pertinent contemporary curriculum questions, particularly as they relate to moves away from a subject-based curriculum design. In this section I will attempt to explain my own reflections on a possible Polanyian response to these questions.

A process-designed curriculum, which is child-centered and encourages enquiry, could be seen as encouraging embodied active learning consistent with some of Polanyi's ideas. For example, he describes how commitment must entail active engagement (*PK*, 313-315), which should not be seen as merely behavioral performances but also involves "mental act(s)" of commitment to encountering reality, reflecting a belief in what is out there to be discovered (Barnes 2018). This activity constitutes a risk, "Only an activity can go wrong, and all activity incurs the risk of failure" (*PK*, 313). It can be argued that allowing students greater choice in their studies is more likely to foster this risky learning, particularly as students might have a greater sense of commitment to what they have chosen to explore.

Furthermore, Polanyi moves from discussing focal and subsidiary awareness to discussion of mastering a skill (*M*, 42-43). He links mastery with purpose and having a sense of the value or meaning of something. Without a clear purpose in view, performance can be impeded by focus shifting to the subsidiary elements. This section implies that the quality of relationship between student and teacher is characterized by respect:

> Feats of intelligence can be observed only if we dwell in their parts as being intelligently integrated, thus identifying ourselves (in this sense) with the person whose intelligence we appraise. Our capacity for making sense of, for understanding another person's action by entering into his situation and by judging his actions from within his own point of view thus appears to be but an instance of the technique of personal knowing (*M*, 44).

As students, it is our willingness to 'identify ourselves' with what a teacher is trying to share with us that facilitates acts of tacit integration essential for personal knowing. The process curriculum can be seen as reflecting a changed relationship between the student and teacher, one that is more egalitarian, in which interpersonal relations are likely to be stronger. Teachers in the cultures this creates will be able to encourage

commitment to learning through their own personal example and engagement with students. These conditions can be contrasted with the tendency of product curriculums to focus on acquisition of knowledge only as it can be evaluated through examinations. The importance of personal relationships shaped by mutual respect and inclusiveness can easily be overlooked in the cultures these 'hot house' environments create, where fear of failure inhibits students' personal engagement. It is one thing to learn material to pass a test, another thing to indwell knowledge.

Educational contexts that encourage positive interpersonal relationships between teachers and students can be seen as beneficial to the learning process from a Polanyian perspective. However, whether the best way to create school environments in which these relationships are fostered is through competency-based, process model, curricula is another issue. Polanyi also writes about the importance of being inducted into traditions and having the opportunity to know what can be described as academic disciplines. As discussed earlier, he presents a hierarchical and multi-level view of the universe within which comprehension of the higher levels of reality cannot be reduced to or derived from the lower (*KB*, 153-155). Understanding particulars is presented as a precursor to the integrations of subsidiary elements that lead to personal knowing and discovery (*M*, 143). In a curriculum sense, concerns to develop *episteme* (subject-based conceptual understanding) is a necessary precursor to students being able to go on to make their own personal discoveries. Models of curricula which ignore the importance of particulars and fail to induct students into the general awareness of fields of meaning, or as Polanyi describes it a "general view about the nature of things" are unlikely to prepare them for independent explorations of reality (*M*, 144).

The tacit dimension depends on conceptualization of reality that is specialized. We need discipline-grounded awareness to know what to look for and to verify the meaning of that which is discovered. Not all new knowledge is discovered from within disciplines; for example, space exploration has contributed new knowledge to several academic fields, but this would not have occurred nor been comprehended adequately without the expert knowledge from within disciplines. Polanyi describes the apprentice needing to trust the master and by implication respect the tradition they represent (*PK*, 53-54). Polanyi provides us a way of seeing the importance of a teacher's sense of tradition. The teacher is actually embodying and modeling commitment to truth that is fundamental to discovery and grounded in academic traditions.

If we apply these Polanyian insights to Young's three types of curricula we can see perhaps more clearly their relevance to debates concerning knowledge:

1. F1 can be seen as leading to a focus on subsidiary items without consideration of purpose and value. This leads to memorization and imitation as the means of evidencing achievement rather than fostering personal commitment and indwelling material studied.

2. F2 encourages engagement and indwelling with the world but may weaken relationships between teacher and student that matter to knowing. Teachers cease to act as trusted guides into broader discipline-based study. What may be gained through more active pedagogies is lost in terms developing the trust in tradition that underpins the beliefs necessary for discovery.

3. F3 respects the importance of disciplines and academic subjects while acknowledging the role of society in verifying what is known. Young distinguishes between the curriculum and pedagogy. Drawing from Vygotsky, he acknowledges the important mediatory role of the teacher in introducing students to knowledge beyond their everyday experience connected to established traditions. He also addresses the issue of how curriculum content should be chosen: not under influence of government instrumentalism but through the professional judgment of educators in contact with disciplines at the cutting edge of discovery. This recognizes the danger of constricting the social role of knowledge to economic values and distinguishes F3 from F1's conservatism in relation to what is considered relevant knowledge to transmit.

A curriculum based on knowledge and grounded in living traditions of academic disciplines is more likely to foster a respect for truth within our education system, creating a legitimate ground for teachers being accorded respect as those who help mediate and prepare young people for their own engagement with acts of discovery. It also provides an antidote to the narcissistic tendencies in contemporary culture that relativize and trivialize truth, leading to a tolerance for 'fake news' and weakness to the effects of propaganda (Adolfsson 2018). Deep conceptual understanding allows knowers to recognize and contextualize what is being presented as true within a broader scheme of knowledge than that which they would otherwise encounter in ordinary life.

Why Knowledge Matters

Young's argument for a knowledge-based curriculum is fundamentally about truth (Young 2007; Young & Muller 2013). Commitment to discovery based on belief that there is something out there to know forms the epistemological ground for a subject-based curriculum and is consistent with a respect for the tradition and community that have preceded us in verifying current knowledge. This then provides students with the foundations for new discovery (*PK*) and protects education from political manipulation (Polanyi 1947).

The purpose of education, to quote Gelwick's interpretation of Polanyi's argument, is that individuals become, "Instruments of exploration in the universe. The acceptance of this responsibility is our most important choice" (1977, 136). It is this that should provide the grounds for a curriculum's aims, not something imposed through a political rationale linked to instrumental values. This is not incompatible with developing

techne and providing pupils with valuable experiences leading to *phronesis*, but those are seen as emerging from pedagogic decisions about how to help develop understanding and engagement with *episteme*, not as a substitute for it. Fundamental to 'powerful knowledge' is the conviction that 'the truth shall set you free,' a fallible and socially verified version of truth (Young 2013). It is towards these aims that Polanyi began his own journey of discovery in the realms of philosophy, motivated by a concern for personal freedom within democratic and moral values (*SFS*, 16-17).

Process and product models of curriculum are contested in relation to presuppositions concerning the aims, pedagogies, and systems of evaluation they imply. As we have seen, process curricula tend to be viewed as closer to Young's Future 2 model, product curricula closer to Future 1. Young's case for Future 3 is based on the view that neither of the alternatives adequately addresses the question of students' access to *episteme*. As such, even attempts to combine aspects of process and product models, such as in the new curriculums of Wales and British Columbia, fail to address the key issue of knowledge. Process models are often advocated as encouraging more child-centered approaches to education, product models are presented as defending the importance of transmitting knowledge and culture. As we have seen, when viewed in relation to the place of knowledge, neither model delivers education from the traps of instrumentalism nor do they grant significance to the personal knowledge that Polanyi considers fundamental for human progress. A curriculum structured around discipline-related subjects, coupled with learning environments within which mutual respect and openness are encouraged is more likely to promote the valuing of truth and commitment necessary to encourage future discoverers of knowledge. Without this we are unlikely to see any greater participation in life-long learning or capacity to resist political manipulation of information.

REFERENCES

Adolfsson, C. H. 2018. "Upgraded Curriculum? An Analysis of Knowledge Boundaries in Teaching Under the Swedish Subject-based Curriculum." *The Curriculum Journal*, 1-17.

Barnes, C. D. 2018. "Comments on Matthew Crawford's The World Beyond Your Head." *Tradition and Discovery: The Polanyi Society Periodical*. 44/2:18-23.

Bernstein, B. 2000. P*edagogy, Symbolic Control, and Identity: Theory, Research, Critique* (No. 4). Lanham, MD: Rowman & Littlefield.

_____. 2004. *The Structuring of Pedagogic Discourse*. London: Routledge.

Gelwick, R. 1977. *The Way of Discovery*. New York: Oxford UP.

Jha, S. R. 2002. *Reconsidering Michael Polanyi's Philosophy*. Pittsburgh: University of Pittsburgh Press.

_____. 1997. "A New Interpretation of Michael Polanyi's Theory of Tacit Knowing: Integrative Philosophy with 'Intellectual Passions.'" *Studies in History and Philosophy of Science Part A*. 28/4:611-631.

Lambert, D. & Biddulph, M. 2014. "The Dialogic Space Offered by Curriculum-Making in the Process of Learning to Teach, and the Creation of a Progressive Knowledge-led Curriculum." *Asia-Pacific Journal of Teacher Education.* 43/3: 210-224.

Meek, E. L. 2007. "Cultivating Connected Knowing in the Classroom." *Tradition and Discovery: The Polanyi Society Periodical.* 34/1: 40-48.

Moore, A. 2014. *Understanding the School Curriculum: Theory, Politics and Principles.* Abingdon, Oxon: Routledge.

Polanyi, M. 1936. "The Struggle between Truth and Propaganda." *The Manchester School*, 7/2 (December): 105-118.

_____. 1946. *Science, Faith, and Society.* Chicago: University of Chicago Press.

_____. 1947. "Foundations of Academic Freedom." *The Lancet.* 249/6453 (3 May):583–586.

_____. 1962. *Personal Knowledge: Towards a Post Critical Epistemology.* Chicago, IL.: Chicago University Press.

_____. 1969. *Knowing and Being: Essays by Michael Polanyi.* Edited by Marjorie Grene. Chicago: University of Chicago Press.

_____, and Harry Prosch. 1975. *Meaning.* Chicago: University of Chicago Press.

Rata, E. 2016. "A Pedagogy of Conceptual Progression and the Case for Academic Knowledge." *British Educational Research Journal*, 42/1:168-184.

Vygotsky, L. S. 1986. *Thought and Language.* Cambridge, MA: MIT Press.

_____. 1987. "Thinking and Speech". In: Rieber, R.W. and Carton, A.S., Eds., *The Collected Works of L. S. Vygotsky*, Vol. 1. *Problems of General Psychology.* Plenum, New York, 39-285.

Yates, L., & Millar, V. 2016. "'Powerful Knowledge' Curriculum Theories and the Case of Physics." *The Curriculum Journal*, 27(3), 298-312.

Yandell, J. 2013. *The Social Construction of Meaning: Reading Literature in Urban English Classrooms.* Abingdon, Oxon: Routledge.

Young, F.D. Michael. 2008. *Bringing Knowledge Back in: From Social Constructivism to Social Realism in the Sociology of Education.* London: Routledge.

Young, M. 2013. "Overcoming the Crisis in Curriculum Theory: A Knowledge-based Approach." *Journal of Curriculum Studies*, 45/2:101-118.

_____, Lambert, D., Roberts, C., & Roberts, M. 2014. *Knowledge and the Future School: Curriculum and Social Justice.* London: Bloomsbury Publishing.

_____ and Muller, J. 2010. "Three Educational Scenarios for the Future: Lessons from the Sociology of Knowledge.'" *European Journal of Education.* 45/1:11-27.

Young, M., & Muller, J. 2013. "On the Powers of Powerful Knowledge." *Review of Education.* 1/3:229-250.

A POLANYIAN RESPONSE TO "PSYCHOLOGY'S RENAISSANCE"

Collin D. Barnes

ABSTRACT

A recent article in the Annual Review of Psychology *heralds the arrival of a renaissance in psychology that is improving research practices in the field. The present article evaluates this new epoch in light of Michael Polanyi's thought. While the reforms the renaissance celebrates are invaluable to psychology in its reliance on probabilities for hypothesis testing, they under appreciate the central place of personal judgments in research, portraying them instead and primarily as sources of error that must be curtailed by a narrow range of methods. Valuing the place of personal participation in probability judgments may embolden psychologists to accredit inquiries that more openly rely on discernment to declare truth and are better suited to the I-Thou relations that distinguish human psychology from the study of matter in motion.*

Knowledge that we hold to be true and also vital to us, is made light of, because we cannot account for its acceptance in terms of a critical philosophy. We then feel entitled to continue using that knowledge, even while flattering our sense of intellectual superiority by disparaging it. And we actually go on, firmly relying on this despised knowledge to guide and lend meaning to our more exact enquiries, while pretending that these alone come up to our standards of scientific stringency (*PK*, 354).[1]

The post-critical philosophy of Michael Polanyi resists idealization of rule-governed scientific knowledge to the neglect (and derogation) of personal judgments that tacitly direct our choice of hypotheses, relevant evidence, procedures of observation, etc. Moreover, it counts as misbegotten the notion that truths and falsehoods can be readily distinguished by strict adherence to methods apart from the personal participation of individual researchers. Greater approximation to such rule-bounded science appears to be the objective of what Leif Nelson, Joseph Simmons, and Uri Simonsohn call "Psychology's Renaissance" (hereafter *PR*) in a recent issue of *Annual Review of Psychology*.[2] The present paper appraises this renaissance in terms of Polanyi's treatment of probability and his discussion of the I-Thou relation in *PK*. Grounds will be found through this appraisal for wondering about alternatives to the dominant tools in psychologists' repertoire today, and although these alternatives will only be pointed towards here, one hopes they appear sufficiently congruent with Polanyi's position on the face of things to justify fuller discussion in the future.

Before proceeding along this path, however, a clarifying note is in order. While psychology's renaissance is not confined to any particular subfield of the discipline, it is true that social psychology, that specialty concerned with questions of individual motivation, action, and thought in relation to others, has experienced sufficient trouble of late to warrant particular attention. Indeed, Nelson and colleagues identify several "consequential events" (*PR*, 512) that led to psychology's renaissance, and all of them at least implicate social psychology (*PR*, 513-514). It is for this reason that the present paper will emphasize this domain of psychological science over others and employ the generic label "psychology" throughout to refer to it.

Is "Psychology's Renaissance" a Renaissance?

Psychology's renaissance, according to Nelson and his coauthors, is an awakening and response to dubious yet longstanding research practices in the field that elevate the number of false positives (erroneous claims of statistically significant results) in published studies to unsettling levels. The problem of false positives is fundamentally about the validity of probabilities that psychologists rely on in hypothesis testing—judging, for instance, whether the numerical difference between two conditions of an experiment is the consequence of random fluctuations attributable to sampling procedures or the experimental treatment. An activity the authors call *p*-hacking is the primary cause of the trouble (*PR*, 514-517; the *p* refers to probabilities consulted for decision making in hypothesis testing). When confronted with a dataset that took considerable time and many resources to compile, it is not unusual for researchers to evaluate a hypothesis by taking multiple passes at their data, each time modifying, among other things, the measures they analyze, the observations they include versus

exclude, and the statistical controls they employ to adjust for potential contaminating variables.

The deleterious effects of such practices often go unappreciated even by conscientious researchers, and they were demonstrated powerfully by Simmons, Simonsohn, and Nelson in a 2011 publication.[3] There the authors relied on computer simulations to test the presence of a difference between two randomly selected samples known to come from one-and-the-same population. They examined 15,000 simulations under different conditions of p-hacking (e.g., testing two measures separately and then combining them for a third test), and on every occasion a test was statistically significant, they documented the result. Based on the criteria psychologists follow in hypothesis testing, we would expect Simmons and colleagues to have falsely detected a difference between the samples about 5% of the time. But p-hacking the analyses in one way or another inflated this percentage considerably (7.7% to 12.6%), and when the researchers combined several distinct forms of p-hacking (a not infrequent practice in data analysis), the percentage of false positives soared to 60.7%![4] This is why p-hacking is counted by Nelson and colleagues as "a first-order problem for the validity of psychological research" (*PR*, 514) and "arguably the biggest threat to the validity of published research" (*PR*, 525).

Psychologists are responding to the problem with reforms in research and publication practices that increase researcher accountability. Some, for instance, are making their data publically available, and journal editors are beginning to require full disclosure of study materials, procedures, and analyses from submitting authors (*PR*, 518); other journals are adopting the practice of pre-registration (*PR*, 519). Here all study details are determined as completely as possible in advance of data collection and recorded as public proof of researchers' intentions, thereby discouraging them from parading free explorations of data as confirmatory tests of *a priori* hypotheses.

Let it be said that the concerns and reforms of psychology's renaissance are not trivial. A Polanyian perspective does not change this. No doubt, pursuing truth in community requires keeping that community's house in order, but it is nevertheless reasonable to ask whether the energy behind psychology's renaissance flows from an epistemology that is disagreeable from a post-critical perspective. Does the renaissance seek impersonal knowledge, knowledge that is strictly formalized and free from reliance on human judgment to discern reality? The ambition sounds outlandish framed in this way, and its exponents certainly do not claim this as their objective. They recognize the inevitability of human participation in science and the complications that follow from this; they see the need for careful reflection on the use of statistics in research and oppose the mindless pursuit of small probabilities that are publishable (*PR*, 529). Nelson et al.'s entire paper, in fact, is predicated on the appreciation that science requires the judgment of scientists, and while this gives the appearance that our

question should be answered in the negative, it neglects what appears, at least to this author, to be the more crucial underlying message: failures in psychological science are primarily attributable to human error, ignorance, or caprice, and successes are realized when researchers commit to getting the science right and conform themselves to proper methods and practices that approach as closely as possible the operations of a purely rational machine. It should be noted, however, that this is not a rebirth; it is the continuation of an aspiration that Wolfgang Kohler judged with some disfavor to characterize American psychology just 70 years ago: "Our main obligation as scientists is that of avoiding mistakes."[5]

The message comes through, for instance, in a curious statement the authors make concerning the evaluation of failed replications in psychology. They say, "Just as it is impossible to bathe in the same river twice, it is impossible to run the same study twice;" they call this state of affairs an "*unfortunate fact*" (emphasis added; *PR*, 520). Assuming these words were chosen conscientiously by the authors, they warrant notice. The inability to conduct exactly the same study twice could only be called "unfortunate" if there was an alternative that is conceived of as ideal and is wished for. What might it be? A world perhaps where a long line of identically executed studies succeed in revealing the precise conditions under which a range of well-measured outcomes return their predicted values. Such an arrangement would constitute the reliable advance of knowledge that finally stands up on its own and speaks for itself, untarnished by human wiles. Knowing this is not our reality, however, we are left to acknowledge our state of affairs as an "unfortunate fact" and reduce our expectations to an unattainable *ideal* of objective knowledge that survives hard times better (by being unattainable) and encourages our best efforts to come near it with proper techniques—statistical analyses and probabilities among them. But inasmuch as "[m]an has a pathetic need for rest and safety," we may be tempted again to confuse the ideal with real possibility and to treat statistics and probabilities as the avenue of rescue.[6] Polanyi however shows that even these are reflections of our own ingenuity and reliance on likeminded explorers in pursuing truth, and since the question of probabilities in hypothesis testing is so essential to psychology's renaissance, considering his evaluation of the subject more carefully is recommended.

Polanyi on Probability and Order

Polanyi reminds us that "[p]robability statements can never be strictly contradicted by experience" (*PK*, 21). Given a bag labeled to contain 95 white marbles and 5 black, our trust in the accuracy of the label and the theoretical probabilities calculated from it, is not fundamentally challenged when we shake the bag thoroughly and then draw a black marble from it on a single occasion (*PK*, 23). However much we would be surprised by the occurrence, the numerical probability does not rule it out

as impossible. Extending the number of trials offers a better test of the bag's purported contents by bringing the force of accumulated evidence to bear on the question. But even here, Polanyi tells us that the label and associated probability statement may only be "controverted" (i.e., contested), "not contradicted" (*PK*, 22). Should I draw a black marble from the bag five times on 15 attempts (where the selected marble is returned to the bag on each occasion and the contents shaken), it can be demonstrated that the theoretical probability of this event is *astonishingly* small (it should occur only once in approximately 1,400 replications of the 15 trials), but not strictly impossible.[7] However preposterous it may seem to raise the question, we can still ask in this case, "Ought we to count the label as mistaken?" Evaluating the observation against the theoretical probability does not force our hand toward rejecting the label; it leaves the matter to us, the inquirers. But the degree of surprise we feel in relation to the observation and the theoretical probability we calculate as a numerical analog of this feeling offers guidance. "I shall be surprised," Polanyi says, "to a degree corresponding to the reciprocal of this numerical probability. Such is my participation in the event to which a probability statement refers, *and this I regard as the proper meaning of its probability*" (emphasis added; *PK*, 22). And yet, in acknowledging this, Polanyi does not "ascribe subjective meaning to the probability of an event," but "universal validity" (*PK*, 22).

How can this be? A clue to an answer may be found in Polanyi's parenthetical confession, "I am prepared to follow [Sir Ronald Fisher]," the 20th century innovator of null hypothesis testing (*PK*, 23). Fisher's method of discerning when an observed result should be counted as genuine or attributable to chance variation is discussed by Polanyi in relation to an experiment of Charles Darwin that compared the heights of self- and cross-fertilized stalks of wheat (*PK*, 22). The average height difference Darwin observed (the cross-fertilized plants were, on average, 20.93 eighths of an inch taller than those that were self-fertilized) was judged by Fisher to be genuine because its probability of occurrence in a distribution assuming no difference at all fell below 5%. It is a question, then, of when we should be struck by an experimental result, and Fisher answers by recommending that when the probability of observed discrepancies are found in a theoretical distribution of mean differences centered on zero (no effect) to be less than .05, we should take notice. Polanyi judges this strategy to put his feelings of surprise in sharper contact with reality, and in so doing he willingly submits to the instruction Fisher provides. His surprise and his interpretation of the probabilities that reflect it, therefore, is not untutored; it is conditioned by Fisher's guidance and also ratified by others who accept Fisher's leadership in this place. This responsible act of following is Polanyi's affiliation with a tradition of inquiry that he believes has commerce with the truth, and in his affiliation, which involves submission to the standards of the guild, his surprise is elevated from the subjective to a personal clue to genuine discovery.

It is in recognition of the personal nature of probability statements that Polanyi goes some length to argue against Gottlob Frege's treatment of language in which declaratory sentences (e.g., "It is raining") are distinguished from statements of assertion ("It is asserted that"). "If language is to denote speech," Polanyi says, "it must reflect the fact that we never say anything that has not a definite impassioned quality" (*PK*, 27). Impersonal assertions of the form, "It is asserted that" are, therefore, no good, and neither are declaratory statements unattached to any human knower ("[It is] no better than an unsigned check; just paper and ink without power and meaning." [*PK*, 29]). Both, for Polanyi, are incomplete symbols—akin, he says, to "a solitary question mark or exclamation mark," (*PK*, 27). Statements of probability are no different. For a person to say in good conscience, "*I believe* [an assertion] the probability of drawing a black marble 5 times out of 15 trials from a bag of 95 white marbles and 5 black is *7 X 10⁴* [a probability statement]" is for that person to "set his seal" (*PK*, 29) to the statement; he acts as a responsible human being who has elected to uphold a particular human tradition he believes to have contact with reality. This leads us to conclude that even granting the methodological improvements of psychology's renaissance, a personal commitment remains necessary to make sense of the probabilities it seeks to purify. We must believe them to be true, and once believing, we must decide what to think by their light in a fellowship of likeminded explorers. This entails, as already suggested, receptivity to education by those we accredit as having authority in this domain.

A further observation Polanyi makes in relation to probability and order is also noteworthy. He says that it is "only in view of…orderliness that the question [can] be asked at all whether the orderliness [detected] was accidental or not" (*PK*, 34). When we evaluate the probability of a particular observation, we do so precisely because the outcome in question has struck us, standing out to our eyes against a background of fluctuations that, according to the conception of "events governed by chance," only could have produced what we see "by coincidence" (*PK*, 36). Null hypothesis testing is the method by which we evaluate the observation's likelihood against chance, but the fact of the observation striking us in the first place is a testimony to the trust we place in ourselves—as, it should be added, is the decision to dismiss the observation out-of-hand and not make the test at all. By no means is this to say that our judgments are always right or that they require no scrutiny; it is rather to remind us that behind every test we make of our judgments—even in the context of justification—*we find ourselves* exercising faith in a tradition and deciding in light of it what to test and what to ignore, selecting procedures and the outcomes that count as successes, and the best words/symbols to describe the results. Reality is certainly there for us to investigate—though we should wonder in what sense it ever speaks univocally for itself (*PK*, 265)—and we believe Fisher's strategy offers a valuable guide for adjusting our thoughts about reality in the proper places. But it behooves us to appreciate that with this belief comes the

hazard of making more of the technique than it warrants. So here at the conclusion of this brief review of Polanyi's analysis of probability, let us frankly state what we already know to be true, but rarely say aloud: Null hypothesis testing is a tool with circumscribed usefulness that does not impersonally and precisely distinguish for us truth from falsehood; this distinction we make for ourselves in consultation with a community of others likewise committed to truth whether Fisher's method is adopted or not. No alternative path to knowledge exists.

Null Hypothesis Testing and Random Sampling

There yet remains a feature of probabilities in psychological research that Nelson, Simmons, and Simohnson appear to pass over completely, and because it provides another occasion for glimpsing the influence of personal judgment in the assessment of probabilities, it is fitting to discuss here. The feature lies slightly upstream from *p*-hacking, but is no less important to the veracity of research. Indeed, for *p*-hacking to pose a danger, it seems that this earlier detail must be addressed first. Consider a classic experiment by Elizabeth Loftus and John Palmer who showed participants footage of a car collision.[8] They asked a subset of participants following the film, "About how fast were the cars going when they *smashed* into each other?" They gave the same question to the remaining participants, but substituted the word "hit" for "smashed." The critical question—pointing to the importance of question wording in interviews—was whether speed estimates reported by participants differed across the two conditions.

In classic null hypothesis testing, this problem is solved by comparing the observed difference between conditions to a theoretical (or null) distribution formed under the assumption of taking all possible random samples from a well-defined population in which no difference in speed estimates exists. Many of the randomly sampled differences will diverge from zero, with some being larger and others smaller than this value, by chance alone. The trick is judging whether the *observed* difference between conditions is sufficiently improbable within the null distribution to reject it as the source of the observed data or, in other words, to rule out chance variability as the reason for the observed difference. Rejecting the null distribution amounts to saying that the difference is not an artifact of random sampling, but is genuine, and Loftus and Palmer reached precisely this conclusion when they reported in their paper that the speed estimates made by participants interrogated with *smashed* as opposed to *hit* were significantly different.

It is, however, well appreciated that psychologists rarely engage in the laborious and expensive enterprise of random sampling (Loftus and Palmer relied on 150 available college students). The interpretation of *p*-values under such circumstances is quite unclear. *What does it mean for a researcher to rule out as an explanation for his results chance fluctuations following from a sampling procedure he did not use?* Educational psychologist

William L. Hays warned students in his critically acclaimed textbook that saw five editions over 40 years in this way: "Inferential methods apply to probability samples, drawn either by simple random sampling or in accordance with some other probability structure. *There is no guarantee of their validity in other circumstances.*" Indeed, Hays goes on to say, "Unless the assumption of random sampling is at least reasonable, the probability results of inferential methods … *might as well be omitted*" (emphases added).[9] That psychologists report *p*-values despite this, and that psychology's renaissance is so deeply concerned about their purity even in the absence of probability-based sampling procedures, is a curiosity. One is left to conclude that psychologists dislike the play of personal judgment in their evaluation of evidence any place they find it, except when it is convenient to the work. Treating as inconsequential differences between their available samples and those they might hypothetically have obtained through random sampling seems an example of this. For Polanyi, however, the proper response to the situation is not stricter methods, per se, but to trust the powers of judgment that led to the method in the first place and then continue to direct our steps when the explicit guidance it supplies fails or falls silent. Indeed, I take this to be exactly what psychologists do when they (responsibly) decide to interpret the *p*-values of their research under circumstances where the requisite assumption of random sampling is not satisfied. But granting this brings another possibility to the fore: if null hypothesis testing can be responsibly wielded in the absence of strict random sampling, might it also be possible to responsibly assign this method lesser importance in psychology altogether and for the purpose of encountering whole persons that quantities, experiments, and statistics cannot approach? The significance of answering this question affirmatively grows when the individual psychologists investigate is properly appreciated as a Thou rather than an It, a distinction that Polanyi clarifies in his discussion of logical levels.

Intimations of a Polanyian Psychology

According to Polanyi, a two-tiered logical structure holds in the scientist's investigation of inanimate matter: there is the object itself (the first logical level) and the scientist's knowledge of the object as a sample of quartz, silt or clay, etc. (the second logical level). This is a "*knowledge of things*" (*PK,* 344). It is distinct from our "*reflections on our knowledge of things*" (e.g., "the logic and epistemology of science"), which constitutes a third logical level (ibid.). This third level surfaces anytime we think about our thoughts about things *and* when we study living organisms in light of what *they* know—a rat's mental map of a maze, for instance (*TSOM,* 76).[10] This situation defies the two-tiered logical structure of physical science by involving reflection on *another being's* knowledge, and it follows from Polanyi's commitment to personal knowledge and the process of evolution he believes gave rise to the mental powers he recognizes in himself that he accredits to lower organisms primitive manifestations of the same.

Studying the knowledge of these organisms thus entails comprehending what they know, discerning what they intend to do, rendering a judgment about the efficacy of their knowledge, and, perhaps, endowing them with new knowledge through education. It *does not* entail treating them as lifeless objects or mindless machines, as befits firewood and toaster ovens (*PK*, 344-345).

This is a crucial shift for Polanyi, and it grows in importance when inter-human relationships are considered. Here "[t]he I-It situation" characterizing the study of inanimate matter "transform[s] into an I-Thou relation" imbued with an altogether distinct degree of "[m]utuality" that is only prefigured in the study of lower animals (*PK*, 346; *TSOM*, 33). The investigator and the subject of investigation now have the potential for comparable self-understanding and contact with reality. The investigator's knowledge of the subject in this case "has lost the character of an observation and has become an *encounter* instead" (emphasis added; *TSOM*, 95). This does not mean that the depth of understanding or contact held by the two are always on a par, but it does preserve the potential for this to be so, and also the potential for the subject to surpass the investigator in these areas.

Treating individuals atomistically without any or only the faintest view toward the whole of their mental existence neglects this "mutuality." Such neglect carries the practical advantage of offering simple facts that can be translated into averages or percentages (e.g., see Loftus and Palmer's research above), but looked at honestly, such quantities are only *clues to still further investigation*. They lead on to vital shades of meaning in the individual and the circumstances he inhabits. Rather than ends in themselves, they are the earliest beginning of comprehension, and it seems, at least to this author, that a psychology which purports to speak authoritatively about the experiences of persons in their surroundings could do better. Consider, for instance, Stanley Milgram's famous obedience studies.[11] His participants were fooled into believing they were administering increasingly painful shocks to another innocent person. It is well known that his procedure evoked intense emotional responses from participants. According to one observer, a man who proceeded to administer the strongest shock possible (450 volts) was "rapidly approaching a point of nervous collapse. He constantly pulled on his earlobe, and twisted his hands. At one point he pushed his fist into his forehead and muttered: 'Oh God, let's stop it'." Now is this behavior best interpreted as a simple instance of obedience (which it was)? His acts seem overshadowed by the powerful external signs he presented of internal distress. Suppose, for instance, that years ago the man was the punching bag for an abusive, alcoholic father. The stone-faced appearance of the experimenter churned up memories from the depths, leading him momentarily to revert to the gutted personality of his pre-pubescent self and relive the submissiveness that saved him from his father's violence. What richness such insight would add to the opaque label "obedient," but it is avoided. Why?

The psychologist avoids treating his quantities as clues to wholes—as means to more important ends—not just because he wants to use statistics (a misbegotten mark of scientific legitimacy in the human sphere), but also from his fear that bias pervades his personal judgment and the corresponding worry that allowing himself to encounter comprehensive entities who are finally irreducible to their measurable parts would require him to rely on it in research. A question psychologists should grant far greater importance than they do is, "What are the *meanings* of this or that individual's actions *for him*? And how are the expressions of several or many members of a community properly brought together into a reflection of their shared experiences?"[12] For such questions to be accepted in psychology as worthy of investigation, the answers that follow would have to be trusted as more than merely interpretive or subjective. A full defense of why such trust is warranted, however, would require a recapitulation of *PK* in its entirety, and this, of course, is beyond the scope of the paper.

But it would be mistaken to conclude that what has been argued up to this point is simply that one mode of inquiry can responsibly be substituted for another once the personal coefficient of our knowledge is accepted. This is fundamental, but it does not stop there. In light of the I-Thou relation discussed above, *such substitution is called for* when the goal is genuine understanding of others' experiences. Accepting this goal as the psychologists' highest obligation, certain consequences follow, including the repositioning of results acquired by experimentation and quantification to lower rungs of importance as clues (among others) to wholes and the elevation of insights gained by broader inquiries to higher ones. This is what follows from granting the reality of logical levels in psychology, and it seems that accepting this conclusion would lead to important changes in the field. Reliance on experimental methods and inferential statistics would diminish to make room for encounters with the free communications of others. This shift would, in turn, require psychologists' training to broaden, perhaps to include the case studies of clinical psychology and the ideographic approaches of personality researchers, and when extended to communities or groups, also the ethnographic and participant-observer techniques of anthropologists and journalists. A reoriented psychology would draw upon the insights of these other disciplines and perhaps intermingle with them; and as Sigmund Koch's piercing observation at the turn of the century makes clear, a reoriented psychology would also have much to gain from the humanities.[13] Just how much is uncertain, but if training in great literature only served to burden psychologists again with the question of human totality, an important service would be done.

Should the above proposal sound too radical, it is worth recalling that Kurt Lewin himself, the accredited founder of experimental social psychology, emphasized individuals' inner experiences (what he called "the field" or "life space" of the person) as the proper sphere of inquiry for psychologists. "*Objectivity* in psychology," he said,

"demands representing the field correctly as it exists for the individual in question at that particular time. For this field [the individual's] friendships, conscious and 'unconscious' goals, dreams, ideals, and fears are … essential."[14] And, lending credence to Koch's position above, he even held out Dostoevsky's work as exemplary, saying that the knowledge he had of his characters is the kind psychologists must strive after with others.[15]

It is also worth considering a proposal Polanyi shared with Carl Rogers in a broadcasted conversation.[16] "If we could only get away from [the word 'scientific' for ten years]" he said, "we would see so many possibilities of appreciating knowledge—of appreciating views and explorations" that we might rightly call instead "penetrating, revealing, sensitive, [and] true … It is quite an obvious way of describing them." And regarding Rogers' experience inside therapy (he felt conflicted about its scientific legitimacy), Polanyi expressed "complete confidence in the value of such a pursuit" to the advancement of truth. Whether the experience was quantitative or qualitative, "scientific" or otherwise, did not trouble Polanyi: "It seems to me," he said, "not a substantial question." In speaking these words, Polanyi offered to Rogers what the latter observed in therapy with clients: *freedom from tension.* Were such freedom to permeate psychology today, what marvelous possibilities would unfold, and what vibrant inquiries might be permitted to invigorate a genuine rebirth in the field.

ENDNOTES

[1] Polanyi, M. 1958. *Personal Knowledge* (Chicago: The University of Chicago Press).

[2] Nelson, L., Simmons, J., Simohnson, U. 2018. "Psychology's Renaissance." *Annual Review of Psychology*, 69:511–534.

[3] Simmons, J., Nelson, D., Simonsohn, U. 2011. "False-Positive Psychology: Undisclosed Flexibility in Data Collection and Analysis Allows Presenting Anything as Significant." *Psychological Science*, 22:1359-1366.

[4] See Endnote 3, Table 1 on page 1361.

[5] See page 729 in Kohler, W. 1959. "Gestalt Psychology Today." *American Psychologist*, 14:727-734.

[6] See page 105 in Kohler, W. 1949 (1992 reissue of 1970 paperback). *Gestalt Psychology* (New York: Liveright Publishing Corporation).

[7] $\binom{N}{r} p^r q^{N-r} = \frac{N!}{r!(N!-r!)} p^r q^{N-r}$, where N = number of trials, r = number of successes, p = probability of success, and q = probability of failure.

[8] Loftus, E., Palmer, J. 1974. "Reconstruction of Automobile Destruction: An Example of the Interaction Between Language and Memory." *Journal of Verbal Learning and Verbal Behavior*, 13: 484-489.

[9] See page 227 in Hays, W. 1994. *Statistics*, 5th Ed. (Belmont, CA: Wadsworth Group/Thompson Learning).

[10]Polanyi, M. 1959. *The Study of Man* (Chicago: The University of Chicago Press).

[11]Milgram, S. 1963. "Behavioral Study of Obedience." *Journal of Abnormal and Social Psychology*, 67: 371-378.

[12]Is this to throw away the nomothetic tradition of research in psychology? No, but in view of the I-Thou relation, it does make the nomothetic subservient to the ideographic. This is the intended meaning of the phrases "clues to still further investigation" and "clues to wholes" in the main text.

[13]Koch, S. 1993. "Psychology" or "The Psychological Studies." *American Psychologist* 48:902-904.

[14]See page 338 in Lewin, K. 1936. "Behavior and Development at a Function of the Total Situation." In Cartwright, D. (Ed.) 1951. *Field Theory in Social Science: Selected Theoretical Papers.* (Oxford, England: Harpers).

[15]Lewin, K. 1936. *Principles of Topological Psychology* (New York: McGraw-Hill Book Company).

[16]See pages 159 and 175 in Kirschenbaum, H. and Henderson, V. (Eds.) 1989. *Carl Rogers: Dialogues: Conversations with Marin Buber, Paul Tillich, B.F. Skinner, Gregory Bateson, Michael Polanyi, Rollo May, and Others* (Boston: Houghton Mifflin Company). See also Polanyi, M. 1957. Scientific Outlook: Its Sickness and Cure. Science, 125:480-484.
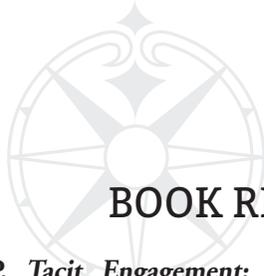
BOOK REVIEWS

Gill, Satinder P. *Tacit Engagement: Beyond Interaction.* **Cham, CH: Springer International Publishing, 2015. Pp. 160 + xvii. ISBN 978-3-319-21619-5. $89.99.**

Satinder Gill is a broadly informed scholar who swims easily in and through dozens of disciplines including philosophy, psychology, and the arts. Growing up in England as the daughter of Karamjit S. Gill (founding editor of *AI & Society: Journal of Knowledge, Culture, and Communication)*, she attended AI conferences as a teenager and regularly talked with exciting thinkers from around the world in the family living room. After majoring in aesthetics in college, she started her PhD in computer science but then skipped to experimental psychology. She studied computational linguistics and psycho-linguistics in Japan and Stanford, and returned to the UK in 2003 to an appointment in Music at the University of Cambridge.

During her experiences abroad, she witnessed frequently how cultural differences can lead to misunderstandings. Cooperating with non-English speaking groups sensitized her to non-verbal communication. Now working as associate editor of *AI & Society*, Gill explores *knowledge transfer* between leading artists,

engineers, and therapists in personal and technologically mediated interactions.

The challenging aim of T*acit Engagement* is to illuminate the complex field of humans in their interfaces. She seeks to "present the whole picture" about "what is dialogue" (p. v). Hence the book includes a wide range of insights from such fields as the history of philosophy and AI research, science studies and music-psychology, cybernetics, and anthropology. Her inquiries include reflections on the problems of expertise and mediation. Gill's arguments are underpinned with glimpses of her personal experiences, teachings from Taoist philosophy, lessons from traditional Japanese dancing, and images of technologically induced interactive performances. The main thesis of the book is the Polanyian idea that data-driven explicit knowledge is deeply inhuman when disconnected from embodied tacit knowing. She believes the digital age threatens us with losing balance in relation to purpose, ethics, aesthetics, and quality of life—and she suggests what we can do about it.

The first chapter guides us through the modern history of AI research, seen as built on naïve cognitivism and the flawed conception of a disembodied brain. Differentiation between the *transactional* levels of communication (aiming to transfer information to achieve a goal) from

the phatic or *relational* levels (concerned to set up and sustain the communicative situation) helps reveal why and how the interest in *embodiment* and *temporality* started to grow in the field of human-computer interaction. The use of dance and music to increase contact between people and foster empathy makes it obvious the "bandwidth of human sense-making" (11) is our personal, embodied act of knowing. She examines the thought of relevant "philosophers of being," including Husserl, Merleau-Ponty, Buber, Heidegger, Gadamer, and Wittgenstein (20-26). She finds Polanyi's thought to be especially useful. It develops a *mediational* understanding of the structure of knowing and reality, since indwelling is about relying on some things to focus on their joint meaning. Mediation and engagement are thus conceptually part of each other in human interaction, reaching mutuality in their heightened form, involving empathy and an aesthetic quality.

In the second chapter, we follow the birth and rise of the false Cartesian dichotomy underlying all expert systems. Both its roots and its critique are traced back to Socrates and Aristophanes and the division of techné-epistemé, later expressed in Leibniz's *characteristica universalis*, Ryle's distinction between knowing *that* and knowing *how*, and the Shannon-Weaver model of communication. Gill argues the Cartesian dichotomy is connected to the ideas of representation, reductionism, and inference (in contrast to Polanyi's *integration*).

Potent critique comes not only from philosophers (like Dewey's learning by doing and Wittgenstein's pragmatic turn), but from real engineers as well. We are introduced to the thought of Howard H. Rosenbrock, who saw already three decades ago that even for machines, "some human intervention will always be needed" because "the expansion of explicit knowledge leads to a reciprocal expansion of tacit knowledge required for using the new explicit knowledge" (54). He urges "engineers to recognize the essential element of art and tacit knowledge in their profession" (as in judging, making commitments, and being responsible for social applications, grounded in the ability to doubt dogmatic formulas). If engineers believe they are not artists but scientists, it will be "difficult to persuade them that other professions have this element" of responsibility also (54).

We also meet Mike J.E. Cooley, who sees the main problem to be the forced split of objective from subjective knowledge, whereas knowledge is in fact a symbiosis between its objective and subjective parts. Their "relative levels … a person utilizes vary as one gains expertise" (56), giving bigger and bigger space to the tacit dimension. Cooley presents the process of acquiring knowledge as manifesting a spectrum ranging from data collecting to acting through successive emergent levels, which together are called the *cybernetic transformation*. According to Cooley, "Data suitably organized and acted upon may become information, and information that is absorbed, understood

and applied by people may become knowledge. Knowledge frequently applied in a domain may become wisdom and wisdom the basis for [normative] positive action" (56). As an advocate of human-centered systems design, Cooley shows that when we forget the importance of learning-by-doing and rely solely on machines, they make us lose our grip on real expertise. Gill also gives a surprising amount of attention to the theories of Harry Collins in his *Explicit and Tacit Knowledge*, but (to my relief) provides a devastating critique of Collins's work.

In chapter three, the condensed history of abstract thought is shifted to case studies to understand how people (and machines) really interact. David Efron's landmark studies from 1941 are used to describe how the hidden rules of gestures and cultural conventions shape conversations. Edward T. Hall's groundbreaking research on cross-cultural communication suggests social behavior is dominated by complex hierarchies of interlocking rhythms. Group synchrony can be seen at playgrounds where children usually—though unconsciously—act in an orchestrated way. The proxemics dance of adults, who adjust their distance while converging to a "fraction of an inch" approximately every 30 seconds, is also cited (78). Using the notion of "floating intentionality," Ian Cross concludes we are "bioculturally" shaped to "both perceive and anticipate when an event, be this a gesture or a vocalization, is going to occur, and to mutually respond to it in a coordinated time" (79). All these perspectives indicate that decision-making is always a culturally rooted communication process and that autonomous experts don't exist. Expertise is distributed, and the truth of interpersonal encounters is expressed by rhythms. *Knowledge is carried in rhythm.* Gill suggests that if we affirm Ryle's distinction between knowing *that* and knowing *how*, we should also recognize the importance of knowing *when.*

Chapter four is mainly about "Dialogue Act Theory," perhaps Gill's most important personal contribution to the science of embodied interactions. Her theory expands the field of pragmatics to body-language ("pragmeme," 106). Body moves affect the way people are present to each other, physically demonstrating their commitment to engage, managing possible loss of contact and lack of attention, working in harmony with the intention of the speech-act. The notions of "entrainment" (from biomusicology) and "pivotal moment" (from music therapy) are key aspects of the notion of the *engagement space*, where embodied persons are constantly negotiating and reforming their fields of interaction (109). The most exciting moment is the parallel coordinated move, at which point the bodies stop acting upon an action-reaction model and become synchronized and move in parallel—highlighting that resolution is found in the discussion (113).

In the fifth and final chapter, eight projects are presented. They all balance around art, engineering, and science. They aim to overcome the problems

previously discussed in the book, thereby making technology more truly interactive and human. The Topological Media Lab of Sha Xin-Wei stands out with its inspiration from continuity and process philosophy. One of their persistant questions has to do with human identity, including the relationship between the individual and the environment (i.e., where one begins and the other ends). Maja Kuzmanovic's FoAM lab projects possible futures with progressive creativity and humor.

However, the main message carried through the first four chapters suddenly and surprisingly becomes vague here. Gill forgets to indicate that real interconnectedness must have been difficult to be felt in SecondLife's virtual world (Cosmin Manulescu's project). She also does not criticize the potential usefulness of the Shannon-Weaver model of information in the Faraway project of Kristina Andersen that posits the use of telecommunication for people in love. Although being a good method to check whether the reader truly uses his/her "ability to doubt," one wonders whether it's inevitable that the sharp philosophical standpoints have to fade when artistic models are employed.

This leads to a thin but basic critique of the book: the lack of proper editing. There is overflowing redundancy of examples used in the chapters. Sometimes the same words and sentences are repeated without reference to the previous use of the example. It does not do to lump together many articles written about the same general topic without doing some serious editing.

In spite of the hazy final chapter, the book's conclusion seems unambiguous: the worship of explicit knowledge is not only sterile, it is dangerous. Of course, it is already useful to know you're never going to train your apprentice adequately through video conferences—or even through a wall of glass. But the false belief that experts have their knowledge of a subject in their *heads* and that there exists "the one best way" (92) to accomplish outcomes has led to damaging effects since the 1970s. The use of knowledge-based systems has made purported experts lose their confidence and their ability to judge perceptively. The power of true knowledge lies in being able to deal with uncertainty and ambiguity. It depends on the capacity of a person to digest and reflect upon information, interpreting and judging it. This in turn requires imagination and tacit ability. Certainty is a roadblock. Gill warns that the damage done to date is only going to be "surpassed by the concept of Big Data" (38). It seems impossible to argue against her.

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Everett, Daniel L. *Dark Matter of the Mind: the Culturally Articulated Unconscious.* Chicago, IL: Chicago University Press, 2016. Pp. 378 + xvi. ISBN-13 978-0226070766. $40.

American linguist Daniel Everett gained prominence and notoriety for his best-selling book *Don't Sleep, There are Snakes: Life and Language in the Amazonian Jungle* (Pantheon, 2008), which tells the story of his experiences living among the Pirahã people and his study of their language. Everett was a Christian missionary when he and his family first came to the Amazon Basin to live with the Pirahã. He lost his faith when he discovered that the Pirahã neither understood concepts necessary to make sense of the Christian story (e.g., desert, the death penalty, sin), nor had any interest in acquiring them. Everett's atheism has been the subject of much discussion, but his controversial status within academia is due in large measure to his rejection of Noam Chomsky's theory of universal grammar.

The disagreement between Chomsky and Everett will sound familiar to students of early modern philosophy. Chomsky follows the Cartesian rationalist tradition according to which some non-trivial truths are known by reason alone. He explains the incredible diversity of human languages, and the ability of young children to acquire languages, by positing a universal grammar, whose structure is innately known to all humans, instantiated in the syntaxes of all natural languages, and distinct from other forms of cognition.

In *An Essay Concerning Human Understanding*, John Locke argues the mind of an infant human is a *tabula rasa*, or blank slate. No mental content is innate; all ideas come from sensory experience, though humans can mentally manipulate sensory information to produce complex ideas and arrive at new conclusions. In *Dark Matter*, Everett plays the empiricist foil to Chomsky that Locke was to Descartes. Like Locke, he rejects innate ideas, which he thinks play no explanatory role, and an alternative to Chomsky's rationalism inspired by Michael Polanyi.

At times he goes quite far in speaking of human minds as blank slates, even comparing his view "to the Buddhist notion of *anatman*, the idea that humans nave no nature and no self apart from the experiences they have united in their memories" (4). But here Everett's characterization of his own view is slightly misleading, in isolation from other things he says. Far from claiming that humans have no nature, Everett develops a substantive account of human nature according to which humans are fundamentally cultural beings and all mental content is culturally influenced.

At the center of this account is what he calls the "dark matter of the mind." Physicists tell us that much of the matter in the universe does not compose visible objects like stars and planets. Everett claims many of the beliefs, ideas, and values we manifest in our behavior are likewise not "visible" to our conscious

reflection. "Dark matter of the mind," he writes,

> is any knowledge-how or knowledge-that that is unspoken in normal circumstances, usually unarticulated even to ourselves. It may be, but is not necessarily, ineffable. It emerges from acting, "languaging" and "culturing" as we learn conventions and knowledge organization and adopt value properties and orderings. It is shared and it is personal. It comes via emicization, apperceptions, and memory and thereby produces the "self" (1).

"Emicization" is terminology borrowed from the anthropologist Kenneth Pike and means, in Everett's words, "the achievement of the perspective of the insider" (64). To someone who is not from the Amazon, a slight movement of a branch might not seem to have any significance, but for the Pirahã this same observation could be pregnant with meaning. It could convey imminent danger through signs so subtle that not even the people who have internalized them and know how to respond to them can easily articulate what they are.

There is an obvious affinity between Everett's "dark matter" and the notion of tacit knowledge in Polanyi's *Personal Knowledge* and *The Tacit Dimension*. This is roughly the idea that we know more than we can tell. Polanyi argues knowledge has a "from-to" structure, meaning that knowledge involves a triadic relation between an epistemic agent, the signs she reasons from, and the conclusion they point to (PK 59, 173; TD 17-18). Some of the signs reasoned from will not be within the agent's immediate conscious awareness and some of them may not even be discoverable through introspection (e.g., recognizing the face of a friend). Polanyi says we "indwell" the signs we reason from; the process of coming to "indwell" signs appears to be the same thing as Pike's "emicization."

Everett credits Polanyi for being one of two important thinkers in the latter half of the twentieth century to have explored tacit knowledge, the other being Chomsky. Everett sees Polanyi as providing an alternative to Chomsky's "nativist" approach to tacit knowledge, since for Polanyi this knowledge is acquired through experience rather than being innate (11). Everett nonetheless seems, at one point, to want to distinguish his "dark matter" from Polanyi's tacit knowledge, writing:

> Polanyi's focus was unlike mine in that it was not so much on culture as on subroutines and components of large intentional acts…My concept of dark matter, on the other hand— to slightly paraphrase George Harrison's quasi-eponymous song—is "within us and without us," at once embodied in individual humans at the same time that it serves as a connective force between members of a given society. It includes our tacit

collective intentions to maintain cultural values and knowledge that binds cultures together (13).

Although I wouldn't expect Polanyi to quote the so-called Quiet Beatle to make his point, I don't think there's anything here Polanyi would disagree with. In fact, I don't believe there is even a difference of emphasis between Everett and Polanyi on this point. Polanyi's tacit knowledge is cultural in nature just as Everett describes. Everett probably could have faithfully adopted Polanyi's terminology had he wanted to, though there is something poetic about the analogy between tacit knowledge and dark matter.

Everett has for years been mounting an empirical challenge to Chomsky's universal grammar. Chomsky's theory predicts that all natural languages feature recursion, meaning there is no non-arbitrary limit to how long a grammatical sentence can be. In his books and many academic articles, Everett argues the Pirahã language lacks recursion and other features that Chomsky's account predicts it should have. In *Dark Matter,* Everett not only defends this longstanding critique, he also challenges assumptions in other fields such as anthropology and cognitive science. Indeed, he suggests the entire field of cognitive science may rest upon a mistake:

> Cognitive scientists never examined in detail the foundational relationship of culture to mind, the mind as an outgrowth of culture. The reason seems to

follow from the misleading idea that the mind is a digital computer, an evolved software running presently (but not necessarily) on neurological hardware. The metaphor is fragile, though. For example, unlike the brain and body, computer software doesn't grow biologically from its hardware…Nor do computers possess emotions— one of the primary drivers of human cognition (10, internal citations omitted).

In Everett's opinion, myopic fascination with rapidly-developing computer technology has made cognitive scientists eager to dismiss these crucial differences as being unimportant. Instead of seeing culture as something that arises from individual, computer-like human minds, we should understand human minds as being embedded within cultures. To paraphrase Everett, we can't understand what's in the mind (i.e., mental content) without understanding what the mind is in (i.e., culture).

Everett's interdisciplinary approach to philosophical questions, and his willingness to dispense with conventional wisdom, make *Dark Matter* an interesting read. I found chapter 7, "Gestures, Cultures and Homesigns," especially interesting. Although it has long been known that people of different cultures exhibit different patterns of gesture, and that gestures can take the place of words in grammatical sentences, linguists have regarded gesture as falling outside language

proper. Everett writes, "But gestures are not simply add-ons to language. There is no language without them. And there are no gestures without dark matter" (228). If he is right, then linguistics should be far more integrated with other social sciences than it now is.

Everett pursues ambitious theoretical goals and shows a willingness to challenge orthodoxies in the social sciences. He makes a powerful case that knowledge should be unified in ways that disciplinary boundaries fail to reflect. But his ambition comes with a price. Everett frequently wades into deep waters in linguistics and anthropology, all the while making it clear many of the positions he advocates are minority positions. Since I am an outsider to all of these fields except philosophy, I'm not able to assess many of the claims he makes. And I am not alone—the audience competent in philosophy, anthropology, linguistics, and cognitive science is bound to be small. Without this kind of wide-ranging expertise, it's hard for any reader to be justifiably confident that Everett's ambitious project is successful.

Three positive takeaway points nonetheless deserve emphasis. First, Everett's book shows Polanyi's ideas can be fruitfully applied to contemporary debates in the social sciences, and that his insights align with those of other thinkers, notably Kenneth Pike. That's an indication that Polanyi was onto something. Second, Everett plausibly challenges many assumptions that linguists and other social scientists make. Third, and I think most importantly, it's impossible to read

Dark Matter of the Mind without rediscovering the strangeness and complexity of human culture (e.g., his discussion about the mysterious connection between culture and body type, 72-76). That alone is worth the price of admission.

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