

# **Descartes' Hostages: Mind and Observability in Education**

by

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## Abstract

My purpose in this dissertation is to argue that given the relationship among the concepts of mind, knowledge, education and assessment, educators must pay more attention to our current view of mind. Educators use assessment practices, for example, to reduce complex, abstract concepts such as knowledge, understanding and mind because of a commitment to a particular view of mind. Further, to understand this relationship, mind's primacy must be acknowledged. As there is significant debate about the idea of mind, examination of this debate must *precede* discussion of deep, conceptual problems in our learning theories, assessment practices and views of education. The primary concerns I address in this dissertation include: the degree to which a particular view of mind frames the aim(s) of education, particularly framing what knowledge and understanding are and what assessment practices are best; and that any view of mind inherits a problematic history and confused vocabulary. To address these concerns, the analysis includes:

- A brief, historical account of mind from philosophy of mind
- An examination of how metaphors of mind are used in an attempt to clarify the concept of mind
- Thought experiments from philosophy of mind used as entry points to encourage new and deeper dialogue
- A summary of informal discussions with teachers about views of mind, knowledge, education and assessment
- An examination of the language from British Columbia's new curriculum to more closely analyze the hold our current view of mind has on education
- A discussion of the concepts of invisibility and visibility as they relate to the larger analysis of the *mind-knowledge-education-assessment* relationship

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## Epigraph

Almost everything worthwhile in philosophy has been thought of before, but this isn't in any way a depressing fact...the local originality that consists in having an idea oneself and later finding that it has already been had by someone else is extremely common in philosophy, and crucial to philosophical understanding.<sup>1</sup>

My aim is not to try to convince anyone of anything, but to record the truth of the matter as far as I can. I am aware, down to the details, I think, of this paper's vulnerability to unsympathetic reading or constructive misunderstanding, but it would take too long to try to block it all.<sup>2</sup>

The older I get the more I realize how terribly difficult it is for people to understand each other, and I think that what misleads one is the fact that they all look so much like each other. If some people looked like elephants and others like cats, or fish, one wouldn't *expect* them to understand each other and things would look much more like what they really are.<sup>3</sup>

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<sup>1</sup> Galen Strawson, *Panpsychism? Reply to Commentators with a Celebration of Descartes*

<sup>2</sup> *Ibid*

<sup>3</sup> Ludwig Wittgenstein, *Letter to P. Sraffa*, 23 August, 1949 in Constantine Sandis, *If Some People Looked Like Elephants and Others Like Cats: Wittgenstein on Understanding Others and Forms of Life*

## Introduction

The efficacy of magic implies a belief in magic. The latter has three complementary aspects: first, the sorcerer's belief in the effectiveness of his techniques; second, the patient's or victim's belief in the sorcerer's power; and, finally, the faith and expectations of the group, which constantly acts as a sort of gravitational field within which the relationship between sorcerer and bewitched is located and defined (Levi-Strauss, 1963, p. 168).

Claude Levi-Strauss in *Structural Anthropology* provides a metaphor for what follows in this dissertation. Perhaps educators are victims of sorcery, bewitched by a scientific picture of the world. Under a spell, where it is assumed that what another knows and understands is observable and measurable, educators participate in a kind of magic when assessing students. As the seeming efficacy of magic leads to a *belief in* magic, so too, does the seeming efficacy of assessment lead to a *belief in* assessment. Specifically, one must believe that the un-seeable (in this case, another's knowledge and understanding) *can* be made seeable, a kind of magic where the invisible becomes visible, the concealed is revealed and the hidden is exposed. Consider these ideas as they relate to a personal fear of mine as a child.

I was afraid of the dark. Many children are. This may be learned rather than a natural condition and eventually some of us outgrow it. Turning on the light made me feel safe because then I could see. Seeing made me feel secure and of my surroundings I felt more certain. Security and certainty are always temporary though, for the next night and the night after that are dark again.

The temporary character of security and certainty make it such that we may fear the future, because what happened in the past might recur. To allay this fear, we create elaborate structures, practices, methods and tools to predict when such fearful things might again happen. We might liken such creations to turning on the light when we fear the dark - our predictability tools or teddy bear to which we cling to make us feel safe ... or at least give us the illusion of safety.

In some professions, we create sophisticated predictability tools. Consider the “racial profiling tool.” The use of this particular tool is encouraged by many state governments in the United States of America to make citizens feel safe by supposedly identifying potential terrorists. Or Dr. Robert Hare’s (1991) “psychopathy checklist tool,” used by psychologists and law enforcement to supposedly identify psychopaths. If we can predict, then we can control and potentially stop future, fearful events. Then we can feel secure and safe and certain. Or so some of us might choose to believe.

Safety and security are not the only reasons we are motivated to create predictability tools. A desire for power, a desire to hire an employee who will be productive and loyal, a desire to find a compatible life-long partner, or a sincere goal to identify educated, professional, and ethical individuals who would be good teachers, are reasons to create predictability tools. Common to all of these examples is an interest in *breaking down or reducing* the complicated, the unpredictable, the conceptual, the immeasurable and the unknowable, to a set of features ... so that we can see ... so that we can measure ... and predict ... and be certain.

We might heed Bertrand Russell's (1946) advice in his *History of Western Philosophy*, where he cautions that "[u]ncertainty in the presence of vivid hopes and fears, is painful, but must be endured if we wish to live without the support of comforting fairy tales" (p. xiv). Russell reminds us that we ought to accept uncertainty as a fact of life. Though feelings of fear and insecurity are uncomfortable, even painful, we must endure for to live otherwise is to live in illusions or fairy tales. Creating and using predictability tools feed these illusions and fairy tales, but philosophy may help wean us from this tendency. As Russell further notes, to "teach how to live without certainty and yet without being paralysed by hesitation is perhaps the chief thing that philosophy, in our age, can do for those who study it" (p. xiv).

Profiling with our predictability tools is a reduction project where we attempt to make the conceptual empirical and therefore measurable, so much so, that history might describe us as the "profiling generation." Dating services, law enforcement, corporations and as I argue in this dissertation, educators, heavily rely on and endorse reduction projects of various sorts. Assessment practices in education, in particular, allow us to reduce concepts such as knowledge and understanding to behaviors and identifiable, measurable skills. Why should we care? We should care because such concepts are not reducible to skills, nor are they identifiable by analyzing behavior. Further, we should care because different and conflicting theories of knowledge, including what counts as knowledge and how it is acquired and developed, comprise an entire sub-discipline that is epistemology within the larger discipline of philosophy. The debate over whether we indirectly or directly perceive reality, for example, whether knowledge is innate or derived from experience or whether it is concrete or abstract, are just some of the many

complicated, ongoing debates within the field of epistemology. In short, what knowledge *is* (or is not) is no settled matter.

Similarly, theories of learning and theories of understanding, both entangled in epistemological debate are abundant and often conflict making it such that they, too, sit in unsettled terrain. Further, these epistemological matters that are the subject of rich, political, historical and current theoretical debate, are mired in theories of mind. These points are critical as embedded within our assessment practices are significant assumptions, including that what counts as learning, knowing and understanding *are* settled matters. A particularly troubling assumption is that thinking is a *skill*. Consider *Bloom's Taxonomy*, highly influential in education, where thinking is reduced to skills and behaviors, and knowing and understanding are reduced to *types* of thinking skills and behaviors. Such reductions persist in our educational discourse and affect our practices. Add to this mix the governmental jurisdiction over education, and we find there are substantial political stakes as to what gets to *count* as mind, knowledge, understanding and education.

My purpose in this dissertation is to argue that given the relationship among the concepts of mind, knowledge, education and assessment, educators must pay more attention to our current view of mind. Educators use assessment practices, for example, to reduce complex, abstract concepts such as knowledge, understanding and mind because of a commitment to a particular view *of* mind. Further, to understand this relationship, mind's primacy must be acknowledged. As there is significant debate about the idea of mind, examination of this debate must *precede* discussion of deep, conceptual

problems in our learning theories, assessment practices and view of education. The primary concerns I will address in this dissertation then, include:

- The degree to which a particular view of mind frames the aim(s) of education, particularly framing what knowledge and understanding are and what assessment practices are best; and
- That any view of mind inherits a problematic history and confused vocabulary

To address these concerns, the analysis will specifically include:

- A brief historical account of mind from philosophy of mind
- An examination of how metaphors of mind are used in an attempt to clarify mind
- Thought experiments from philosophy of mind used as entry points to encourage new and deeper dialogue
- A summary of informal discussions with teachers about views of mind, knowledge, education and assessment
- An examination of the language from British Columbia, Canada's new curriculum to more closely analyze the hold our current view of mind has on education
- A discussion of the concepts of invisibility and visibility as they relate to the larger analysis of the *mind-knowledge-education-assessment* relationship

Wanting educators to more thoughtfully interrogate these concepts from epistemology and philosophy of mind, and noting the difference between concepts and “things” as they

bear on education, the dissertation is a call for educators to pay closer attention to the concept of mind. As Robin Barrow (2010) suggests in *Was Peters Nearly Right About Education?* our concepts in education are often unexamined and unpacked. In the context of Richard Peters' (1966) work, Barrow argues that there is a need in education

...for more analytic ability; so much argument in politics, the arts and the humanities in particular is conducted by means of concepts that whatever else they may be are simply unclear...In order to explicate a concept, one needs not only to use clear terminology but also, very often, to unpack other concepts involved in the definition. Thus, if we say that education involves the imparting of worthwhile knowledge, that, though clear terminologically, obviously invites further questions about what is involved in worthwhile knowledge (p. 14).

He goes on that determining what knowledge is and what is worthwhile to know is a “task, contrary to many a prevailing viewpoint, [that] is not simply a matter of exchanging entirely subjective opinions.” Rather, “it is a question of focusing on the nature of knowledge and on the quality of arguments surrounding particular value claims” (p. 18). Stressing that educators have confused the empirical with the conceptual, Barrow reminds us that

...[c]oncepts are not things, both in the sense that some concepts are of abstractions such as love, which are not generally regarded as things, and in the sense that the concept of a stone is not the same as a particular stone (which is a thing)...[d]espite the fact that formally few would dispute it, many...seem to forget this basic point” (p. 12).

Importantly, concepts are not objects we can observe or “things” we can see. Calling for a particular type of conceptual analysis in doing philosophy of education, namely, a philosophical analysis advocated by Richard Peters, Barrow describes such an analysis as

one that, “involves no set procedures” and is “defined by its questions: it can only be characterised in terms of explicating or inquiring into concepts...generally imaginative and reflective rather than technical or calculative” (p. 20). This style of analysis is an “attempt to do some extensive and imaginative thinking and to encourage others to consider critically what one has to say” (p. 14). In the spirit of such an analysis, and standing on the shoulders of many, this dissertation is a modest attempt at some extensive and imaginative thinking about the connection among the concepts of mind, knowledge, education and assessment (the *mind-knowledge-education-assessment* relation). As well, it is hoped that it will encourage others to consider critically what I have to say on these matters, namely, that a certain view of mind *is* assumed in education - a view that allows us to magically *see* mind and *see* the degree to which another knows and understands ... or at least allows us to believe we can.

In Chapter 1, I argue that education has inherited Cartesian error and a corresponding erroneous vocabulary. As a result, educators are left with a confused account of mind, an account that has rooted in our curriculum, teaching and assessment practices. Using the history of philosophy of mind as an entry point and adding to the existing scholarship in this area, I argue that a view of mind dictates a view of knowledge, a view of education and a view of assessment.

I begin with a general discussion of some mistakes educators inherit from the philosophy of Rene Descartes, particularly the mind-body problem. Because of this historical problem of mind, the corresponding views of knowledge, mind, education and assessment practices similarly inherit the errors. I then discuss this relationship in the context of some influential views of mind in education, including John Locke’s idea of

mind as a tabula rasa, and Jerry Fodor's mind-computer analogy.

Given the influence of mind on education, I next discuss the need for a close examination of the *history* of mind. Drawing from the work of philosopher, John Searle and his account of mind, I begin with Descartes' dualist thesis, and move through the various theories of mind. This sketch, from Searle's *Mind: A Brief Introduction*, includes short summaries of the theories of materialism, behaviorism, physicalism, identity theory, functionalism and computationalism.

I conclude the chapter with a discussion of the deep, philosophical difficulties the problematic vocabulary from the history of mind leaves educators. Further, given the relationship of mind, knowledge, education and assessment, a call to abandon the vocabulary of mind is offered as an alternative worth serious consideration.

Chapter 2 is an exploration of the degree to which a particular view of mind has taken hold in education. Focusing on assessment, I discuss the assumption of assessment: that one can assess from a third-person perspective what another knows and understands. Using some thought experiments from philosophy of mind as analogies, I argue that given third-person limitations, assessment is only useful to assess skill competency and task completion. I also argue that knowledge and understanding are irreducible and therefore *un-assessable*. As such, specific learning outcome language, rubrics and *Bloom's Taxonomy* are used (erroneously) to reduce knowledge and understanding to behaviors and skills. Once reduced, what a student knows and understands *appear* to be assessable. Thomas Nagel's thought experiment *What Is It Like To Be A Bat?* Frank Jackson's *What Mary Doesn't Know* and John Searle's *The Chinese*

*Room* are used as support for these claims. Some of Searle's arguments about the character of consciousness (and the corresponding vocabulary he uses to describe consciousness) are also used to discuss the limits of assessment. Woven through this discussion is some of Andrew Davis's significant scholarship in the area of assessment, along with some language from British Columbia's "transformative new curriculum."

I begin the chapter with a discussion of the residue left by the mind-body problem. Given the failure to reduce mind, this residue influences educators and leaves us with a problematic vocabulary of the mental and the physical. I use some examples from educational literature to show how this problematic vocabulary and a particular view of mind frame curriculum language in education.

Next, I highlight the importance of using thought experiments from philosophy of mind to discuss these problems in education. Beginning with Nagel's thought experiment, I argue that teachers cannot know what it is like to be a student. Further, I suggest that we cannot reduce student knowledge and understanding and cannot access what Nagel terms another's *first person subjectivity*. Andrew Davis's work on assessment is used to show how criteria and rubrics in our assessment practices are necessary tools to forcefully reduce student knowledge and understanding.

Following this discussion, I use Frank Jackson's thought experiment to similarly point out the limits of reducibility as they relate to education, and further discuss what teachers don't know. Along with John Searle's *The Chinese Room*, these thought experiments from philosophy of mind are used to further illustrate the mind-knowledge-education-assessment relation, and expose the push to reify concepts such as mind,

knowledge and understanding.

Next, I show how *Bloom's taxonomy* is erroneously used and modified to reduce complex, abstract concepts. Arguing that epistemological ideas such as knowledge and understanding are improperly reduced to skills and behaviors, I explore why educators might re-consider and re-think the use of Bloom. John Searle's description of causal and ontological reductions, in the context of philosophy of mind and his arguments about consciousness, are used to show some of the more glaring errors in our assessment practices. Offered as "a vocabulary for assessment," I conclude the chapter suggesting that Searle's distinctions reveal how the language of assessment (ministry language, rubrics, outcomes, etc.) is purposefully constructed to fit a scientific picture of the world.

In Chapter 3, I explore metaphors of mind. In particular, I examine how the use of metaphors, while often an effort to clarify what mind *is* and how knowing and understanding might be *classified*, adds to the confusion. The exploration draws attention to how metaphors of mind impact educational practice and policy, how embedded within the metaphors are assumptions of epistemology and pedagogy, and how particular metaphors have far-reaching consequences.

I begin with a general discussion about thinking metaphorically and how various scholars describe it. Thinking metaphorically has implications for education, particularly as educators use metaphors to understand, for example, the concept of mind. Examining our *use* of metaphors in educational practice, I also discuss how metaphors are often conflated with the object *of* the metaphor.

Next I discuss some historical metaphors of mind in education. Following the

descriptions, I note how metaphors of mind are not *wrong*, but problematic in that they are assumed to be *right*. The consequence of this latter point is that views of knowledge, education and assessment are similarly assumed to be *right*. Sheppard's scholarship is used here to examine the relationship between conceptions of mind, knowledge, and education, and the assumptions that are made in practice.

Following this examination, I discuss the current metaphor influencing education. The computer metaphor (and its various iterations, including the neuroscientific view of mind) is analyzed, along with the mechanistic, algorithmic language that is used to describe it. How such language is then used in our descriptions of assessment expectations and curriculum development is also addressed. I use examples from the British Columbia Ministry of Education to show how pervasive the language of this metaphor is.

I conclude the chapter with a discussion of another iteration of the computer metaphor – the ecosystem metaphor of mind. Examining the metaphor and the language used to describe it, I suggest that the metaphor allows for the erroneous reductions of knowledge and understanding to skills and behavior. I also suggest that the use of metaphors of mind, in general, only exacerbates the already deep, philosophical problems with which educators must deal.

Chapter 4 is an investigation of the degree to which metaphors of mind impact education. With reference to informal conversations with educators, I inquire about teachers' views on mind, knowledge and assessment. The chapter begins with a conceptual inquiry, where I discuss some conflicting perspectives about mind and more

deeply examine confusion about the *concept* of mind.

This conceptual analysis is followed by a summary of discussions with teachers about mind. The conversations cover a range of ideas about mind, including the distinction between brain and mind; discussions about skills, knowledge and understanding; and views of assessment practices. This accounting of casual, engaging conversations with teachers about mind is also included as important feedback about the impact “mind talk” has on educators. Scholarship and vocabulary from philosophy of mind is again used to expose some of the philosophical problems that educators face; problems deeply rooted in our confusion *about* mind. Reference to British Columbia’s new curriculum is also occasionally made to further argue an allegiance to a particular and confused view of mind.

I conclude the chapter with some final thoughts on my discussions with teachers and how the discussions might inform teacher education. I also suggest that there is an appetite for empirical research in this area, for those interested in doing so. Such studies might well be conducted in the future to more formally explore teachers’ views on mind.

In Chapter 5, I examine the concepts of invisibility and visibility. As part of this examination, I expose some of the limitations teachers encounter when conducting assessment (as noted in some of the informal discussions with teachers in Chapter 4). Further, I examine how invisibility and visibility relate to our current view of mind, and how the concepts are discussed and used in some of the educational literature. Arguing that invisibility and visibility is key in determining *why* we maintain a particular view of mind, I reassert how such a view of mind fits into a physical, scientific picture of the

world.

The chapter begins with a theoretical discussion using Plato's stories of *The Ring of Gyges*, *The Allegory of the Cave* and *The Divided Line*. The stories are used as analogies to show how maintaining a particular view of mind means educators assess skills and task completion (because they can), and leave out the most important aspects of education (deep understanding, wisdom or enlightenment) because they are un-assessable.

I then move to an examination of how the concepts of invisibility and visibility are discussed in some of the educational literature. Specifically, I explore how the concepts are used in relation to the assessment of learning, knowing and understanding. I also discuss how the concepts of invisibility and visibility are crucial to a reduction project. Made possible by using rubrics and *Bloom's Taxonomy*, the reduction project allows for knowledge and understanding to be reduced to observable skills or behaviors. Vocabulary from philosophy of mind is again used, specifically John Searle's distinctions of epistemic and ontological subjectivity and objectivity, to continue untangling our current view of mind.

I conclude the dissertation with some thoughts and recommendations of how educators might shift and re-focus. Returning to Searle's call to abandon the erroneous assumptions and subsequent erroneous vocabulary of mind with which Descartes leaves

us, I discuss how as hostages of Descartes, educators might negotiate their release ... or as Wittgenstein (1953) suggests, how we might as a fly get ourselves out of the bottle.<sup>4</sup>

The purpose of this work is to draw attention to a *relation*, wherein a view of mind informs a view of knowledge, which both inform the aim of education and the purpose of assessment. While I am not attempting to resolve which particular view of mind is correct or incorrect, I do argue that there are significant challenges with the computational view (its most recent iteration being the neuroscientific view) of mind.

While there is existing scholarship in philosophy of education about mind, and significant scholarship about knowledge, aims of education and assessment, this dissertation calls for a stronger connection of these concepts. That is, a view of mind is *connected or leads to* a view of what gets to count as knowledge, which then leads to a view of education, which then informs our assessment practices. Given that any view of mind inherits problems and faulty assumptions from the history of philosophy of mind, educators would benefit from 1) a deep, philosophical analysis of the history of the concept of mind; and 2) a careful examination of how the inherited, historical problems and faulty assumptions about mind impact the *mind-knowledge-education-assessment* relation.

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<sup>4</sup> See Ludwig Wittgenstein (1953) *Philosophical Investigations*

# Chapter 1. Inherited mistakes

## Introduction

We can with some difficulty imagine what it would be like to be a bird flying... the temptation is always to imagine what it would be like for us if we were flying... But the exact qualitative character... is not accessible to standard forms of empirical tests. And indeed, why should it be? Why should we assume that all the facts in the world are equally accessible to standard, objective, third-person tests? If you think about it, the assumption is obviously false (John Searle, 1998, p. 73).

In *Rediscovery of the Mind*, John Searle questions how qualitative character can be empirically tested or accessible through any third-person test. His broader context is philosophy of mind. Debates about the character of consciousness inevitably lead philosophers into debates about mind, which inevitably lead into debates about whether the world is physical, mental or both. If, as some claim, consciousness is something that happens in the mind, then the mental must exist and there must be minds. If, as some claim, the world is entirely physical, then everything that exists must be reducible to the physical. But since the qualitative character of consciousness cannot be reduced to something physical, the world cannot be *entirely* physical because it would leave something out – consciousness. Of note here is that embedded within the discussion of the qualitative character of consciousness is unsettled debate about mind, and embedded within debate about mind is unsettled debate about the character of the world.

Educators might engage in a similar philosophical analysis. How, for example, can the qualitative character of knowledge or understanding be empirically tested and

“accessed” through an objective third-person test? In this chapter, I draw close attention to this question and argue that because of a commitment to a particular view of mind, educators reduce complex, abstract concepts, such as knowledge and understanding, to make them “assess-able.” Further, I argue that any view of mind leads to a particular view of knowledge, both of which dictate a view or aim of education, and all of which drive assessment practices.

Assessment practices in education can be said to *supervene* on an aim(s) of education, a view of knowledge and a view of mind. To *supervene* on something is to “depend upon.” In philosophy of mind, for example, some philosophers argue that mind supervenes on body. That is, having a mind depends first on having a body. David Donaldson (1970) in *Mental Events*, describes supervenience as follows:

...mental characteristics are in some sense dependent, or supervenient, on physical characteristics. Such supervenience might be taken to mean that there cannot be two events alike in all physical respects but differing in some mental respect, or that an object cannot alter in some mental respect without altering in some physical respect (p. 214).

As I will discuss in this chapter, applying the idea of supervenience to education, assessment practices *supervene* on (or depend upon) a view of education. A view of education *supervenes* on a view of knowledge. And a view of knowledge *supervenes* on a view of mind. Given this supervenience, while some scholars in philosophy of education focus on aims of education, such a focus is appropriate *only after* a rigorous examination of the concept of mind. Kieran Egan (1997), for example, outlines the conflicting aims of education in his work, *The Educated Mind* noting three competing distinctions: 1) the

Platonic aim where education ought to be about the pursuit of knowledge and development of mind; 2) the Rousseauian aim where education ought to be about self-discovery; and 3) the Socialization aim where education ought to be about preparing the student to be a useful, productive member of society. The reason that aims of education conflict is that each entails a different view of what counts as education and how it ought to be achieved. Egan's distinctions lead me to question, however, if the conflict of aims is symptomatic of, if not deeply rooted in, a deeper conflict – conflicting views of mind.

While Egan does discuss Plato's and Rousseau's views of mind and knowledge as they relate to their views of education, this dissertation makes a stronger claim about the relationship and what ought to be the focus of analysis: a view of mind *leads to* a particular view of knowledge, both of which lead to a view or aim(s) of education (Sheppard, 2001), all of which determine assessment practices. Because of mistaken assumptions and an erroneous vocabulary from the history of philosophy of mind (which Plato's, Rousseau's, and any view of mind inherits), our focus as educators ought to be a deep analysis of *mind* and how the subsequent relationship of *mind-knowledge-education-assessment* is fraught with unexamined assumptions, confusion and error.

Returning to Egan's conflicting aims of education (the Platonic and Rousseauian aims in particular), the Platonic aim, where education is about the pursuit of knowledge and development of mind, has embedded within it a particular view of knowledge. That is, knowledge is "*forms...carry[ing] the mind from its initial confusions and unclarity to a recognition of the truth about reality...from eikasia to pistis to dianoia to noesis*" (Egan, 1998, p. 54). And this view of knowledge has embedded within it a particular view of mind, where mind is:

...[an] epistemological organ...not a kind of psychological organ we are accustomed to thinking of it as...the mind is what it learns...so the construction of a curriculum that will allow the vehicle of increasingly elaborated forms of knowledge to carry the mind onward to noesis is the crucial educational task (p. 54).

The Rousseauian aim, where the aim of education is self-discovery, has embedded within it a particular view of knowledge, where knowledge is “spontaneous, internal, autonomous growth” (Egan, 1998, p. 54) and “all knowledge [comes] through direct contact with the physical world.”<sup>5</sup> This view of knowledge has embedded within it a particular view of mind, where mind is:

...an internal development process...the mind, in this conception, goes through an autonomous process, rather like the body. The human body is programmed so that, given appropriate environmental supports, it will pass through a series of changes that will carry it from embryo to adult...mind [has] its own distinctive process of development...education tends to be seen as furthering and fulfilling that process (p. 54).

Of course, views of mind are not limited to the aforementioned. Some hold a computational view where mind is an “information-processor.” Others hold that mind is just a brain or that mind is a blank slate. Because we do not really have a clear account of what mind *is* and how it *works*, we turn to metaphors, each of which has its own connotations and limitations (Sheppard, 2001). Given the complex history of the concept of mind, along with the problematic vocabulary we use to discuss it, the turn to metaphor only further confuses us. If our discussions about mind are confused, then our discussions

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<sup>5</sup> See discussion of Rousseau’s view of mind in *Emile* at <http://education.stateuniversity.com/pages/2380/Rousseau-Jean-Jacques-1712-1778.html>

about knowledge, the aim(s) of education, and assessment practices are similarly confused. While Egan's distinctions of the aims of education are important, they are better placed as a later chapter in a story of the problems we face in education. In short, conflicting aims of education arise *because of* deeper, conceptual differences and conflicts about what counts as knowledge, and *because of* deeper, conceptual differences and conflicts about mind.

### **Some views of mind influential in education**

My purpose in this dissertation is not aimed at resolving which view of mind is right or wrong, though I believe there are serious problems with the current computational view of mind, more fashionably now the neuroscientific view. My purpose is to draw attention to a "necessary relation" where a view of mind informs a view of knowledge, both of which inform the aim(s) of education and assessment practices.

Consider the following two examples as support for these claims:

John Locke (1690) in *An Essay Concerning Human Understanding* offers educators an historical view of mind describing it as a "tabula rasa," a blank slate or piece of paper:

Let us then suppose the mind to be, as we say, white paper void of all characters, without any ideas; how comes it to be furnished? Whence comes it by that vast store, which the busy and boundless fancy of man has painted on it, with an almost endless variety? Whence has it all the materials of reason and knowledge? To this I answer, in one word, from *experience*: in that, all our knowledge is founded; and from that it ultimately derives itself.

Locke describes an innocent enough metaphor. His characterization of mind, however, leads to a significant epistemological assumption: that knowledge comes from experience, and a pedagogical instruction: that educators “paint” the tapestry that is a student’s mind.

Jerry Fodor (2000) offers a more contemporary view of mind, a view currently influencing educators, where mind is compared to a computer and described as an information processing system. Arguably the father of the computational view of mind, Fodor suggests that this view of mind gives us “the best theory of cognition that we’ve got.” Kennedy (2012) further describes this view, likening mind to an information processor – a characterization that allows for a better understanding *of* mind. As he notes,

...[t]he power of the computer–brain metaphor is its ability to make us think we understand something about the mysteries of the mind; by likening the operation of the brain to the operation of a digital computer, it can be more easily understood, given the state of knowledge. Information fed into a computer is converted from analog into digital form, processed and either stored or returned to the user in a similar or modified form. Information fed into the brain through the senses is converted from light and sound energy (mainly) into electrochemical form, processed, and either stored or returned, usually in a modified form. The similarity is that both the brain and the computer can be regarded as information processors.

While Locke’s view of mind as a tabula rasa leads to an epistemological claim that knowledge comes from experience and implies a pedagogical role of educator as “painter,” the computational view of mind leads to an epistemological claim that knowledge is *processed information* and implies a pedagogical role of educator as

“inputter.” That knowledge is experiences put *on* the mind logically follows from the view that mind is a blank slate. Education on this account is about exposing the student to certain experiences, and assessment is of the extent to which the student’s slate is filled. Alternatively, that knowledge is processed information going *in* to the mind logically follows from the view that mind is an information or computational processor. Education on this account is about exposing the student to information and assessment is of a student’s *processed output*.

### **Our current view of mind**

An examination of curriculum language and educational literature suggests that our current view of mind is that it is a processor - informational, computational or neural. As just a few examples, British Columbia’s Ministry of Education (2017) writes that its new curriculum “supports a neuroscience informed classroom.” Leslie Owen Wilson (2013) writes that, “the learner consolidates and internalizes information by actively processing it.”<sup>6</sup> Citing Jensen (2011), Caine & Caine (1999) and Souza (2011), Wilson further suggests that, “the brain is a parallel processor,” “it can perform several activities at once,” “information is stored in multiple areas of the brain, and can be retrieved through multiple memory and neural pathways.” Writing about music education, Anita Collins (2013) argues that, “neuroscientists have been fascinated by the way the brain processes music” and further that “neuroscientists offer us a better understanding of the human brain’s structures and functions...prop[os] explanatory models for how the brain processes music” (p. 217). The fact that one may personally disagree with the view

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<sup>6</sup> See Wilson’s discussion of brain-based learning in *The Second Principle* at <http://thesecondprinciple.com/teaching-essentials/beyond-bloom-cognitive-taxonomy-revised/>

of mind that it is some type of processor, does not negate that the view is assumed in assessment guidelines in post-secondary and public schools throughout North America. Perhaps this is because the view allows mind to be observable and therefore assessable. There is a sense of urgency for educators to concern themselves with such a view of mind as newly designed curriculum, teaching practices and assessment practices remain rooted in a faulty assumption: we can assess what students know and understand. Assessment methods, at best, measure skill competency and task completion, both of which are observable from a third-person perspective. I can observe, for example, that a student correctly spells words or has completed an assignment. Currently, there is a call to shift away from mere skill competency and task completion and shift toward *deep learning*, as evidenced in the new, transformative curriculum from the British Columbia Ministry of Education. As discussed in the dissertation, however, this move leads to erroneous assumptions that deep learning and mind are assessable.

Another troubling assumption is that mind and brain are identical. This is typically assumed in two ways: in the context of the casual interchange of *mind* and *brain* in educational discourse, and in the context of curriculum design and assessment practices. Considering these assumptions and confusion about mind, along with the *mind-knowledge-education-assessment* relation, it is worthwhile to begin the examination with the history of mind.

## **History of philosophy of mind**

A number of philosophers of education have seen the value in exploring the problems we face in education using philosophy of mind as a bridge. Catherine Elgin,

Randall Curran, Andrew Davis, Shelby Sheppard and Robin Barrow, as examples, have contributed important scholarship. The recently published, *Neuroscience and Education: A Philosophical Appraisal* (2016), where philosophers of education explore problems with the neuroscientific view, and “mind-brain education” is also encouraging. In one of the essays, *Out of Our Minds: Hacker and Heidegger contra Neuroscience*, Emma Williams and Paul Standish, for example, discuss category mistakes and problems with the neuroscientific account of mind, arguing for a new explanatory model of the mind-brain relation. Generally, however, pre-service teachers are neither privy to nor required to study philosophy of mind, but such study is important – perhaps now more than ever. My interest then is to add to existing scholarship in a manner that hopefully engages teachers, beginning with a simplified sketch of the historical accounts of mind. Working through some of this history, I offer these descriptions for teachers to consider and analyze as they relate to their own views of knowledge, education and assessment.

Given his careful analysis of the history of mind, my descriptions primarily rely on the work of philosopher, John Searle. Examining the history of philosophy of mind from his and others’ perspectives, I argue that education has inherited Cartesian error and a corresponding erroneous vocabulary, leaving educators with a confused, mistaken account of mind. This mistaken account of mind continues to infect current curriculum design, practice and assessment. To make this argument, I give a short summary of the mind-body problem followed by brief descriptions of its various iterations, including materialism, physicalism, functionalism, computationalism, brainism and personalism.

Philosophers of mind (from the discipline of philosophy) are not necessarily interested in how views of mind impact educational policy, practice and assessment, nor

are they necessarily connected with philosophy of education. In fact, some philosophers of mind remark that they are unsure of what their work has to do with education. That said, and as previously suggested, a view of mind informs a view of knowledge, education and assessment practices. As such, an examination of the history of the concept of mind is necessary.

## **The Mind-Body Problem**

Thomas Nagel (2012) in *Mind and Cosmos* suggests that human beings are “large-scale, complex instances of something both objectively physical from outside and subjectively mental from inside,” and that “perhaps the basis for this identity pervades the world” (p. 29). Critiquing his friend Nagel, and the view that the mental is separate from the physical, John Searle (2000) in *Consciousness* suggests that we must “overcome the philosophical tradition that treats the mental and the physical as two distinct metaphysical realms” (p. 131). Beginning with the problem of how the mental that is *non-physical* can influence the body that is *physical*, John Searle (2004) attributes the problem of this mind-body distinction to the philosophical writings of Rene Descartes. Noting that Descartes was not the first philosopher to argue for dualism, he describes Cartesian dualism (or *substance dualism*) as the idea that we can divide the world up into two different realms. That is, the mind and the body are two separate entities or substances, each of which can exist on its own. While everyone is said to have a mind and a body, Cartesian dualism holds that they are separate *substances*. The mind is *mental*, indivisible and cannot be destroyed, and the body is *physical*, divisible and can be destroyed. Descartes (1641) clearly makes this distinction in Meditation VI:

There is a great difference between the mind and the body, inasmuch as the body is by its very nature always divisible, while the mind is utterly indivisible. For when I consider the mind, or myself in so far as I am merely a thinking thing, I am unable to distinguish any parts within myself; I understand myself to be something quite single and complete. Although the whole mind seems to be united to the whole body, I recognize that if a foot or arm or any other part of the body is cut off, nothing has thereby been taken away from the mind. As for the faculties of willing, of understanding, of sensory perception and so on, these cannot be termed parts of the mind, since it is one and the same mind that wills, and understands and has sensory perceptions. By contrast, there is no corporeal or extended thing that I can think of which in my thought I cannot easily divide into parts; and this very fact makes me understand that it is divisible. This one argument would be enough to show me that the mind is completely different from the body, even if I did not already know as much from other consideration (p. 59).

As Nagel (2012) summarizes Descartes' argument, "since we can clearly conceive of the mind existing without the physical body, and vice versa, they can't be one thing" (p. 27). According to Searle, even though Descartes' idea that there are mental substances and physical substances is nothing short of a disaster, some form of Cartesian dualism still influences us to this day. Hypothesizing that a lingering debate between science and religion provides at least some of the explanation for its current force, Searle (2004) notes, "Cartesian dualism was important in the seventeenth century...as it seemed to divide up the territory between science and religion" (p. 9). Further, as scientific and religious views of the world were considered incompatible, Descartes' dualism alleviated some of the acrimony "giving the material world to the scientists and the mental world to the theologians" (p. 10). The body could be studied "by such sciences as biology,

physics, and astronomy” (p. 10) but the mind could not, as it was a part of the mental realm.

Thomas Nagel (2012) similarly describes the mind-body problem and Cartesian dualism, noting them as products of the scientific revolution of the seventeenth century. As he writes, Descartes laid the groundwork for the physical sciences to provide “a mathematically precise...description of an external reality extended in space and time...limited to...primary qualities such as shape, size, and motion, and to laws governing the relations among them” (p. 26). In contrast, “subjective appearances...how this physical world appears to human perception - were assigned to the mind, and the secondary qualities like color, sound, and smell were to be analyzed relationally” (p. 26). Nagel points out that these subjective experiences of the mind *had to be* left out of any account of the physical world “in order to permit this powerful but austere spatiotemporal conception of objective physical reality to develop” (p. 26). Even as neuroscience currently works to bring mind into a “single physical conception of the world,” Cartesian dualism lingers. Noting the continued distaste for dualism, Nagel further points out how our view of the world and our historical accounts of the world are at stake, making it such that physical science *must* carve off the realm of the mental: “the mind-body problem is not just a local problem having to do with the relation between mind, brain, and behavior in living animal organisms...it invades our understanding of the entire cosmos and its history (p. 11).

While debates continue as to whether or not Descartes’ distinction of mind and body is merely a “conceptual” distinction (Strawson, 2006), Searle (2004) summarizes that “Descartes’ views have led to endless debates and it is fair to say...dividing the

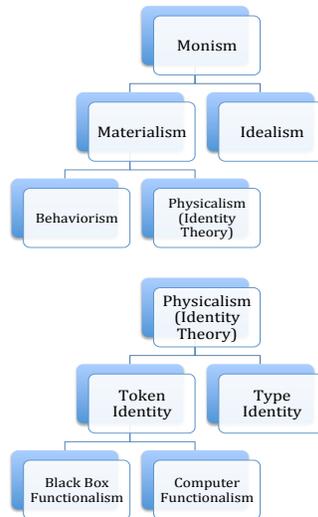
mental and the physical leaves us with a bushel of problems” (p. 11). To address this bushel of problems, Materialism and its various offspring are offered as solutions – solutions to one of the problems with which Cartesian dualism leaves us: an inconsistency with modern physics.

## **Materialism**

“Physics says that the amount of matter/energy in the universe is constant; but substance dualism seems to imply...another kind of energy, *mental* energy or spiritual energy that is not fixed by physics” (Searle, 2004, p. 30). This inconsistency gives rise to what Searle calls a weaker form of dualism referred to as *property dualism*. As its name suggests, it differs from substance dualism in that there are not two separate *substances*, but rather two types of *properties*. In short, humans are not made up of two different substances (mind and body) but their bodies do have both physical and mental properties. As Searle argues, however, even though property dualists avoid the problem of accounting for two separate substances, they still inherit the same problems of Cartesian dualism, namely, “the problem of how the mental properties...can ever function causally to produce anything” (p. 30). Further, he asks, how can mental states “which on this view are not even part of an extra substance...merely non-physical features of the brain, function to cause any physical events?” (p. 30). Simply put, the short-cut does not work as “we really do not get out of the postulation of mental entities by calling them *properties*...we are still postulating nonmaterial mental things” (p. 32) and we are therefore still left with the problems of Cartesian dualism.

The following diagram (Searle, 2004, p. 52) is helpful to visualize the “family

tree” of dualism before proceeding further (see Figure 1). Dualism (both property and substance dualism) gives rise to monism as follows:



**Figure 1. Family Tree of Monism**

In an attempt to deal with the problems of dualism, monist accounts of the world – that the world is *one* - are offered. The idea that the world is entirely mental (mentalist monism) is referred to as idealism, for which George Berkeley is perhaps the most famous. The more popular form of monism, however, is materialism which gives rise to the “most influential family of views in philosophy of mind leading into the twenty-first century” and is described thus: “the only reality that exists is material or physical reality...if mental states have a real existence, they must...be reducible to...be nothing but, physical states of some kind” (Searle, 2004, p. 34). Describing materialism as the “religion of our time...among most of the professional experts in the fields of philosophy, psychology and cognitive science” (p. 34), Searle goes on to argue that materialism paves the way for our current functionalist, computational view of mind – a view of mind still held hostage by its Cartesian DNA. As Nagel (2012) puts it:

Materialism is the view that only the physical world is irreducibly real, and that a place must be found in it for mind, if there is such a thing. This would continue the onward march of physical science, through molecular biology, to full closure by swallowing up the mind in the objective physical reality from which it was initially excluded. The assumption is that physics is philosophically unproblematic, and the main target of opposition is Descartes' dualist picture... The task is to come up with an alternative, and here begins a series of failures (p. 27).

The first in the series is Behaviorism.

### **Behaviorism – Mind is Behavior**

As materialism grows in response to dualism, various iterations develop, including behaviorism. Science dictates that everything is material and therefore observable and testable. In kind, psychologists advance a theory respected by and compatible with science: behaviorism. The idea of behaviorism is that “there is nothing over and above the behavior of the body that is constitutive of the mental” or, more simply, “mind just *is* the behavior of the body” (Searle, 2004, p. 35), and “mental concepts were explained in terms of their observable behavior” (Nagel, 2012, p. 28).

### **Methodological Behaviorism**

Tethering itself to science, the behaviorists, most notably B.F. Skinner (1936) and John B. Watson (1925), argue that human behavior is testable, public and objective. As such, so-called *laws* correlate “the input stimulus to the organism with the output response behavior” (Searle, 2004, p. 35). This view, known as methodological behaviorism, is so-named because it presents a *method* rather than dealing with the messy

matter of Cartesian dualism and how to account for mind. In short, methodological behaviorists argue that “scientific claims have to be objectively testable and the only objectively testable claims about the human mind are claims about human behavior” (p. 35). It is important to note here that this shift to behaviorism has significant consequences for education. It provokes a turn, for example, from the discipline of philosophy to the discipline of psychology.

Psychologist, B.F. Skinner (1968), in particular, wrote extensively about teaching and education, advising that an “effective technology of teaching, derived not from philosophical principles but from a realistic analysis of human behavior, has much to contribute” (p. 438). As well, he lays the foundation for modern pedagogical practices and learning outcome language, such as “performance-based standards” (now re-named *competencies*.) One can hear the Skinnerian ghost in today’s classroom practices and curriculum documents, as he suggests that education is observable *skill development*, and in his work *The Technology of Teaching*, counsels teachers to:

...[c]learly specify the *action* or *performance* the student is to learn to do; Break down the task into small *achievable steps*, going from simple to complex; Let the student *perform each step*, reinforcing correct actions; Adjust so that the student is always successful until finally *the goal is reached*; Transfer to intermittent reinforcement to maintain the *student's performance*.

As will be discussed later in the dissertation, while methodological behaviorism still drives assessment practices in education, it is important to note that the theory is aggressively critiqued in philosophy of mind as sidestepping the problem of Cartesian dualism by simply terming it “irrelevant.” Methodological behaviorism offers an

unsatisfactory and incomplete picture, and as a consequence, a new kind of behaviorism emerges: logical behaviorism - a theory that Cartesian dualism is “logically incoherent,” not irrelevant.

### **Logical Behaviorism**

John Searle (2004) describes this offshoot of behaviorism as follows: “having a mental state was just being disposed to certain sorts of behavior” or put in other words, “if such-and-such conditions obtain, then such-and-such behavior will ensue” (p. 36). It is worth mentioning here what broad appeal this type of behaviorism had, as it sought to overcome the problems of Cartesian dualism. Adding to this movement, and a supporter of the behaviorist account of mind, Gilbert Ryle (1949) in *The Concept of Mind* describes Cartesian dualism as a *category mistake* creating “a ghost in the machine.” Descartes’ category mistake is analogously compared to Oxford University, where Ryle describes someone visiting Oxford for the first time who, “is shown a number of colleges, libraries, playing fields, museums, scientific departments and administrative offices” and then queries, ““but where is the University?”” Ryle further explains, how the visitor must be corrected:

The University is not another collateral institution, some ulterior counterpart to the colleges, laboratories and offices which he has seen. The University is just the way in which all that he has already seen is organized. When they are seen and when their co-ordination is understood, the University has been seen. His mistake lay in his innocent assumption that it was correct to speak of Christ Church, the Bodleian Library, the Ashmolean Museum *and* the University...as if ‘the University’ stood for an extra member of the class of which these other units are members. He was mistakenly allocating the University to the same category as

that to which the other institutions belong (p. 6).

Ryle uses the example to highlight the error of thinking that there are *two things*. When “their co-ordination is understood,” the mind and the body are *one* thing, not two different categories or two different substances. Ryle’s endorsement of behaviorism is powerful, as he argues that it is simply *not* the case that there is some substance called mind that really exists “behind the behavior of the body.” Rather, “it was simply *part of* that physical behavior.” Consider also D.M. Armstrong’s (1970) example in *The Nature of Mind* to illustrate this point: “my anger with you is not some modification of a spiritual substance” but rather, my anger “*is* the aggressive behavior itself” (p. 37). The main problem with behaviorism, however, is the reduction of thoughts to observable behavior. As Searle (2004) maintains, “this runs against our common-sense intuition that there is a causal relation between our inner mental states and our outer behavior” (p. 37).

An additional problem with behaviorism, as Armstrong (1970) notes, is that it is possible to have some mental experiences or processes occurring “although there is no behavior occurring that could possibly be treated as expressions of these processes.” As an example, “a man may be angry but give no bodily sign; he may think, but say or do nothing at all” (p. 37). As Searle (2004) summarizes:

The real difficulty with behaviorism... is that its sheer implausibility became more and more embarrassing... We do have thoughts and feelings and pains and tickles and itches, but it does not seem reasonable to suppose that these are identical with our behavior... the feeling of pain is one thing, pain behavior is something else (p. 38).

Riddled with problems in both its methodological and logical forms, behaviorism wanes and physicalism (sometimes called identity theory) becomes the new and improved theory of mind.

## **Physicalism and its Family Tree – Mind is Brain**

Physicalists argue that Descartes is not wrong about the mind-body distinction as a matter of *logic* (as the logical behaviorists claim) but wrong just as a matter of *fact* (Searle, 2004, p. 38). Physicalism comes in “two flavours,” as Searle describes them: type-type identity theory and token-token identity theory, the former being the first to emerge. Identity theorists argue that mental states are identical with brain states. In other words, minds are brains and mental states are the same as brain states (Searle, 1998).

### **Type-type identity theory**

Type-type identity theorists argue that brain states and mental states are identical as a matter of *fact*, just as water is identical to H<sub>2</sub>O as a matter of fact (Searle, 2004). It does not take long, however, before type-type identity theorists face the same roadblocks as materialists. First, the theory is criticized for violating Leibniz’s Law – a law that says if two things are identical, they must have all of their properties in common (Searle, 2004). It is straightforward to show that the two states are not identical. The mental state of being in pain, for example, clearly has different *properties* than the brain state of being in pain. When I am in a state of pain from stubbing my toe (mental state), though there is corresponding neuronal activity in a certain part of my brain (brain state), the neuronal activity is not itself the *thought* of pain. The pain is not in my brain - it is in my toe. In short, the mental state and the brain state clearly have different properties. As Searle

(2004) describes, “the brain state that corresponds to my thought that it is raining, is 3 cm inside my left ear, but it doesn’t make sense to say that my *thought* that it is raining is 3 cm inside my left ear” (p. 39).

Another problem with the theory is that upon closer examination, it ends up back in dualism. The idea that the mental state of being in pain is identical to the brain state of being in pain means we have to identify *both* to compare and ensure that *they* are in fact identical. But to do so, means we have two different states again, and are therefore committed to dualism. Because of this challenge, type-type identity theory is replaced by token-token identity theory.

### **Token-token identity theory**

In this view, a *token* is a specific, “concrete example of the abstract general *type*” or as Searle (2004) describes it, “if I write the word *dog* three times, I have three written instances or tokens of the one *type* of word” (p. 40). As type-type identity theory (every type of mental state is identical with every type of physical/brain state) fails, token-token identity theorists argue that “for every *token* of a certain *type* of mental state, there is some token of some type of physical/brain state” (p. 40). Searle (2004) explains that the revised theory “didn’t require all *token* pains be exactly the same *type* of brain state...they could be *tokens* of different *types* of brain states, even though they were all tokens of the same mental *type* – pain” (p. 42).

### *Rigid designators and Anomalous Monism*

In the development of identity theory, two philosophers require special mention: Saul Kripke and his idea of the *rigid designator*, and Donald Davidson and his theory of

*Anomalous Monism*. Saul Kripke (1971) critiques identity theory, arguing that in order for things to be identical, there must be a rigid designator, which refers to the same object in every possible situation, on each side of the identity statement. For example, “water is identical to H<sub>2</sub>O” is a proper identity statement since each side has a rigid designator: Water is H<sub>2</sub>O in every possible situation and H<sub>2</sub>O is water in every possible situation. In other words, if a brain state is identical to a mental state, each requires a rigid designator. If, as identity theorists argue, the mental state of pain is simply c-fibre stimulation in the brain (the mental state of pain is identical to the brain state of c-fibre stimulation), then each side of the identity statement must have a rigid designator. Kripke shows this is not the case. We can imagine a case where some animals, for example, do not have a c-fibre but still experience pain. Similarly, we can imagine a case where someone is in pain but does not have c-fibre stimulation.

Donald Davidson (1970), a token-identity theorist, suggests that “Anomalous Monism” explains the problem of how minds *cause* physical events. As he writes, “mental events such as perceivings, rememberings, decisions...resist capture in the net of physical theory” and asks “how can this fact be reconciled with the causal role of mental events in the physical world?” (p. 167). Davidson claims that mind “causing” anything only makes sense in terms of rationality. But the principles of rationality are part of a *mental* state, not a physical *law*. Suppose, he argues, that minds could cause physical events. Cause implies a law. Laws do not correlate with *mental-physical* relations, only *physical-physical* relations. Since laws cannot be mental, only physical, he concludes that mental states *must be* physical states in order to function causally.

Identity theory, in both forms (type-type and token-token) turns out to be incomplete. Like the type-type identity theorists before them, the token-token theorists are still left with *two* things – mental states and brain states - and thus are, once again, committed to a form of dualism. Additionally, both types of identity theory are criticized for leaving out the *qualitative feel* (the first-person, subjective experience) of what it is *like* to be in this or that mental state.

### **Functionalism – Mind is a set of causal relations**

With the failures of type-type and token-token theories, the next improved version of identity theory offered is functionalism. While behaviorists argue that mental states are just behavior and are realizable by observing behavior, functionalists go farther proposing a system of causal relations or a causal explanation of behaviors. Mental states are just states with particular functions, and functions can be explained by causal relations to external stimuli, to other mental states, and to external behavior (Searle, 2004, p. 43). A belief, then, is simply anything that can stand in causal relation. The causal chain proceeds as follows: a perception *causes* a belief, which when combined with desire, *causes* action or behavior. Put in other words, my perception causes a belief (that it is raining) and that belief, combined with desire (to stay dry), causes the action or behavior to carry an umbrella (Searle, 1998). To avoid any mention of a mental substance, functionalism makes a crucial move using the *Ramsey Sentence*. As Searle (1998) explains:

Suppose that John has the belief that *p*, and that this is caused by his perception that *p*; and, together with his desire that *q*, the belief that *p* causes his action *a*. Because we are defining beliefs in terms of their *causal relations*, we can

eliminate the explicit use of the word *belief* in the sentence and simply say there is something that stands in such-and-such causal relations...Ramsey sentences get rid of the occurrence of psychological terms such as ‘desire’ and ‘perception’...showing that there is nothing especially mental about mental states...mental states are just neutral sets of causal relations (p. 41).

Labeled *black box functionalism* as it ignores the mental (Searle, 1998, p. 42), the main objection to the theory is that like its predecessors, it leaves out first-person subjectivity, or the qualitative feel of mental states. Nonetheless, there is no doubt that functionalism opens the door for a significant turning point in the history of mind – the theory that mind is a computer.

### **Computationalism**

Described as one of the most exciting breakthroughs in 200 years of materialism, the computational view of mind takes center stage (Searle, 1998, 2004). Using the analogy of the computer, mind is described as a computer program and brain as a computer. Combining ideas from artificial intelligence and functionalism, the field of cognitive science gives us a new account of mind. The idea that mind is a computer or an information processor prevails as a metaphor of mind today. More recently tweaked by neuroscientists as a “neural processor,” where thinking is neural processing in the brain, this theory of mind is criticized as simply a newer version of identity theory, inheriting all of its problems. Compared to an algorithm, thinking is just a *process* where if one follows a set of steps correctly, one gets the “right answer.” The usual objections to the theory are launched, including the objections that mind as a computer or any type of processor is too mechanistic, leaving too much out such as beliefs, intentions and desires. Most

importantly, Searle (1980) in his famous Chinese Room thought experiment, argues that mind *cannot* be a computer. One can follow a set of procedures or steps as a computer does, for example, but not *understand*. In short, just because one follows an algorithm, follows a set of steps, or performs language-based tasks (as a computer does), it does not follow that one understands. This thought experiment and its significance to education are discussed in detail in the next chapter.

As with other views of mind, the computational view leaves out the idea of first-person subjectivity, or what a mental state feels like. More radically, the view gives rise to *eliminative materialism*, a view espoused by Paul Churchland.

#### *Eliminative materialism*

Churchland (1987) argues that while we think we have mental states (such as beliefs and desires) that cause our behavior, mental states do not actually exist. In his view, since all real things are smoothly reducible to physical things, and since mental states are not smoothly reducible to physical things, mental states do not exist. Further, he argues, neuroscience can provide a match for what *happens* when we are in pain and the so-called *belief* that we are in pain. On this account, beliefs, intentions and desires are illusions, and what we *call* beliefs, intentions and desires, are just neural synapses in the brain. There are no mental states and there is no mind.

#### **Brainism, Personalism, Externalism and the Extended View of Mind**

Like the eliminative materialist's view of mind, *current* theories of mind continue to be held hostage by Cartesian assumptions and vocabulary. Philosophers of mind and philosophers of education continue to search for ways to cope. In attempts to sort out the

problems of the mental and the physical, theories such as brainism, personalism and extended mind are added in to the mix.

In *Minds, Brains and Education*, philosopher David Bakhurst (2008) contrasts brainism with personalism. Bakhurst draws from the work of Russian philosopher, Evald Ilyenkov and argues that personalism should replace the outdated view of brainism, given its negative impact on education. As Bakhurst describes it, “brainism’s influence on education was one of Ilyenkov’s major concerns.” It “only leads educators to blame children’s failure to learn on their supposedly innate abilities, or lack of them, when the real culprit lies in the education system” (Ilyenkov, 2002, pp. 76–77). Further, “it also encourages the idea that a future brain science might enable us to stream students for specialised programmes in light of their innate abilities” (Bakhurst, 2008, p. 416).

### *Brainism*

Broadly, brainism is another version of a physicalism (identity theory) where mind is simply brain, and mental states are identical to brain states. Bakhurst (2008) describes brainism as a view where “an individual’s mental life is constituted by states, events and processes in her brain” (p. 215). Brainism is contrasted with personalism, a view advanced by Ilyenkov. This is the view that “psychological attributes are...ascribed only to persons...mental phenomena do not occur inside the person.” Further, such mental phenomena “are aspects of her mode of engagement *with* the world” (Bakhurst, p. 415). Philosophers, Bennett and Hacker (2007) concur with Ilyenkov’s view of personalism, noting that, “psychological attributes cannot be ascribed to the brain... it makes no sense to say that a brain thinks or reasons, decides or remembers.” Rather, decisions, thinking, reasoning and remembering are things “done by people, not brains”

(Bakhurst, p. 417). While I concur with Bennett and Hacker (and Williams and Standish, 2016) on this point - that it makes no sense to say that a *brain* thinks or reasons, decides or remembers - confusion remains about the concept of mind. This confusion and Bennett and Hacker's criticisms are further discussed in Chapter 4.

### *Personalism*

Bakhurst (2008) explores the view of personalism using the work of McDowell (1998). McDowell argues that the idea our mental experiences or mental lives happen *in our mind* "can and should be detached from the idea that there is a part of us, whether material...or immaterial, in which it takes place." Further, *where* our so-called mental experience or mental life occurs "need not be pinpointed any more precisely than by saying that it takes place where our lives take place" (p. 281). Our mental experiences or their "states and occurrences can be no less intrinsically related to our environment than our lives are" (p. 281). McDowell's personalist view seems tied, as Bakhurst suggests, to Hilary Putnam's (1975) idea of externalism: the idea that meaning is not located in the head. As Bakhurst cites Putnam, "[c]ut the pie any way you like, meanings just ain't in the head!" (p. 227). Bakhurst suggests that McDowell extends Putnam's idea where *meaning* is not in the head, arguing that *mind* isn't in the head. As he writes, "the mind—the locus of our manipulations of meanings—is not in the head either" (p. 431). Summarizing McDowell as Bakhurst does, because Putnam's argument is so successful - that meanings are in the mind but not in the head - "we ought to conclude, the mind is not in the head" (McDowell, 1998, p. 276). This background, where personalism emerges as a theory in response to brainism, is important as it arguably paves the way for an extended view of mind.

### *Extended view of mind*

According to the extended view of mind, mind is not *in* the head but rather a “mode.” Mind is best described as various relations or engagements to or with one’s environment, such as others or nature. Andy Clark (2008) describes extended mind as “human cognizing [including] inextricable tangles of feedback, feed-forward and feed-around loops... that promiscuously criss-cross the boundaries of brain, body and world” (Lin, 2013, p. 252). It is worth noting here that brainism, personalism, externalism and extended mind all inherit the same problems as the historical views of mind – they accept a Cartesian account of the mind-body problem, and use the erroneous vocabulary. As Searle (1998) says:

We are deeply committed to the traditional vocabulary and categories. They really think there is some more or less clear meaning attaching to the archaic vocabulary of dualism, monism, materialism, physicalism and that issues have to be posed and resolved in these terms... we have to challenge the assumptions behind the traditional vocabulary (p. 4).

The view of extended mind, in particular, has embedded within it a functionalist view of mind. Algorithmic language is used to describe thinking, and mental states are just “standing in some relation.” But as Searle (1998) warns, if we “accept a certain vocabulary [then we accept] with it a set of assumptions...the [Cartesian] vocabulary is obsolete and the assumptions are false” (pg. 2).

Sometimes the Cartesian ghost is subtle. At other times it is obvious, as in Bakhurst’s (2008) description of Ilyenkov’s view of mind: “the *substance* of mind is always the life-activity [of a person] ...and the brain with its innate structure is only its

biological substrate.” (Ilyenkov, 2002, p. 98). Given that the concept of mind has embedded within it Cartesian error and a problematic vocabulary, confusion and incoherence persist in our dialogues *about* mind. While Bakhurst et al add important perspectives to the discussion, we are still unclear: mental states are apparently part of the mind (which is not in the head) but “mental states are unified because they are all states of a particular person, me” (Bakhurst, p. 422). Consider the following claims in Bakhurst, noting the highlighted vocabulary, as evidence of continued Cartesian error:

**Physicalist** accounts are cast from a third-person perspective...they will always fail to capture a crucial aspect of the **mental**...The **personalist**, in contrast, does not depend on the limitations of the third-personal perspective...she can hold that much of our **mental life** is observable from a third-person perspective because it is manifest in the life-activity of the subject. The **personalist**'s point is that the first-person perspective on the **mental** is not one of observation but agency, and this precludes a person adopting an attitude to her own **mental states** as if from the third-person...Our **brain states**, in contrast, are possible objects of observation (p. 430).

Adding to the confusion, mental states are supposedly *different* from brain states but they are connected: “if we are to understand the unity of a mental life we have to think of the *person*, rather than any of her *parts*...it is the *person* that has an orientation to the world...not her *brain*” (p. 422). Persons *have* brains, but their orientations toward the world are not *in* their brains. Their orientations toward the world are *in* the persons (presumably in their *body* but just not in their brains), or as McDowell suggests, our orientations to the world (mind) may be *outside* the person. Numerous scholars have spent a lifetime trying to develop a coherent theory of mind, including what it is, where it is, how it is or is not the brain, or how it is or is not observable. While such attempts are

admirable, we continue to make the same mistakes over and over again. Why? Searle (1998) offers an answer:

Along with the Cartesian tradition, we have inherited a vocabulary, and with the vocabulary a certain set of categories, within which we are historically conditioned to think about these problems. The vocabulary is not innocent, because implicit in the vocabulary are a surprising number of theoretical claims that are almost certainly false. The vocabulary includes a series of apparent oppositions: physical versus mental; body versus mind; materialism versus mentalism; matter versus spirit... Thus we are supposed to believe that if something is mental it cannot be physical; that if it is a matter of spirit, it cannot be a matter of matter; if it is immaterial, it cannot be material. But these views seem to me obviously false (p. 14).

## **Final Thoughts**

A Wittgensteinian scholar himself, Searle's call to challenge the assumptions behind the language – indeed challenge the language itself – is reminiscent of Ludwig's (1922) idea that “the limits of my language mean the limits of my world” (5.6). Chien-Te Lin (2013) in his work *Rethinking Mind-body Dualism: a Buddhist Take on the Mind-body Problem*, offers such a challenge and explores the limits of our language in discussing mind. There are problems with Lin's account of mind, as it is still constrained by Cartesian vocabulary. But there are important openings in the theory, allowing educators to talk and think differently about mind. Also, as discussed earlier, given that embedded within views of assessment, education and knowledge are views of mind, perhaps a Buddhist account can loosen some of the hold traditional ways of thinking and talking about mind has had to date.

## A Mindful Approach? A Buddhist Account of Mind

Lin (2013) argues that in Buddhism, there is no *ontological* distinction between the mental and the physical but rather a *phenomenological* one used “mainly for the sake of facilitating discourse” (p. 241). Arguing against the interpretations of Peter Harvey (1993) and Griffiths (1986), who hold that the Buddhist terms of *na mā* and *ru pā*, suggest a mind-body relationship and therefore dualism, Lin asserts that language in Buddhist philosophy is a tool and is *temporary*. As he writes, “language and concepts function...as a temporary means to achieve a higher goal” and that “rather than...an end in itself, linguistic expression serves as a *tool* to communicate a diverse range of ideas” (p. 241). Further, the distinction of mind and body is not absolute, as Buddhism has many ways to express or “convey the concept of a human being as a holistic entity” (p. 241). Lin argues that the Buddhist account of mind is at odds with many of the ways Western philosophical traditions theorize about mind. Addressing dualism and monism specifically, and suggesting that the Buddhist position is a middle path supporting neither dualism nor monism, Lin writes,

From the perspective of dualism, minds can continue to exist apart from bodies even after the ‘conscious entity’ has left the body. From a Buddhist viewpoint this causes one to fall into the trap of eternalism, where one mistakenly believes that either the mind or body can exist independently from its own side. Monism, on the other hand, claims that mental states are simply brain states, a view which again causes one to fall into the trap of nihilism, where one mistakenly believes that the reality of mind and consciousness can be disregarded altogether (p. 250).

Buddhism does not support physicalism or identity theory, writes Lin, as “the Buddhist explanation of the interdependence of mind and body is at odds with mind-body (mind-

brain) identicalism” (p. 241).

Equally skeptical of behaviorism and behaviorists’ treatment of the mind-body problem, Lin suggests “any theory which equates the concept of mind to nothing more than behavior would be troublesome” (p. 248). Of materialists or physicalists in general, Lin holds (as Searle does) that both end up subscribing to some form of monism “in their bid to account for the obvious presence of both mind and consciousness” (p. 248). All of the theories try to “explain away mental phenomena, with an extreme physicalist being happy to contend that we are no different to *zombies*” (p. 248).

Critiquing dualism and monism, then, mind is understood as abstract (p. 250). As Lin puts it, “consciousness (*vijñāna*) and name-form (*nāma-rūpa*) are interdependent as a whole...the way in which three reeds support each other in order to stand erect.” Referring to “the integrated wholeness of a human being” (p. 241), a better way to approach mind is to consider it somewhere *between* traditional binaries:

Mind has axiological features in addition to its physical or biological features. Abstract concepts may...be subdivided into two categories...concrete objects which may be experienced directly via the senses, such as ‘chariot’, ‘book’, ‘pen’, ‘desk’, ‘classroom’ and ‘student’; and another involving non-substantial things which may not be directly observable, such as ‘justice’, ‘courage’, ‘goodness’ and ‘beauty’ ...the first is essentially descriptive, the second...evaluative in nature. In my opinion, the concept of mind falls *in between* these two categories (p. 249).

Finally, extending his idea of wholeness and mind as an abstract concept, Lin describes the Buddhist relation of mind and body using the example of a painting and how one might experience such beauty:

...[the physicalist might argue] there is no beauty apart from the painting itself...[just] colors, textures, shapes and lines...we also cannot reasonably claim that the experience of beauty exists independently of the colors and materials that constitute the artwork...So although the painting is instrumental in the experience of beauty, it is itself neither identical to nor different from the beauty experienced...mind is to body, what beauty is to the painting...beauty is neither identical with nor different to the painting...mind is neither identical with nor different from the body or the brain (p. 254).

Arguing that different views of mind “are all influenced by specific background knowledge or certain cultural traditions” (p. 256), Lin echoes Searle’s (1998) call to pivot from the problematic vocabulary and binary perspective of the mental and the physical. Perhaps Lin would agree with Searle that our vocabulary and the accompanying categories we use to talk about mind are the source of our deepest philosophical difficulties. As Searle writes,

There is something immensely depressing about this whole history because it all seems so pointless and unnecessary. It is all based on the false assumption that the view of reality as entirely physical is inconsistent with the view that the world really contains subjective conscious states such as thoughts and feelings. The weird feature about this entire discussion is that materialism inherits the worst assumption of dualism. In denying the dualist’s claim that there are two kinds of substances in the world or in denying the property dualist’s claim that there are two kinds of properties in the world, materialism inadvertently accepts the categories and the vocabulary of dualism. It accepts the terms in which Descartes set the debate. It accepts, in short, the idea that the vocabulary of the mental and the physical, of material and immaterial, of mind and body, is perfectly adequate as it stands... the vocabulary, and the accompanying categories, are the source of our deepest philosophical difficulties. As long as we use words like ‘materialism,’ we are most invariably forced to suppose that they imply something inconsistent

with naïve mentalism... it would probably be better to abandon this vocabulary (p. 54).

These deep, philosophical difficulties we have with the concept of mind impact education. How and why they do, along with Searle's suggestion that we might be better to abandon the vocabulary of mind, are the subjects of the next chapters.

## Chapter 2. What it's like to be a student, what teachers don't know, and the classroom

### Introduction

Thomas Nagel (2012) in *Mind and Cosmos* suggests, “the failure of reductionism in the philosophy of mind has implications that extend beyond the mind-body problem” (p. 29). Indeed, and the implications extend as far as education. As discussed in the first chapter, the history of our current view of mind takes us back to Descartes and the idea of dualism. Specifically, the vocabulary we casually use today suggests that there are separate *realms* – the mental and the physical. As stated, if Wittgenstein (1922) is right that “the limits of my language mean the limits of my world” (5.6), then how we use language to discuss our world has obvious implications, consequences and limitations for any view of education ... education ... a place where we talk a great deal about, and frequently refer to, *mind*.

As discussed in Chapter 1, the Cartesian view (that there are *two* substances: mental and physical) is contrasted with the materialist's view (that there is only *one* substance: physical). This turn to materialism sets the stage for the psychological views of behaviorism (where mental states are just behavior) and cognitivism (where mental states are just the processing of information). Importantly, both of these views allow for the *inner* to be observable and therefore measurable and assessable. In short, the turn to behavioral and cognitive psychology in education has allowed for the acceptance of a functionalist view of mind, that mind is observable, and that it is some type of information, cognitive or neural processor. Educators need to concern themselves with

such characterizations and limitations since curriculum language, assessment practices and teacher education programs (as examples) *supervene* or are dependent upon views of mind. Should there be doubt that this view of mind is assumed in education, and that assessment language falls in line, consider the following:

It is difficult to see how an IP model that views its operands as inert tokens, utilized solely for input to functionally defined operations, could be seen as providing a sufficient theoretical basis for a normative view of education (Fisherman, 2012)

To be meaningful, a learning outcome needs to be built around a verb that is sufficiently precise that it can result in a measurable, deliverable outcome since how do you measure *knowledge, understanding, appreciation or learning?* (Centre for Teaching Excellence, University of Waterloo)

The current emphasis on computer technology, in particular, has led to the use of computational-talk that has become pervasive in teachers' vocabularies. Consequently, terms such as "processing," "accessing information," "student input," and "performance outcomes" are becoming common terms of reference in discussions about the development of students' mental abilities, thus lending credibility to the notion that humans are, in fact, computational mechanisms (Sheppard, 2001)

The idea that we can resolve controversial issues by means of problem-solving processes and metacognitive strategies relies for its justification on the widely held view that the human mind is in fact an information-processing mechanism, not unlike that of a computer program. Support for this view is found in the research from the fields of cognitive science and cognitive psychology. However, recent work in these fields suggests that this view of mind is highly questionable (Sheppard, 2001)

Some words to avoid when writing objectives [include] *know, understand, appreciate, aware* and *familiar*, as they are neither measurable nor observable (Schreyer Institute of Teaching Excellence, Pennsylvania State University)

Learning outcomes should be observable and measurable...avoid vague terms such as *understand* and *know* because they are difficult to measure...terms like *identify, demonstrate, show, compare*, etc. are recommended (Nicholson, 2011)

Learning disabilities result from impairments in one or more processes related to perceiving, thinking, remembering or learning. These include, but are not limited to: language processing, phonological processing, visual spatial processing, processing speed...and executive functioning (B.C. Ministry of Education)

[The student]...has weaknesses in *cognitive processing*...is proficient at *decoding*...is slow to *process information*...it is important to give learners time and opportunities to make their *thought processes* explicit...[which] deepens a student's *thinking process*...[and improves] *processing strategies* used during reading (North Vancouver School District, 2013)

With this view of mind *in mind*, what follows is a discussion of the hold the view has on education and why it has such a hold, giving specific attention to the implications for assessment. Using some thought experiments from philosophy of mind, I argue that assessment practices only measure *surface features* such as skill competency and task completion. John Searle's Chinese Room thought experiment is used by way of analogy to make this argument. Secondly, I discuss how specific language is used to describe assessment practices, and how such use suggests that deep learning and understanding are observable from a third-person perspective. Deep learning and understanding, however, are irreducible, and are inseparable from the rich, subjective, first person character of the thoughts and experiences that *background* them. This irreducibility and background

disable any assessment by a third-person observer. As such, deep learning and understanding are actually *left out* of any picture of a learner. Assessment practices are necessarily focused then on that which can be scientifically and objectively measured: surface features such as skill competency and task completion. Thomas Nagel's thought experiment, *What Is It Like To Be A Bat?* and to a lesser extent, Frank Jackson's, *What Mary Doesn't Know*, are used by way of analogy and introduction to give texture to these claims. Similarly, John Searle's arguments about the irreducibility of consciousness, along with the vocabulary he uses to make the arguments, further probes by analogy how educators are unable to assess understanding or "deep learning."

Using the idea of irreducibility to critique assessment practices in education is not new, and is of interest to philosophers of education. Critiquing assessment practices in Great Britain, for example, Andrew Davis (2008) has contributed significant scholarship. As such, some of his ideas will weave through my discussion. What is new is a deeper analysis of the *mind-knowledge-education-assessment* relation. Specifically, how assessment language and practices have embedded within them a view of mind – a particular view of mind that informs a particular view of knowledge and a particular view of education. The examination in this chapter, then, will address the following:

- The current view of mind in education
- What the view of mind allows *for*, what it allows us to *do*, and how the vocabulary associated with the view shapes our ideas about education
- How the view of mind frames learning outcome language in particular, and with the help of *Bloom's Taxonomy*, allows us to reduce both

knowledge and understanding to *skills* (a move that “makes” them observable)

It may turn out that task completion and basic skills are indeed prerequisites for understanding or “deep learning.” By themselves, however, these prerequisites are a superficial, incomplete and insufficient picture of what one knows, has learned or deeply understands. Frankly, as will be discussed later in John Searle’s Chinese Room example, we can easily imagine a case where one displays basic skills and completes tasks yet lacks understanding – a result that surely cannot be an aim of education. More importantly, assuming a functionalist view of mind, where mind is reduced to a computational or neural processor, muddies and makes unclear *what* we are assessing. What is the unfortunate consequence? That which is most important, yet irreducible and un-assessable (deep learning), is improperly reduced to observable *features, skills or behaviors*. Why should educators take note? As Nagel (2012) cautions, “intellectual humility requires that we resist the temptation to assume that tools of the kind we now have are in principle sufficient to understand the universe as a whole... pointing out their limits is a philosophical task” (p. 11).

## **What Is It Like to Be a Student?**

Thomas Nagel’s (1974) *What Is It Like To Be a Bat?* is a creative entry point to discuss the limitations of assessment in education. Before discussing the usefulness of this essay, a brief review of the historical background from chapter 1 is helpful.

## Historical Background

As a scientific account of the world emerges, Descartes' theory of dualism – the idea that there is the mental which is separate from the physical, or the idea that the mind is a separate substance from the body – is critiqued. This criticism leads to a monist account of the world, namely, materialism (that the world is entirely physical) and all of its various iterations. The materialist's account gives rise to behaviorism (that mental states are just behaviors or can be *reduced* to behaviors), which then gives rise to physicalism or identity theory (that mental states are just brain states or can be *reduced* to brain states).

From identity theory there emerges two significant views: functionalism (that mind can be reduced to an algorithm, or anything that stands in *causal relations*), and the computational theory of mind (that mind is reducible to a computer or neural, information processor). All of these iterations are just tweaked versions of behaviorism and different versions of the same thesis - mind is reducible to brain states, with the current functionalist view even allowing for machines to have minds (Searle, 2004).

The materialist's reduction of mental states to brain states is properly critiqued since the reduction *leaves something out*. Any version of materialism leaves out the qualitative, first person, subjective account, or what it *feels like* to have thoughts and experiences. As Nagel (1974) notes, “we have at present no conception of what an explanation of the physical nature of a mental phenomenon would be” (p. 436). Nagel's interest here is “the fact that an organism has conscious experience...[which] means...that there is something it is *like* to be that organism” (p. 436). This he terms the

*subjective character* of experience and that it “cannot be captured by any of the familiar, recently devised reductive analyses of the mental” (p. 436). First person subjectivity cannot be analyzed “in terms of any explanatory system of functional states...since these could be ascribed to robots...that behaved like people though they experienced nothing” (p. 436). It is important to note that Nagel is not suggesting mental states aren’t *related* to behavior, but rather that it is wrong to reduce the mental to the physical (to mere behavior), as it leaves something out:

If physicalism is to be defended, the phenomenological features must themselves be given a physical account. But when we examine their subjective character it seems that such a result is impossible. The reason is that every subjective phenomenon is essentially connected with a single point of view, and it seems inevitable that an objective, physical theory will abandon that point of view (p. 437).

### **Nagel’s thought experiment and implications for assessment practices**

With this as background, Nagel’s thought experiment is a call to imagine what it might be like to be a bat. I can imagine, for example, being something that has wings, that can fly, that hangs upside-down and that is out at night. I can study the bat, including its habitat, its eating and mating habits, and can become an expert about bat *behavior*. The thought experiment is constrained, however, as any such imagining is from *my own perspective* - what it would be like if *I* were a bat. This is different, of course, from what it is like *to be* a bat. As Nagel writes,

I am restricted to the resources of my own mind, and those resources are inadequate to the task. I cannot perform it either by imagining additions to my present experience, or by imagining segments gradually subtracted from it, or by

imagining some combination of additions, subtractions, and modifications. Even if I could by gradual degrees be transformed into a bat, nothing in my present constitution enables me to imagine what the experiences of such a future stage of myself thus metamorphosed would be like. The best evidence would come from the experiences of bats, if we only knew what they were like (p. 439).

Though not intended as an analogy for assessment in education, Nagel's thought experiment certainly serves as one. When a teacher assesses her students, she is similarly restricted to the resources of her own perspective. She cannot imagine additions, subtractions or modifications, nor her self metamorphosed *unmediated* by her own subjective thoughts and experiences. One might be inclined here to argue that imagining what it is like to be another human is surely easier than imagining what it is like to be a bat. But the important point is that the subjective character of the student's thoughts and understandings is not assessable by another. The teacher cannot be the student she is assessing nor can she be objective. As Nagel says of bats, "we believe that bats feel some versions of pain, fear, hunger...but we believe that these experiences also have in each case a specific subjective character, which it is beyond *our* ability to conceive" (p. 439). Similarly, students have thoughts and experiences that in each case have a specific, subjective character, beyond a teacher's ability to conceive. It is easy here (but erroneous) to conflate the teacher's ability to *imagine or guess* what the subjective character of the student's thoughts and experiences *might be like*, with the teacher's ability to *know* the subjective character of the student's thoughts and experiences. The latter is beyond a teacher's ability, not only in the practical sense of inaccessibility or invisibility from a third-person perspective, but also because of the obvious inability to

exit or set aside the subjective character of her *own* thoughts and experiences, to examine and assess those of another.

To these points, Andrew Davis (1998) speaks, in the context of assessment practices in education: “beliefs should not be seen as discretely identifiable entities” and further, “in the face of someone’s behavior and speech we have to perform complex acts of interpretation, in which we impute intentions and beliefs to the person concerned and characterize actions” (p. 65). Questioning the existence of other minds is sometimes a response to these claims. But succumbing to this solipsistic, seductive tangent is to miss the broader point (a point which is more deeply examined later): teachers must seriously question the assumption that another’s beliefs, intentions, knowing, learning and understanding are objectively assessable by observing *behaviors* and *performances*. Further, while a teacher might concede after debate that these are *not* objectively assessable by observing behaviors and performances, she nonetheless employs assessment practices *as though they are* assessable through these means. How does she do this? By using assessment tools and assessment language that *reduce* beliefs, intentions, knowing, learning and understanding to behaviors and performances.

### **The tools and language of assessment**

In an effort to make assessment practices objective, observable, measurable, scientific and consistent, criterion-referenced assessment or “rubrics” are considered the latest and greatest tools. The thinking is that common descriptors or criteria of what good work or learning “looks like,” and descriptors on which all parties can agree, will ensure objective and consistent assessment. As Davis (2008) suggests, criteria applied to writing

might include agreed upon descriptors such as “viewpoint well-controlled” or “subtleties in meaning evident” (p. 36). The procedure in writing criterion-referenced assessment is to slightly modify rubric language to describe different levels of competency. So “viewpoint *well*-controlled” might be characteristic of a good writer or a “B paper,” “viewpoint *somewhat* controlled” might be characteristic of an average writer or a “C+ paper,” and “viewpoint *not* controlled” might be characteristic of a poor writer or a “D paper.” Once rubric language is set, teachers can use student written work as “anchor papers.” Teachers use these anchor papers to “group mark” and discuss the assigned marks, ensuring that there is “inter-marker reliability.”

There are several problems with these assessment tools and practices. First, as Davis notes, “it is not possible for a common language to be used to characterize rich, cognitive achievements by pupils in such a way that their attainments may be reported on in a wider arena and intelligible comparisons made” (p. 143). Nor does a general or common language account for the rich, subjectivity of *each* student’s unique perspective on a given assignment. Further, Davis argues that, “at least some of the aspects of writing which require interpretation and aesthetic judgment resist a drive towards uniformity of judgment” (p. 34). As an example, one teacher “may feel very strongly that a student has taken a creative risk that deserves every credit” but another teacher’s “verdict on the same piece of work might be that the student has gone too far and fails to understand” (p. 34). Davis points out that while an assessment practice that is *consistent* is considered to be superior, scientific and objective, teachers “who disagree might be dealing with an important feature of the student work – this feature will be sidelined in the drive for a reliable, consistent marking system” (p. 37). In other words, policies

dictate that assessment practices adhere to scientific principles (objective, consistent and reliable). This drive, however, sidelines and *leaves out* important, rich features of student work. Any third person assessment practice cannot do otherwise, as it is necessarily limited to that which is observable - behavior, words, speech and performances as examples. This leaves out *and always will leave out* what Davis terms the rich subjectivity of each person's thoughts and experiences. Further, it is a mistake to believe that teachers can be objective if they are just given the correct assessment tools. Assessment tools do not provide the means for teachers to escape their own subjectivity to objectively assess another. Nor do the tools allow teachers to assess the complex, subjective character of another's thoughts and understandings. The problem is not caused by a *failure* of the assessment tools themselves. And the problem is not caused by the failure of a teacher to properly use the assessment tools. The problem, as earlier noted, is two-fold. The first part of the problem is a faulty assumption: that another's beliefs, intentions, knowledge and understanding *are* assessable by observing their behaviors and performances. The second part of the problem is an improper reduction: of beliefs, intentions, knowledge, and understanding to observable behaviors and performances ... *so that* they can be assessed. As is discussed later in more detail, the improper reduction is made possible through the use of carefully constructed assessment language and the creation of assessment tools. A teacher can at best assess by analogy, where she imagines what evidence of learning and understanding is like for *her*, and then assume it is also like that for her students.

## Martians and some other pains for assessment

Nagel's description of David Lewis's (1980) thought experiment, *Mad Pain and Martian Pain*, offers another useful, analogous lens to discuss the problem of assessment.

Nagel writes that,

...the fact that we cannot expect ever to accommodate in our language a detailed description of martian or bat phenomenology should not lead us to dismiss as meaningless the claim that bats and martians have experiences fully comparable in richness of detail to our own. It would be fine if someone were to develop concepts and a theory that enabled us to think about those things; but such an understanding may be permanently denied to us by the limits of our nature. And to deny the reality of logical significance of what we can never describe or understand is the crudest form of cognitive dissonance (p. 440-441).

This description helps characterize some of the limits of assessment. As earlier noted in Davis, students have experiences fully comparable in richness of detail to teachers' experiences. But such understandings of students' experiences are denied to teachers by their *own* limits and their *own* subjective perspective. Further examining how significant the subjective character of the bat is, and our inaccessibility to it, Nagel asks us to imagine what it might be like for a bat (or a martian) to understand the subjective character of a human being's experience:

...we know what it is like to be us...and we know that while it includes an enormous amount of variation and complexity, and while we do not possess the vocabulary to describe it adequately, its subjective character is highly specific, in some respects describable in terms that can be understood only by creatures like us (p. 440).

This description is analogous to a student's perspective. When asked to complete a written assignment, for example, students' ideas include significant variation, complexity and connectedness to their *own* experiences. They are highly specific, and in some respects, describable in terms that can be understood only by them. Again, succumbing to a solipsistic tangent here would be to miss the point. At issue is the faulty assumption that a teacher can accurately assess students' understanding, and that they can do so by observing students' behaviors and performances. While some maintain that teachers can draw on their own personal experiences to assess students, including what it was like for *them* when they were at the student's age, what *they* wrote when they were young, how *they* felt, and what words *they* chose, this is assessment by analogy. And most importantly, it is to miss, as Davis suggests, the specificity and inaccessibility of the student's perspective: the variation, complexity, and connectedness to the student's *own* experiences that can only be understood *by the student*.

Considering Nagel's thought experiment, educators might concede, "there are facts that do not consist in the truth of propositions expressible in a human language" and we should be "compelled to recognize the existence of such facts without being able to state or comprehend them" (p. 441). While human teachers are attempting to interpret human students (not bat students), there are facts for students that may not be expressible in a language a teacher understands. There are facts for students that may not be "state-able." Students have thoughts, experiences and understandings that may not be "convey-able" and that a teacher cannot comprehend. Simply put, thoughts, experiences and understandings are not reducible to behaviors, performances and actions. As David Armstrong (1980) points out in *The Nature of Mind*:

If somebody speaks and acts in certain ways it is natural to speak of this speech and action as the *expression of* his thought. It is not at all natural to speak of his speech and action as *identical with* his thought. We naturally think of the thought as something quite distant from the speech and action... Thoughts are not to be identified with behavior (p. 194).

It is possible to think, to understand, to have an idea and to *do nothing*. As Armstrong continues, “when I think, but my thoughts do not issue in any action, it seems as obvious as anything is obvious that there is something actually going on in me which constitutes my thought” (p. 194). But if education is to have credibility, assessment practices must be objective, observable, measurable and assessable. Reducing thoughts and experiences to observable behaviors, actions and performances is, therefore, critical. Importantly, such reductions allow educators to make mind something observable and assessable. In educational practice, it seems that mind *has to be* some physical thing or reducible to some physical thing for how does one reasonably talk about assessment of mind if “it” is merely a philosophical abstraction?

## **What Teachers Don’t Know**

Arguing against physicalism and its various manifestations, including behaviorism, Nagel (2012) writes that,

...it is certainly true that mental phenomena have behavioral manifestations, which supply our main evidence for them in other creatures. Yet all these theories seem insufficient as analyses of the mental because they leave out something essential that lies beyond the externally observable grounds for attributing mental states to others, namely, the aspect of mental phenomena that is evident from the first-person, inner point of view... Behaviorism leaves out the inner mental state

itself (p. 27).

Frank Jackson (1982) shares Nagel's concerns about behaviorism, and proposes his own thought experiment to show that a purely scientific account of the world leaves something out. While not intending to do so, like Nagel's essay, Jackson's *What Mary Doesn't Know* helps to illustrate by analogy some of the problems and limitations of assessment. Keeping in mind the historical background as discussed in the introduction to the Nagel essay, Jackson's thought experiment proceeds as follows:

Mary is a brilliant scientist who is, for whatever reason, forced to investigate the world from a black and white room *via* a black and white television monitor. She specializes in the neurophysiology of vision and acquires...all the physical information there is to obtain about what goes on when we see ripe tomatoes, or the sky, and use terms like 'red', 'blue', and so on. She discovers...just which wave-length combinations from the sky stimulate the retina, and exactly how this produces *via* the central nervous system the contraction of the vocal chords and expulsion of air from the lungs that results in the uttering of the sentence, 'The sky is blue'...What will happen when Mary is released from her black and white room or is given a color television monitor? Will she *learn* anything or not? It seems just obvious that she will learn something about the world and our visual experience of it. But then it is inescapable that her previous knowledge was incomplete. But she had *all* the physical information. *Ergo* there is more to have than that, and Physicalism is false (p. 132).

Of significance in this thought experiment, is Jackson's (1986) use of the term *qualia* to describe what Nagel terms a *first-person subjectivity*. The idea is that mental states have a qualitative character (or qualia) that is non-physical and is therefore left out of any physical account of the world. Clarence Lewis (1929) who originally used the term, describes qualia as "qualitative character" that is distinct from "properties of

objects...[and] directly intuited, given...and purely subjective.” Jackson further describes qualia as:

...certain perceptual experiences, which no amount of purely physical information includes. Tell me everything physical there is to tell about what is going on in a living brain, the kind of states, their functional role, their relation to what goes on at other times and in other brains, and so on and so forth, and be I as clever as can be in fitting it all together, you won't have told me about the hurtfulness of pains, the itchiness of itches, pangs of jealousy, or about the characteristic experience of tasting a lemon, smelling a rose, hearing a loud noise or seeing the sky (p. 127).

These ideas are applicable to assessment practices in education. For example, a teacher can observe student behavior, can hear about a student's history or background, can read and hear a student's words, but cannot observe the “qualia” of a student's perspective. Any third person assessment of what a student knows is necessarily a physicalist account, and that is all it *can* be. A physicalist account cannot tell a teacher anything about a student's subjective thoughts and experiences – subjective thoughts and experiences that inform and background a student's knowing, learning and understanding. Third person assessment cannot access knowledge and understanding “from the inside” of the student. We are not the student (Jackson, 1982). This is not to suggest that teachers cannot assess *anything* about a student. Indeed and as already noted, teachers can assess skill competency, behaviors, performances and task completion, all of which are observable. As discussed in more depth in relation to John Searle's Chinese Room thought experiment that follows, however, knowing and understanding *are not* skills or behaviors, nor are they necessary conditions for task completion.

## Restricted access and the problem of understanding

Since assessment practices are restricted to assessing the observable or the physical (behaviors, writing and speech), such practices necessarily leave something out yielding an inadequate and incomplete picture of a student's understanding. These points are illustrated in Davis's discussion of Richard Skemp's (1989) distinction between *instrumental* and *relational* understanding. Davis gives an account of Skemp's comparison of two people trying to get somewhere. One has a map and one does not. Each is given the directions: "left under the railway bridge, right, left, and the church is ahead of you." As Davis describes:

The first person does not have a map. If he goes wrong in following the sequence he is lost and will only find his way by sheer luck. The second person has a map. If he deviates from the directions, he can locate himself on the map and find his way back to the sequence or devise a new route. The person without a map is likened to the mastery of a person in possession of *rules* or *think* knowledge [*instrumental understanding*]...if he forgets the rules, he cannot reconstruct them and cannot devise an alternative way of solving the problem...the map owner...*can* reconstruct a rule if he forgets...he can devise new ways of solving the problem...he possesses *relational understanding* (p. 53).

Skemp points out that the "difficulty of assessment of whether a person understands instrumentally or relationally...[is that] from the marks he makes on paper, it is very hard to make valid inference about the mental processes by which a pupil has been led to make them" (p. 53). Extending this idea, from the marks a student makes on paper, it is very hard to make valid inference about the complex, subjective, rich character of his thoughts. What is visible to the assessor are simply "surface features." Further, it is very hard to make valid inference about the *content* of another's "mental processes." As

discussed later in more detail, assessment language and practices suggest that this inaccessible content *can* be observed and can be assessed.

Worthy of re-mentioning from Chapter 1, is John Searle's (2004) cautionary note that while we do have thoughts and feelings, it is not reasonable to suppose they are identical with our behavior. As previously discussed, in philosophy, there are deep, conceptual problems with the idea of mind. As such, there are deep, conceptual problems with any particular *view of mind*, including behaviorism and its various iterations. These problems that persist in philosophy of mind impact assessment practices in education, and require the serious attention of philosophers of education. As Davis (2008) summarizes:

Broadly speaking the philosopher must assume the role of a conceptual therapist. Such an approach was made famous by Wittgenstein. There are deep and complex conceptual mythologies underlying some everyday practices in educational assessment... questions arise about the motivation of those who wish to hold firmly to their perspectives and to resist the therapy. How, if at all, can they be persuaded to relinquish their grip? (p. 1).

One way to persuade educators to relinquish their grip is to find new ways of discussing assessment. Philosophy of mind offers such opportunities. Like Nagel's *What Is It Like to be a Bat?* and Jackson's *What Mary Doesn't Know*, John Searle's (1986) Chinese room thought experiment helps to expose problems and assumptions in current assessment practices – problems that are rooted in deeper problems and assumptions about mind.

## The Classroom

In *Minds, Brains and Science*, John Searle (1986) describes our history of likening the brain to some type of technology. As he notes,

Because we do not understand the brain very well we are constantly tempted to use the latest technology as a model for trying to understand it. In my childhood we were always assured that the brain was a telephone switchboard...

Sherrington, the great British neuroscientist, thought that the brain worked like a telegraph system. Freud often compared the brain to hydraulic and electromagnetic systems. Leibniz compared it to a mill...At present, obviously, the metaphor is the digital computer (p. 44).

Using technology as a metaphor to understand the brain has its problems, and these problems are worsened when we add “mind” into the mix. As discussed in Chapter 1, the history of mind leaves us with a bushel of problems and in a predicament. Is brain synonymous with mind or are they separate? Is the brain physical and mind non-physical? These questions and problems drip into educational practice. The Cartesian mind-body debate and the vocabulary used in the debate (materialism, behaviorism and functionalism, to name a few) complicate and confuse educational discourse and practice. Why? Likely because we remain unclear about what mind *is*. Specifically, we remain unclear about whether “it” is a *thing* like the brain or just *is* the brain, or whether mind is an abstract concept. If mind is just the brain or a *thing*, then educational policies and assessment practices fall neatly in line with a physical, scientific picture of the world. If, however, mind is an abstract concept, then “Houston, we have a problem.”

## Descartes again?: making it physical

A general assumption in our current educational practices is that learning is observable and this may, in part, be rooted in a belief that education is some sort of *thing* that can be observed. That we make this assumption in public education and in post-secondary institutions seems fairly obvious. This is demonstrated, for example, in the “visible, measurable” language used to frame objectives in various curriculum documents, syllabi and assessment practices. Our assumptions about observability are worthy of investigation, as I argue that they are linked to a particular view of mind. Shoter (1993) for example, notes that, “research traditions and theoretical perspectives in the area of human thinking and learning...have a bias towards *things ontologies*” (p. 389). Saljo (2002) similarly points out that if a theory is to be accepted, “it has to accord with features of common-sense notions” and that subsequently “a things ontology may serve as a device for grounding observations and claims in something that is tangible and concrete” (p. 400). In reifying and thinking of education as a thing, one opens the door to, or at least makes it easier to think of education as something that can be observed. Hamza and Lundegard (2005) describe this reification as, “the habit of creating entities out of human activities” and caution that this “leads to circular reasoning, the entities thus created acquiring an ontological status as structures which allegedly underlie, and thus cause, the activities from which they were generated in the first place.” In particular, they note how “thinking, remembering, and perceiving are examples of human activities which have become reified.” Echoing Hamza and Lundegard, Saljo (2002) argues,

...if something is to be considered as ‘real,’ it has to have a thing like character and be ultimately grounded in physical objects or structures. Brains, following

this things ontology, are real, while ideas – powerful as they may be – are not. The tendency to reason in this manner has very concrete consequences for how we view the world and ourselves (p. 390).

It is because, Saljo continues, “phenomena such as learning, thinking, development...can never be observed...[that we must] make inferences...on the basis of observable activities such as what people do or say” (p. 393). In things, there seem to be *aspects* or *characteristics* or *qualities* that can be observed. Suppose education *is* some sort of thing. Suppose further that this thing that is education is the transmitting of knowledge by the teacher and the acquiring of knowledge by the student. It would be reasonable to assume then that such transmitted knowledge, and the extent to which someone has understood such transmitted knowledge, is empirically observable and measurable. In this description, education seems to *have to be* a thing, for it does not make sense to talk about *it* being observable and measurable if *it* is not a thing.

### **Making a thing of mind and education**

Embedded in the idea that education is an observable, measurable *thing*, is an assumed view of mind - that mind is some type of information processor. John Searle’s (2004) broader argument in his Chinese Room thought experiment is that this functionalist view of mind (especially that form of functionalism known as the computational theory of mind) treats minds as “information processing systems.” Searle illustrates how mind is improperly characterized as a computer or information-processor and alludes to the two prior thought experiments of Gottfried Leibniz and Alan Turing. From *Monadology*, Leibniz’s (1714) thought experiment asks us to imagine a particular type of machine such that we assume it thinks, perceives and has experiences. As

Leibniz describes,

...it must be confessed that perception and that which depends upon it are inexplicable on mechanical grounds, that is to say, by means of figures and motions. And supposing there were a machine, so constructed as to think, feel, and have perception, it might be conceived as increased in size, while keeping the same proportions, so that one might go into it as into a mill. That being so, we should, on examining its interior, find only parts which work one upon another, and never anything by which to explain a perception.

Leibniz compares how the machine is “acting” (supposedly providing proof that it is thinking), with how the machine is “operating.” He goes on to argue, however, that the machine is not conscious or perceiving or thinking in any way. Rather, it is mechanically operating and moving its parts from place to place.

The other thought experiment informing Searle’s Chinese Room argument is Alan Turing’s (1948) *Intelligent Machinery*. Turing describes a program made for a machine such that it can play the game of chess. Turing imagines

...a series of simple steps like a computer program, but written in natural language (e.g., English), and followed by a human. The human operator of the paper chess-playing machine need not (otherwise) know how to play chess. All the operator does is follow the instructions for generating moves on the chessboard. In fact, the operator need not even know that he or she is involved in playing chess—the input and output strings, such as ‘QKP2–QKP3’ need mean nothing to the operator of the paper machine.

In both thought experiments, Leibniz’s and Turing’s works expose a faulty assumption: If there is task completion, there is thinking, perceiving and understanding. Further, the

thought experiments expose our own tendency to falsely assume that because something *functions* like an *x*, it therefore *is* an *x*. This faulty assumption is similarly illustrated in John Searle's thought experiment, particularly instructive, and relevant to our current view of mind in education.

### **The Chinese Room**

John Searle makes his Chinese Room argument in the context of artificial intelligence. He argues that just because a computer performs a task, it does not follow that the computer thinks or *understands*. As will be discussed in more detail, his thought experiment has important applications to education. Namely,

- We mistakenly assume that mind is a computer
- Just as artificial intelligence proponents mistakenly assume they can assess that computers *understand*, educators mistakenly assume they can assess that students understand (Sheppard, 2001)

In his thought experiment, Searle asks us to imagine an English-speaking person who does not know any Chinese. The person is locked in a room with a box of Chinese symbols and some instructions for manipulating these symbols. Individuals outside of the room send questions in Chinese into the room. By following the instructions for manipulating the symbols, the person inside of the room is able to pass back "answers" to the questions in Chinese, looking as though he understands Chinese when he does not.

As Searle argues:

I perform computational operations on formally specified elements. For the purposes of the Chinese, I am simply an instantiation of the computer

program. Now the claims made by [supporters of] strong [Artificial Intelligence] are that the programmed computer understands the stories and that the program in some sense explains human understanding...[I]t seems to me quite obvious in the example that I do not understand a word of the Chinese stories. I have inputs and outputs that are indistinguishable from those of the native Chinese speaker, and I can have any formal program you like, but I still understand nothing.

Searle's thought experiment (along with Turing's and Leibniz's) helps to unearth the faulty assumption that one can observe another's *understanding*, simply by observing *completed tasks*. Applying the thought experiment to education, if a student successfully completes a task or series of steps according to a rubric, it is not necessarily evidence that the student has understood the taught material. But if the successful completion of a task, or the carrying out of a requisite number of steps according to a rubric *were to be* considered evidence of understanding, then suddenly (and interestingly) understanding becomes something observable. To clarify, this is not to suggest that students *do not understand*, but rather that understanding is not observable, measurable or quantifiable. And it is certainly not implicit in one's completion of tasks or the following of steps.

### **Processing language and education's current metaphor of mind**

The computational view of mind invades all areas of education, including teacher preparation programs where student teachers are required to create lessons and unit plans using specific language. Computational or "processing" language is used to frame learning outcomes, and to describe assessment practices and teaching strategies.

Phrasing such as, "the processing of information," "student outcomes and outputs," "the processing of learning," and "the processing of reading" (Sheppard, 2001) is common in

government curriculum documents. In British Columbia, for example, student teachers are required to use provincially prescribed curriculum documents, specifically referencing this processing language, to support their unit and lesson plans. Consider, as mentioned earlier, this processing language used in the British Columbia Ministry of Education's definition of students with learning difficulties:

Learning disabilities result from impairments in one or more processes related to perceiving, thinking, remembering or learning. These include, but are not limited to: language processing, phonological processing, visual spatial processing, processing speed...and executive functioning (p. 46)

These students are further described as having “weaknesses in *cognitive processing*” (p. 48) and to help such students become good readers, teachers should ensure that “the student is proficient at *decoding*” (p. 48). Consider also British Columbia's North Vancouver School District's repeated references to student writing as written *output* and how to construct agenda items for school-based team meetings, such as “Mary is slow to *process information*” (p. 12); that “it is important to give learners time and opportunities to make their *thought processes* explicit” (p. 17); and that such time granted not only “deepens a student's *thinking process*” but also helps students to identify their own “*processing strategies* used during reading” (p. 18).

One might ask why this computational view of mind seems to be so popular. Its popularity highlights the power and influence two particular disciplines have on education: psychology (especially behaviorism) and science. Both disciplines privilege ideas such as *proof, accountability, evidence, data* and *support* as though these are unquestioned requirements of any worthwhile idea of education. In *The No Child Left*

*Behind Act Of 2001*, for example, the United States Congress passed legislation “with the goal of supporting educational practice based on scientific evidence” (Mertens, 2005, p. 32). The Act outlines the guidelines and importance of scientifically-based research in Title IX, Part A, as it states that such research must “employ systematic, empirical methods that draw on observation,” (Mertens, p. 32) and that it “relies on measurements or observational methods” (p. 32). This allegiance to science and the scientific method in education assumes that “the social world can be studied in the same way as the natural world” (p. 8) and “that there is a method for studying the social world that is value-free and the explanations of a causal nature can be provided” (p. 8). Because these particular disciplines and their accompanying methods drive educational policy, it is no surprise that the current metaphor of mind is typically unquestioned. Not questioning the view, however, has consequences for education. What follows next is an analysis of some of those consequences, with a particular focus on the reduction of concepts such as knowledge and understanding. John Searle’s Chinese Room argument, along with his broader arguments concerning consciousness and vocabulary, are again used later in the discussion to illustrate the impact our current view of mind has on education and the myths that endure.

## **Reducing education**

Thomas Nagel (2012) writes that,

We humans are parts of the world, and the desire for a unified world picture is irrepressible. It seems natural to pursue that unity by extending the reach of physics and chemistry, in light of their great successes in explaining so much of the natural order... these successes have so far taken the form of reduction (p. 26).

Indeed the pursuit of a unified world picture explains why the extension of physics and chemistry, in light of their great successes, has reached far and deep into educational policy and practice. As discussed in the Chinese Room example, the computational view of mind reduces mind to a machine. On this account, knowledge can be reduced to information and teachers can input information into students. Information is processed by students, is outputted, and teachers assess the outputted, processed information. The outputted, processed information is therefore the *basis* for assessment of student learning. Further, on this account, outputted, processed information is *evidence* of student learning (or lack thereof) of what a teacher has (or has not) inputted.

This view of mind obliges educators to assess what is observable. As discussed earlier, while focusing on the observable always leaves something out, assessment practices *necessarily* remain restricted to what an assessor can “see” or observe. This explains the need to reduce mind, such that what is “going on” inside of *it*, can be observed by a third person. Not only must mind be reduced so that it can be observed and assessed, the “things” *in it* must also be reduced – things, for example, like knowing and understanding.

### **Reduce, Reduce, Reduce - Learning outcome language and Bloom**

The use of learning outcome language in education allows for complicated concepts such as knowing and understanding to be reduced. Once reduced, they can be observed and assessed. A brief on how to write learning outcomes prepared by McMaster University, for example, encourages that “learning outcomes should be observable and measurable” and that when writing outcomes, one should “avoid vague terms such as

*understand* and *know* because they are difficult to measure.” Rather, terms like *identify*, *demonstrate*, *show* and *compare* are recommended. Consider further the language used in various state and provincial government documents:

- The Illinois State Board of Education’s assessment rubric language to assess student writing samples: “structure is *evident*...major points are *paragraphed*...coherence and cohesion *demonstrated*...lines of reasoning *identified*...sufficient writing to *show* that criteria are met”
- Arizona Department of Education’s core standards requirements, requiring that students: “*produce* responses that *demonstrate skills*”
- PARCC (Partnership for Assessment Of Readiness for College and Careers), the Arizona Department of Education further requires that student writing “*demonstrates full understanding*...*shows* supporting details...*states* the gist of the text...*cites* specific textual evidence”
- British Columbia’s Ministry of Education curriculum suggests that teachers can identify student competency by observing how the student “*speaks and listens to interpret, analyse, and evaluate* ideas...*compares* ideas and elements among texts...*describes and compares* perspectives...*identifies* the importance and impact of historical and cultural contexts”

Post-secondary syllabi similarly use observable, learning outcome language:

- History students from Indiana University *show* an understanding of History by: “*explaining* historical interpretations...*identifying* author’s

arguments...*summarizing* important themes...*recognizing* broad themes...*producing* arguments based on primary and secondary documents”

- Philosophy students at University of Portland are asked to, “*distinguish* between arguments and non-arguments...*identify* common formal and informal fallacies...*translate* ordinary language statements and ...*demonstrate* an understanding”

As earlier noted, our current view of mind reduces mind to a “thing” so that it can be observed and assessed, therefore obliging assessment practices to focus on the observable. Concepts like knowing and understanding (and thinking in general) must also be reduced so that they can be observed. Interestingly, these reductions are made possible with *Bloom’s Taxonomy*, to which I now turn.

### **Bloom’s Taxonomy**

Using active verbs in the framing and constructing of learning outcomes is critical to making learning observable and measurable. Consider the advice from the Centre for Teaching Excellence at the University of Waterloo, where it is suggested that “[t]o be meaningful, a learning outcome needs to be built around a verb that is sufficiently precise that it can result in a measurable, deliverable outcome” since “how do you measure *knowledge, understanding, appreciation or learning?*” Similar advice comes from the Schreyer Institute of Teaching Excellence at Pennsylvania State University, where it is suggested that “[d]ocumenting student learning is easier if you first specify what you want students to *do* [and use] verbs that involve specific actions and observable

behaviors.” They also offer “some words to avoid when writing objectives [including] *know, understand, appreciate, aware and familiar*” as they are neither measurable nor observable. Interestingly, the authors suggest *avoiding* certain frames and verbs, while encouraging verbs that are observable and measurable. Further, each of the authors cite and include a list of action verbs, all of which appear to align with the thinking skills of *Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation*, as outlined in American educational psychologist, Benjamin Bloom’s (1956) *Taxonomy of Learning*. The list and reference is provided to help the framer write observable learning outcomes.

In its original form, Bloom’s taxonomy was divided into three sections: the cognitive domain; the affective domain and the psychomotor domain,”<sup>7</sup> This “classification system [was] created at an informal meeting of college examiners attending the 1948 American Psychological Association Convention in Boston.” As Anderson and Krathwohl (2001) describe Bloom’s categories, “from the late 1950s into the early 1970s, there were attempts to dissect and classify the varied domains of human learning – cognitive (knowing, or head), affective (feelings, or heart) and psychomotor (doing, or kinesthetic, tactile, haptic or hand/body)”<sup>8</sup> The significance of Bloom’s document to education cannot be overstated, as is evidenced in public school curriculum language and in post-secondary institutions’ syllabi. Reducing thinking to a *skill*, Bloom’s taxonomy allows for the concepts of knowing and understanding to similarly be

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<sup>7</sup> See Benjamin Bloom (1956) *Taxonomy of Educational Objectives: The Classification of Educational Goals*

<sup>8</sup> See Anderson, L. W. and Krathwohl, D. R., et al (2001) *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom’s Taxonomy of Educational Objectives*

reduced. Specifically, knowing and understanding are reduced to *types of thinking skills*.

Such a reduction of thinking to a skill, however, is the subject of much debate. As

Barrow (1990) argues,

...the assumption that everything is a skill, runs through much of our educational thought and practice...[and] lulls us into accepting the usual implications and connotations of that term. Skills are things that can be trained in and of themselves. If we can teach the people the skill of wielding a pen, dribbling a ball, or operating a machine...we can teach people the skills of critical thinking, brainstorming and problem solving in the same way and leave them to apply the skills...But this is all nonsense-nonsense that might have been avoided, if we took more care with our language and our concepts and, specifically, did not regard as skills abilities that manifestly are no such thing (p. 89).

Unfortunately, the debate seems largely ignored in educational practice. Perhaps this is because a reduction to skills means that knowing and understanding can be assessed (as types of thinking skills) by observing students' *behaviors* including actions, performances and "products." A behaviorist's account of mind, of knowledge and the aim(s) of education are implicit in Bloom's work. As just a few examples in his *Taxonomy of Educational Objectives*, Bloom writes the following:

- what does a student *do* who really understands, which he *does not do* when he does not understand
- *cognitive* ...is used to include *activities* such as remembering and recalling knowledge, thinking, problem solving, creating
- the clearest definitions of objectives are to be found phrased as descriptions of student behavior
- this taxonomy is designed to be a classification of the student *behaviors* which represent the intended outcomes of the educational process. It is

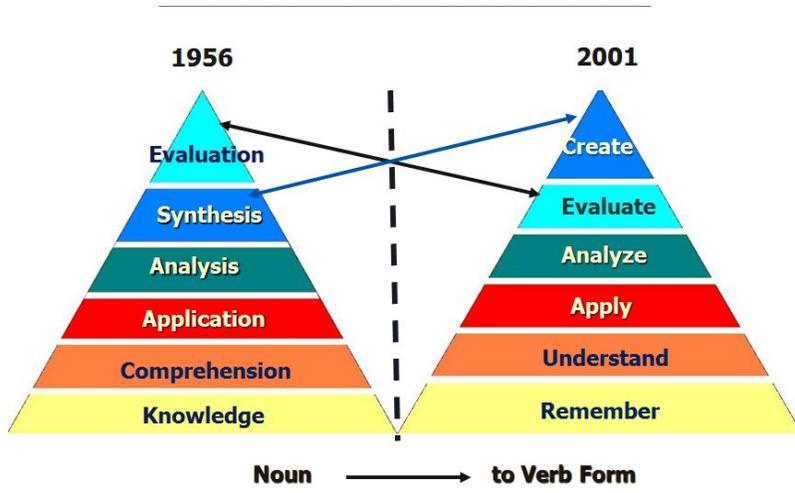
assumed that essentially the same classes of behavior may be observed in the usual range of subject-matter content, at different levels of education (elementary, high school, college), and in different schools. Thus, a single set of classifications should be applicable in all these instances

The evolution of Bloom's Taxonomy, from its original form to its current, revised form is diagramed below in Figures 2, 3 and 4.<sup>9</sup> Great liberties are taken with Bloom's work. As noted in Chapter 1, matters that are the subject of complex debate in epistemology, such as procedural knowledge, abstract knowledge, conceptual understanding and abstract understanding, and contested terms such as "metacognition," are assumed settled matters and agreed-upon facts. They are not.

The following figures, from the work of Anderson and Krathwohl (2001) and Bloom & Krathwohl (1956), are later adapted by *Iowa State University Center for Excellence in Learning and Teaching*, and by Leslie Owen Wilson (2013), respectively. Note that significantly, Bloom's original language is modified (Case, 2013), including a shift from noun form (thing) to verb form (action), making the thinking skills more explicit and more easily assessable:

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<sup>9</sup> See Anderson and Krathwohl (2001) and Bloom & Krathwohl (1956) charts, as adapted by *Iowa State University Center for Excellence in Learning and Teaching*, and Leslie Owen Wilson (2013) *The Second Principle*



**Figure 2. Bloom’s Taxonomy**

concrete knowledge		abstract knowledge	
factual	conceptual	procedural	metacognitive*
knowledge of terminology knowledge of specific details and elements	knowledge of classifications and categories knowledge of principles and generalizations knowledge of theories, models, and structures	knowledge of subject-specific skills and algorithms knowledge of subject-specific techniques and methods knowledge of criteria for determining when to use appropriate procedures	strategic knowledge knowledge about cognitive tasks, including appropriate contextual and conditional knowledge self-knowledge

**Figure 3. Concrete and Abstract Knowledge**

The Knowledge Dimensions	Cognitive Processes					
	1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
Factual						
Conceptual						
Procedural						
Metacognitive						

**Figure 4. Cognitive Processes**

There are no signs that this language and these types of assessment practices will change any time soon. This, despite the so-called “new curriculum” to “transform education and assessment,” for example, that has recently been developed in the province of British

Columbia. How can educators create new ways to dialogue about these problems? A new vocabulary is helpful and in order. Discussions in philosophy of mind about the character of consciousness, and the vocabulary used in these discussions, provide interesting ways for educators to re-consider assessment practices. In the next section, referring to debates in philosophy of mind about consciousness, I introduce the ideas of causal and ontological reductions. Applying these descriptions of reduction to some of our problems in education offers new possibilities for change.

### **Reducing consciousness and applications for education**

One of the difficulties for any physicalist account of the world is how to explain consciousness. As discussed earlier with the Nagel and Jackson thought experiments, every conscious state has first person subjectivity, or something that it *feels like* to be in a conscious state. This first person subjectivity *exists* (or has ontological status) for every conscious state. Because first person subjectivity is irreducible, it means that any physicalist account of the world would have to leave it out. This, of course, is unsatisfactory to many philosophers. In attempts to deal with this problem, some philosophers argue that consciousness *can* be reduced.

#### *Causal reduction and ontological reduction*

Searle (2004, 1998) argues that despite some philosophers' attempts to reduce consciousness, it remains irreducible. Making this argument, he distinguishes between two types of reduction. The first type is a *causal reduction* where we say that "As are causally reducible to Bs if the behavior of As is *entirely causally explained* by the behavior of Bs, and As have no causal powers *in addition* to the powers of Bs" (p. 83).

He uses the example of solidity to explain this type of reduction. Solidity can be causally reduced to just molecular behavior. That is, what *causes* something to be solid, are really just the molecules behaving in a certain way. And the features of solid objects (such as impenetrability) are causally explained by the molecular behavior (p. 83).

The second type of reduction is an *ontological reduction*. We can do an *ontological reduction* of something if As are *nothing but* Bs. That is, we can do an ontological reduction of material objects and say that they are *nothing but* collections of molecules. As Searle (2004) describes this distinction between causal and ontological reductions:

In the history of science we make an ontological reduction on the basis of a causal reduction. We say solidity is *nothing but* a certain sort of molecular behavior. We *carve off* the surface features of solidity, such as the fact that solid objects have a certain feel, resist pressure, and are impenetrable by other objects, and we redefine the notion in terms of the underlying causes. Solidity is now defined not in terms of surface features but in terms of molecular behavior (p. 83).

Importantly, consciousness *cannot* be ontologically reduced like solidity. As Searle explains:

In the case of consciousness, we can make a *causal reduction* but we cannot make an *ontological reduction* without losing the point of having the concept. Consciousness is entire *causally* explained by neuronal behavior but it is not thereby shown to be *nothing but* neuronal behavior [because] the main point of having the concept of consciousness is to capture the first-person, subjective features of the phenomenon and this point is lost if we redefine consciousness in third-person, objective terms. We would still need to explain the first-person ontology (p. 84).

As he summarizes the problem, consciousness is different from “liquidity and solidity that have surface features, in that we are reluctant to carve off the surface features and redefine the notion in terms of the causes of the surface features” (p. 84). Noting many examples where an ontological reduction or *nothing but* reduction is improper, Searle (2004) uses one example in particular to illustrate the point. Beethoven’s Ninth Symphony can be reduced to wave motions in the air but were we to do so, we would carve off the rich, complex, first person subjective experience of what it is like to listen to the piece. Further, to assert that music is *nothing but* wave motions is to entirely miss the point and beauty of music.

#### *Eliminative reduction*

Another useful term in demonstrating the difficulty in reducing certain phenomena is *eliminative reduction*. This type of reduction “show[s] that the reduced phenomenon does not really exist,” and as an example, “the reduction of sunsets to the earth’s rotation is eliminative because it shows that the sunset was mere appearance” (p. 85). But one cannot do such an eliminative reduction of consciousness, argues Searle. We cannot say that since it is possible for consciousness to be reduced to just neuronal behavior in the brain, that therefore consciousness does *not exist*. As Searle writes,

You can do a causal reduction of consciousness to its neuronal substrate, but that reduction does not lead to an ontological reduction [or an eliminative reduction] because consciousness has a first-person ontology, and you lose the point of having the concept if you redefine it in third-person terms (p. 86).

#### **A Vocabulary for Assessment?**

Using the vocabulary of reduction from philosophy of mind opens up new ways

to dialogue about assessment practices in education. In the province of British Columbia, for example, despite the “new” curriculum, the language in these documents remains deeply entrenched in behaviorism and a functionalist view of mind. Reducing the idea of learning to various *skills* (now dressed up as *competencies*), for example, appears to make learning observable. Core competencies are defined by the Ministry as “sets of intellectual, personal, and social and emotional proficiencies that all students need to develop to engage in *deeper learning*” and include the thinking competency, communication competency and social and personal competency. But each *competency* is simply a list of descriptors and behaviors. The thinking competency, for example, is described as “specific thinking skills as well as habits of mind and metacognitive awareness” and the competency is a *representation* of “the abilities students need to undertake *deep learning*.” Such descriptions are evidence of reduction, employed so that learning and knowing are observable for third person assessment. In other words, if you *can*, or if you are *able*, then you must *know*. Further, such descriptions are evidence of an ontological reduction, where knowing (or competency) is *nothing but* exhibiting a set of behaviors on a checklist, or the completion of various steps.

### *How to reduce knowledge*

Consider the systemic contradiction in British Columbia Ministry’s new curriculum where on one hand, assessment is described as “tied to learning, *not behaviors*,” but on the other hand, the competencies are described as follows:

- Competencies are activated in the “doing of a subject”
- Competency represents the combined skills, processes, *behaviors and habits of mind* that learners use to make sense of the world

- “Habits of mind” are characteristics of intelligence or *sets of behaviors* people engage in when they are confronted with problems
- Core competency continua will describe the range of *performance exhibited by students* at different levels of development...The levels will answer the question ‘If they are *able to* ...what might we work on/look for next?’

Returning to the earlier claim in Chapter 1 that a view of mind informs a view of knowledge, a view of education and assessment practices, it is worthwhile to examine how the current view of mind cashes out in British Columbia’s new curriculum. What is knowledge, for example, as the new curriculum suggests? Using Erickson (2007), to frame the transformative curriculum, the Ministry in its glossary of terms follows Erikson’s account of knowledge and defines it as: “*structured* by facts, topics, concepts, and generalizations (big ideas) in a bottom-to-top arrangement.” Specifically, “facts are organized into topics; topics lead to related concepts; and concepts that are generalizable lead to big ideas.” Big ideas “get at” deep learning, and apparently all of this is then transferrable to other contexts. Interestingly, knowledge is *not* defined, other than to note that it is *structured*, and the structure, significantly, takes the form of an algorithm. This algorithm nicely fits into a functionalist template and is consistent with a functionalist view of mind:

Knowledge = **Facts** (which are organized into **Topics**), which lead to **Concepts**, which lead to **Generalizations**, which lead to **Big Ideas** which lead to **Deep Learning**. Or,

$$K = F \rightarrow T \rightarrow C \rightarrow G \rightarrow B \rightarrow D$$

Once the algorithm is set, it is easy to “plug in” content – any content. As long as the algorithm is followed, this view of knowledge can be justified. Further, because it is laid

out in an algorithmic format (allowing it to be observable), it is assessable every step of the way. This same method can be used to construct criterion-referenced assessment and rubrics. If *this*, then *that*. If there are xs, ys and zs in the student's assignment, and if I can check these items off on a checklist, and if certain tasks have been completed, then the assignment is "excellent" or receives an A. If there are only xs and ys, then the assignment is "good" or receives a B. This is an over-simplification of the method, but the general idea is to make the language such that student work can plug in to generalized, objective, agreed-upon, transparent criteria ... an algorithm.

#### *How to reduce understanding or deep learning*

The same method that is used to reduce knowledge is used to reduce understanding: use language to reduce the concept to an observable skill, behavior or performance. The reduction of understanding, or what is termed "deep learning" by British Columbia Ministry of Education, is of particular concern as understanding is a key part of any aim of education. Because of its irreducibility, however, it is unobservable, immeasurable and un-assessable. Conceding that understanding is irreducible seems unacceptable. Why? For some, it is reasonable to expect that I have deep learning in a subject if I have been educated in the subject. Further, deep learning is a reasonable (even an expected) *outcome* of education. Indeed, some might argue that it is *the* most important outcome of education. Consider how we wonder why someone lacks deep learning of a subject in which they have supposedly been educated. We might even become impatient and irritated in such a scenario. Ministry language indicates an awareness of this concern, as the writers point out in their curriculum rationale how education must go beyond mere task completion and the memorizing of steps or

information. Andrew Davis, too, gets at the importance of deep learning, or what he characterizes as “understanding,” noting what is sacrificed if teachers simply focus on facts, information, procedures, and steps (or the observable and the measurable):

...developing true understanding [deep learning] cannot be equated with polishing the performance of a piano piece for the Grade 5 Associated Board music examination. Teachers being honest about the kind of learning they intend would in effect be indicating to children that they shouldn't bother to try to understand... they should concentrate instead on managing specified tasks (Davis, 1999, p. 34)

and further that,

[teachers]...are likely to shift the emphasis of their teaching away from the promotion of properly understood knowledge [deep learning], and towards developing in their students a limited range of closely-defined *performances*...this transmits to students a powerful message about the fundamental character of [deep] learning...to learn is to master a specific set of *procedures*... (Davis, 1999, p. 34).

But if we concede that we cannot observe or measure this significant, *maybe most significant* aspect of education (understanding), then it seems like we are conceding too much. Or that a major part of what we generally expect of education cannot really be known or measured in any objective, empirical sense. It is fairly uncontroversial that deep learning is important but if it is irreducible and therefore not observable or measurable, how do we proceed? Are we going to say that it *cannot* be measured and leave the impression that it is not as important as that which can be? Or, are we going to say that sometimes that which is most important, is invisible and immeasurable? Both options seem unsatisfactory, particularly in an institution that seeks scientific credibility.

A particular course of action - a way to proceed – *has* been chosen, but the subtlety with which the choice has been made requires explicit exposure.

Its rich, first person subjectivity is such that deep learning *cannot* be reduced to a set of features or causally reduced to some sort of algorithm. Nor can it be ontologically reduced to be *nothing but* a set of features, completed tasks or behaviors. But this is exactly how deep learning is treated in education in its subjection to both a causal and an ontological reduction. In its glossary of terms, for example, the British Columbia Ministry defines deep learning by causally reducing it to a set of observable features, behaviors and performances. Deep learning is:

...learning *that encourages* students to look at things from different perspectives, *to see* the relationships between their learning in different subjects, and *to make* connections to their previous learning, their own experiences, and to the world at large...*that emphasizes* the use of key disciplinary concepts, principles, and generalizations to think critically, solve problems, and communicate ideas...*that develops* understanding; *that allows* students to think about and apply their learning in meaningful ways; *that helps* students build up an increasingly sophisticated conceptual understanding of how knowledge has been constructed within a particular topic or discipline; *that helps* students build generalizations and mental models of the world; *that allows* them to make sense of new information and connect it to prior knowledge; *that goes* beyond rote learning or surface learning, where a student may memorize a procedure or formula, but does not actually understand the underlying principle; and *is not assessed by* the ability to recall a textbook account or teacher's explanation.

Importantly, we do not get a clear account of what deep learning *is*. Instead, we are told *about* deep learning, what it *does*, what it *encourages*, where it *goes*, what it *helps with*, what it *emphasizes*, and how it is *not assessed*. No clear description of *what it is* is ever

given. The closest description of what deep learning *is*, is an example of what it “looks like.” The Ministry uses this characterization of “looks like” in Socials and in Math:

In mathematics, deeper learning means students *are able to* see the underlying principles of a problem and not be confused by surface changes, like switching from an equation to a word problem...In social studies, deeper learning means students *are able to recognize and explain* similarities and differences between what they have learned about revolutions in history and current events in the Middle East.

Like Searle’s description of consciousness, deep learning has a first person subjectivity that is irreducible. That it is irreducible means that any ontological reduction of it, where deep learning is *nothing but* a set of causal relations, behaviors or observable performances, carves off the first person, subjective experience, not to mention the complex, fluid, timeless, ever deepening aspects. So while deep learning cannot be reduced to a set of features, nor can it be observed from a third person perspective, educators *do* reduce it by manipulating and contorting assessment language. This manipulation and contortion is carried out in various algorithmic forms, such that what is “in” a student’s mind is reduced to a set of behaviors or outputs. This manipulation then allows us to *pretend* that we *can* observe and assess deep learning from a third person perspective when we cannot.

More radically, we flirt with an eliminativist reduction of deep learning, as evidenced in the learning outcome literature and curriculum language. Consider Angela Linse’s (2011) *What Do I Want Students To Be Able To Do*, where she describes how to write assessment language so as to observe student learning and understanding. Though

not intended to be an example of how we perform an eliminative reduction of deep learning, it is:

*I want students to be able to:*

Know		Analyze
Learn	<b>HOW DO YOU KNOW?</b>	Solve
Understand		Compare
Appreciate	<b>BECAUSE THEY CAN&gt;&gt;&gt;</b>	Critique
Value		Respect
Perform		Diagnose
Create		Evaluate

Listing the features that typically characterize deep learning (a *causal reduction* in and of itself), the left-hand column is comprised of that which is immeasurable, unobservable and un-assessable. Recognizing the importance and third person inaccessibility of such qualities, how does one proceed? Make the invisible visible: Reduce the qualities to *behaviors*. Reduce the qualities to *performances*. Reduce the qualities to anything observable. Then deep learning becomes *nothing but* observable actions or behaviors. One might ask here, just how important is deep learning, if it is *nothing but* observable actions or behaviors?

## **Final Thoughts**

How did we get here? Zooming out, the turn to materialism and its offspring that includes behaviorism and cognitivism, holds educators hostage in a peculiarly “Stockholm Syndrome” fashion. We have developed a fondness for our captor, perhaps

out of necessity. Behaviorism and cognitivism allow for the “inner” to be observable and therefore measurable and assessable. As teachers are required to assess students, they are given the impossible task of objectively observing what is “in” students’ minds. The turn to behavioral and cognitive psychology in education allows for an acceptance of a particular view of mind: that mind is observable and a type of processor. This view of mind dictates what counts as knowledge, which then drives curriculum design, assessment practices and teacher training programs. The abduction of education, in general, has given rise to improper causal and ontological reductions of subjective, irreducible concepts including mind, understanding and perhaps the concept of education itself.

The abduction obliges educators to play a game where the point of the game is to appear objective. Rubrics, criterion-referenced assessment, learning outcomes, prescribed learning outcomes, learning objectives, accountability, objective criteria, along with redressing old terms like formative and summative assessment, are all part of the game. Such language allows us to forget that all we are really doing when we are assessing students is observing task completion and skill competency, with the latter even somewhat in question. We subjectively interpret, as we cannot help but do so, and we ultimately assign a percentage or letter grade because we are required to do so.

Education as a purely conceptual, subjective experience is apparently out of the question, as that would be “unscientific” and admitting to the existence of spooky things like the invisible, the irreducible and the immeasurable. But what if education *is* just that?

## **Chapter 3. Metaphors of mind**

### **Introduction**

There are unacknowledged Cartesian leftovers strewn everywhere in cognitive neuroscience, causing substantial mischief...when neuroscientists help themselves to terms...they ought to proceed with the utmost caution, since terms have presuppositions of use that can subvert their purposes and turn otherwise promising empirical theories and models into thinly disguised nonsense...many cognitive neuroscientists [are] bedazzled by the idea of a place in the brain (which I call the Cartesian Theater) where an inner show of remarkable constructions is put on parade for a material *res cogitans* sitting in the audience (Daniel Dennett, 2009, p. 74.)

Cartesian leftovers, as Daniel Dennett points out, are indeed strewn everywhere and cause substantial mischief for educators in particular. As discussed in the prior chapters, the complicated history of mind, including Descartes' dualism and the vocabulary with which he leaves us, impacts educational policy and practices. A theory of mind frames a view of knowledge and education, both of which inform assessment practices. So if educators are unclear about mind, this lack of clarity spills into views of knowledge, education and assessment. Problems born out of the historical debates about mind remain, and as such, educators continue to seek clarity about the concept of mind. In an effort to be clearer, we sometimes turn to metaphors. This chapter explores and draws attention to how consequential these metaphors of mind are to educational practice and

policy, for embedded within each of them are assumptions *about* mind, knowledge, education and practice.<sup>10</sup>

As noted in Chapters 1 and 2, a consequence of the behaviorist's account of mind, is to assume that mind is just behavior. In the context of education, this assumption allows for the deeper assumption that student learning is assessable by observing behavior. Also previously noted, it is not surprising then that curriculum documents and assessment practices in public school and post-secondary institutions are filled with assumptions that learning, knowing and understanding are observable. Asking, for example, "what does learning look like?" and requiring that assessment rubrics include observable verbs are just a few examples. How did we get here? And how have metaphors of mind added to the confusion?

Feldman (2006), though not intending to necessarily inform philosophy of education may nonetheless offer some answers. In his work, *From Molecule to Metaphor*, Feldman states that the use of metaphors "is the normal way we think and talk about ideas and the mind" adding further that, "this is the standard way in which people try to understand new ideas in terms of familiar ones" (Feldman, 2006, p. 197). Thinking with similes and metaphors is imaginative and assumed to be helpful in our attempts to understand our world. Historically, philosophers have compared mind to a blank slate, an aviary and a wax tablet, to name just a few. Currently in an effort to understand mind and how we learn, some have compared it to a computer or an information processor. Thinking metaphorically, however, has its limitations. Asserting that mind is a computer

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<sup>10</sup> This chapter is also a journal article. See Rodgers, S. (2015) "Minding Our Metaphors In Education" *Educational Philosophy and Theory*, June 23<sup>rd</sup>.

or that mind is an information processor, make it easy to forget that *it isn't either*. A metaphor is simply a comparison and perhaps a useful tool for deepening our understanding of something.

Returning to the point that educators assume mind and “its workings” are observable, we should know better. Along with our metaphors and similes, we best pay attention to our most basic proverbs such as “looks can be deceiving” and “you can’t judge a book by its cover.” Indeed it is because of concerns of subjective, biased assessment practices that more objective practices are sought and encouraged, but this may be missing a deeper point. As stated, what follows in this chapter is a call to notice that metaphors of mind influence educational practice and policy. That is, we ought to be aware *that* we employ metaphors of mind in education and the limitations thereof. Further, as mentioned, embedded within these metaphors are presuppositions of epistemological and pedagogical significance—presuppositions that have far-reaching consequences. Since educators may be unaware of the extent to which metaphorical understandings of mind permeate curriculum documents and educational policy, this philosophical exploration is both necessary and worthwhile.

## **Thinking metaphorically**

Lakoff and Johnson (1999) suggest that human thinking is primarily metaphorical, noting that as the human mind is *in* the body, all mental experiences can only be understood through the body. Citing Lakoff and Johnson’s, *Philosophy in the Flesh*, Stein (2014) describes the power of metaphor thus:

Metaphors form an inescapable and ubiquitous aspect of our meaning-making

systems, especially when it comes to describing things we cannot see or do not quite understand, such as the human mind. We speak about things we do not understand as if they worked like the things we do understand. This can be a powerful aid to understanding, but it can also lead to distortions, errors, and a comforting illusion of knowledge where there is really only confusion.

Summarizing how thinking is metaphorical and that cognition is embodied, Rennie and Fergus (2006) describe Lakoff and Johnson's theory as a "fine-grained analysis of language ... used to demonstrate the extent to which conceptualization of the world is organized in terms of cognitive image schemata derived from embodied experience" (p. 485). More specifically, thinking occurs when "easily graspable categories are sourced in embodied image schemata ... often metaphorically and metonymically" (p. 486).

Rasmussen (2012) further describes Lakoff and Johnson's idea of embodied thought and metaphor as follows:

The mind being in the body means that our way of thinking ... is dependent on our basic sensory and motor systems ... most of our thought operations take place below the level of cognitive awareness ... our brain has to perform many and extremely complex processes [and] these processes are not accessible, to a large extent, for conscious awareness and control. A crucial example of this is that our thought is endemically metaphorical (p. 202).

Lakoff (2012) himself argues that human thinking is metaphorical by first distinguishing embodied action: "concepts for literal embodied actions, like running, actually draw upon physical experiences of running ... concepts for what the physical body is and does are embodied" (p. 775). What is most interesting, Lakoff notes, is that "abstract concepts are embodied as well. There are two kinds: cognitive primitives and primary conceptual

metaphors” (p. 775). Further, Lakoff contends that “many basic metaphors arise from correlations between co-occurring embodied experiences...happy is up, sad is down; more is up, less is down; affection is warmth, and so on” (p. 776). Arguing that metaphors account for a significant part of our mental experiences, Lakoff describes their embodiment in two ways:

via embodied cognitive primitives that structure the frames in frame-to-frame mappings, and via the hundreds of primary metaphors that ground human metaphor systems and more complex metaphors in embodied experience (p. 778).

Simply put, Lakoff maintains that “we really do live by metaphor” (p. 782) suggesting that we do not directly experience our world.

This understanding of metaphor is similar to Friedrich Nietzsche’s (1873) in his work, *Truth And Lies In A Nonmoral Sense*. Suggesting that human communication is itself metaphorical, Nietzsche writes,

For expressing these relations [man] lays hold of the boldest metaphors. To begin with, a nerve stimulus is transferred into an image: first metaphor. The image, in turn, is imitated in a sound: second metaphor. And each time there is a complete overleaping of one sphere, right into the middle of an entirely new and different one ... we believe that we know something about the things themselves when we speak of trees, colors, snow, and flowers; and yet, we possess nothing but metaphors for things—metaphors which correspond in no way to the original entities (p. 248).

Nietzsche’s description of our metaphorical communication highlights the limits of metaphors. The metaphor is not *the thing itself* but rather a translation. Importantly, on

Nietzsche's account, it is not a *choice* to employ a metaphor.<sup>11</sup> We can only communicate metaphorically, and as such, two distinct experiences (the experience itself and the communicating of that experience) are given false equivalency.

### **Implications for education**

Relating this idea to education, mind and metaphors of mind may be falsely equated. Perhaps the use of simile rather than metaphor would help to keep the distinct experiences separate. It is easy to forget, for example, that mind isn't really a computer but rather that mind might be *like* a computer. Educators make a similar false equivalency in assessment by assuming, as an example, that a student's personal understanding of a piece of literature corresponds to a student's written or spoken words in an assignment about the piece of literature. To this point, Nowlin (2009) highlights Nietzsche's description of metaphorical communication:

The metaphorical activity of perception and communication necessitates that all communication, and thus all language, is always already rhetorical, for humans do not communicate reality itself but rather the relational ground in which reality is apprehended in a metaphorical manner.

Arguing that communication is metaphorical, Nietzsche (1873) concludes that what is true or "truth" is merely:

...a mobile army of metaphors, metonyms, anthropomorphisms, in short, a sum of human relations which were poetically and rhetorically heightened, transferred, and adorned, and after long use seem solid, canonical, and binding to a nation. Truths are illusions about which it has been forgotten that they are illusions,

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<sup>11</sup> It is worth mentioning here that Nietzsche is pointing out that 'everything' is metaphor, not just what we recognize to be metaphor-- which is quite a bit stronger than Lakoff and Johnson.

worn-out metaphors without sensory impact, coins which have lost their image and now can be used only as metal, and no longer as coins (p. 250).

The “truth” about what a student understands is equally illusory, for attempts on the part of educators to assess or *know* what a student understands just yields third, fourth, fifth, etc. layers of metaphor. Educators are humans and like humans, as Nietzsche suggests, who have forgotten that truths are illusions, educators should consider that assessment could have its illusions – that assessment *tools*, for example, allow us to measure student understanding. At best, assessment tools allow us to manipulate the metaphor and at worst, they allow us to perpetuate an illusion.

### **Historical metaphors of mind in education**

As discussed in Chapter 1, Locke (1690) in *An Essay Concerning Human Understanding* offers educators an historical metaphor of mind as he describes mind as a “tabula rasa,” a blank slate or piece of paper. Such a metaphor of mind leads to the view that knowledge is from experience and implies that the role of the teacher is to “paint” the student’s mind. Early experiences are the first strokes of paint on the child’s blank tablet and therefore must be artfully and systematically applied. Originally letters of counsel to a friend on how to best educate children, Locke’s (1693) *Some Thoughts Concerning Education*, outlines appropriate experiences and the order of presentation of such experiences to properly begin furnishing a youngster’s mind. The educator’s (in Locke’s context here, the parent and/or tutor) primary “painting” responsibility is to teach the child how to learn and to love learning. Specifically, the educator is,

...not so much to teach him all that is knowable, as to raise in him a love and

esteem of knowledge; and to put him in the right way of knowing and improving himself when he has a mind to it (p. 148).

Into the child's tablet must also be etched a temperament of self-denial as,

...[h]e that has not a mastery over his inclinations, he that knows not how to resist the importunity of present pleasure or pain, for the sake of what reason tells him is fit to be done, wants the true principle of virtue and industry, and is in danger never to be good for anything. This temper therefore, so contrary to unguided nature, is to be got betimes; and this habit, as the true foundation of future ability and happiness, is to be wrought into the mind as early as may be (p. 32).

Ultimately, the educator must ensure the child has experiences that shape “a sound mind in a sound body” (p. 10). Development of mind is secondary to development of the whole person, however, as the latter is what ensures happiness. As Locke writes,

A sound mind in a sound body is a short, but full description of a happy state in this world. He that has these two, has little more to wish for; and he that wants either of them, will be but little the better for any thing else. Men's happiness or misery is most part of their own making. He, whose mind directs not wisely, will never take the right way; and he, whose body is crazy and feeble, will never be able to advance in it (p. 10).

Instructions for properly educating the “whole” youngster aside, of significance in Locke's work are his characterizations of mind and the implications such characterizations have for educators. Some early views of learning (and indeed a current view of learning for some) appear rooted in an assumption that mind is a blank or empty canvas. King (1993), for example, notes that we still have an outdated transmittal model of teaching and learning where “the student's brain is like an empty container into which the professor pours knowledge [and] students are passive learners” (p. 30). Of note here

is the following: 1) each metaphor where mind is a blank slate or mind is an empty container has its limitations, as is the case with any metaphor of mind; 2) implicit in both metaphors is an assumption that mind is some *thing* or *object* - a slate or a container; and 3) in both metaphors, mind is assumed to be synonymous with brain.

If mind is metaphorically understood as a blank slate or some sort of empty vessel, the student assumes a passive role in her own education, while the educator is clearly painter-in-chief. While one might argue that passivity on the part of a student is temporary – since on Locke’s account she ultimately is encouraged to take up the brush and begin painting herself – the deeper point is to notice the assumptions of the metaphor of mind. As is examined later, it is not so much that the metaphor is bad or wrong as much as it is noteworthy how the presuppositions implicit in any metaphor of mind can influence classroom practice and assessment.

### **Mind is a computer**

The neural theory of language, along with much of contemporary cognitive science, is based on the physiological correlates of experience. We absolutely do not understand the nature of subjective experience, but there is overwhelming evidence that experience correlates with measurable brain events. Distinctive patterns of neural activity are correlated with seeing, speaking, emotions, dreaming, grasping, and increasingly detailed knowledge about the circuitry and activity underlying various experiences is now available. Until a conflict between the measurable and the subjective is found, theories of mental function will continue to use measurable activity and responses as indicative of experience. This is not completely satisfying, but it is productive in its own right, and is one of the most promising ways to address the deep problem of subjective experience (Feldman, 2006, p. 331).

Feldman's neural theory described above may have its roots in Fodor's (2000) computational metaphor of mind, as noted in Chapter 1. Lakoff (2006) develops the computational metaphor further, describing it more as "neural computation" or the *new view*:

The new view is that reason is embodied ... The brain gives rise to thought in the form of conceptual frames, image-schemas, prototypes, conceptual metaphors, and conceptual blends ... thinking is not algorithmic symbol manipulation, but rather neural computation, using brain mechanisms.

The new view unfortunately still assumes that the brain is mechanistic and that it computes. With the employment of a neural computational metaphor come all of its connotations and consequences. While a new and better metaphor of mind is created to deal with the problems and limitations of an old one, it is still a metaphor of mind. So what? Well, any metaphor of mind necessarily carries with it baggage and unsettled matters from the history of mind as discussed in Chapter 1. Mind is a contested idea. Additionally, there is a confused vocabulary embedded in any discussion of mind – mental, physical, dualism, monism, material, ideal, and the like. What mind is or is not, whether it is synonymous with brain or not, whether it is embodied or disembodied, a concept, an object, have not been settled. Further, a metaphor of mind assumes a *particular view of mind* and assumes a particular view of knowledge. Considering the *mind-knowledge-education-assessment* relation, what happens when such a mechanistic, computational metaphor and its connotations find their way into education, and how does it frame pedagogical and assessment practices?

In support of this new view, Feldman (2006) offers a theory of mind where

language and thought are embodied neural brain functions. In short, Feldman suggests that the brain is not so much like a computer as it is a complicated and particular type of neural processor. As he explains,

Neuroscientists speak of neurons as processing information and communicating by sending and receiving signals ... as performing computations ... neural computation has become the standard way of thinking about how the brain works (p. 15).

Further, Feldman argues that “thought is structured neural activity” (p. 336) and that “language and thought are inherently about how information is acquired, used, and transmitted...information processing is [his book’s] organizing theme” (p. xv). His overall objective in writing the book he states is to “present a story...consistent with all the existing scientific data and...plausible to you as a description of your own mind” (p. xiv).

Using the metaphor of an information processor, Feldman also draws from the work of Reddy (1979) who created the conduit metaphor. Reddy argues that “ideas are objects, phrases are containers (for idea-objects) and communicating is sending (idea-objects in phrase-containers)” (p. 196). Further, the conduit metaphor is described as part of a more elaborate metaphor referred to as the mind-as-body system: “the mind is a body, thinking is physical functioning, ideas are entities” (p. 196). To explain how what one is thinking is communicated to another, the metaphor is developed thus,

Communicators put idea-objects into phrase-containers and attempt to ‘get the idea across’ to their interlocutor. Communication is successful if the interlocutor ‘gets’ what they say ... Idea-objects don’t fit into arbitrary word-containers; there are right and wrong words for an idea, and it is up to the speaker to put his or her ideas in the right words. In most cases, ‘the meaning is in the words’. But when a

speaker communicates insincerely, the words may be ‘hollow’ or ‘empty’. A speaker who is trying not to communicate directly can ‘hide her meaning’ in ‘dense’ paragraphs (p. 196).

Using Reddy’s conduit metaphor then, Feldman summarizes that the metaphor helps to “define a large proportion of our modes of comprehension of what ideas, thought, understanding, and communication are” (p. 196). As outlined in Chapter 1, while Locke’s metaphor of mind as a tabula rasa implies an epistemological claim that knowledge comes from experience and implies a pedagogical role of educator as painter or artist, the computational metaphor implies an epistemological claim that knowledge is processed neural information and implies a pedagogical role of educator as “inputter- in-chief” or programmer. Interestingly, the former metaphor connotes “artistry” while the latter metaphor connotes “machinery.” Both metaphors allow for the conclusion that mind is in some way observable and assessable. That is, if mind is reified to be a blank slate, then the assessor can look at the student’s canvas (her mind) to see what she has painted (what she knows). If mind is a processor, the assessor can look at the student’s processed, outputted information to see what she knows.

As earlier stated regarding Locke’s metaphor of mind, it is not so much that the metaphor of mind as a computer, an information processor or a neural processor is *wrong* as much as it is assumed to be *right*, and is forgotten to be just a metaphor *for* mind, not *mind* “*it – self*.” To this point, not only is the current, fashionable metaphor assumed to be *the* way of understanding mind rather than *a* way of understanding mind educators might miss, as Nietzsche’s comments suggest, that we have mistaken the metaphor for the *thing*.

## Minding the use of metaphors and unforeseen consequences

In *Does Mind Matter: Education and Conceptions of Mind*, Sheppard (2001) cautions educators regarding the use of metaphors of mind, particularly the current metaphor of mind that it is a type of processor. Arguing for the connection between mind and education to be clarified in three key areas, Sheppard itemizes them thus:

...first, the relationship between conceptions of mind, knowledge, and education; second, some questionable assumptions related to the information-processing view of mind; and third, some implications of those assumptions for educational theory and practice (p. 243).

As previously noted, the reason educators must be cautious is that “when educational decisions assume [a] metaphor of mind...the metaphor influence[s]...teacher preparation, curriculum scope and content, student and teacher goals, and...classroom practice” (p. 255). Providing examples, Sheppard notes that ideas associated with the computational metaphor are then “used to support the contemporary technological emphasis in education,” including that students need to have “marketable *thinking skills*,” that they need to have the “ability to *interact with information* of various sorts,” and that progress requires the “ability to manipulate efficiently (by means of technology) our growing *storehouse of data*” (p. 255).

Quoting Richard Mayer (1996) in his work, *Learners as Information Processors: Legacies and Limitations of Educational Psychology's Second Metaphor*, Sheppard asserts that this particular metaphor of mind means that the “role of the teacher is a dispenser of information and the role of the student is a recipient of information” (p. 255). Or, as Mayer puts it, learning is “a process of knowledge acquisition in which

information is transmitted from the teacher to the learner. It follows that teachers are dispensers of information, and learners are information-processors” (p. 255). Using Sheppard’s metaphors of mind and corresponding vocabulary one might then chart or categorize them in the following way (see below). It is important to repeat here that metaphors of mind are created and used in an attempt to deal with the limitations and problems with a prior metaphor. As stated earlier, however, the problem is it is still a metaphor of mind. And *any* metaphor of mind has embedded within it the unsettled problems from the history of mind and the confused vocabulary used to discuss it. There is not agreement on what mind is or is not. These points cannot be overstated as they remind us that any discussion of mind is necessarily bound by its problematic history. Any metaphor *of* mind then, is similarly bound.

### **Sheppard’s metaphors of mind and criticisms**

#### *I. View of Mind – Tabula Rasa / blank slate*

*Presuppositions:* mind is blank at birth; inner place or “room” that is available for the sorting and storage of ideas; mind is passive

*Ontology:* mind is a “thing” (empirical)

*Epistemology:* knowledge is a “thing”; knowledge is the product of experiences gained through sensory experiences; knowledge is *on* the slate; *in* the mind

*Purpose of Education:* Fill the tabula rasa through experiences; create reasoning, virtuous citizens

*Pedagogy:* teacher is painter; emphasize experience and observation to extend ideas on the “slate” (mind); add to the furniture in the “room” (mind)

## *II. View of Mind – Deep well*

*Presuppositions:* Mind is a repository or place in which there are innate ideas

*Ontology:* mind is a “thing” (inner well)

*Epistemology:* knowledge is innate; knowledge is *brought out* by the teacher

*Purpose of Education:* development of reason; wisdom

*Pedagogy:* teacher is sage; emphasize and develop reason; guide student to enlightenment

## *III. View of Mind – Organic*

*Presuppositions:* Mind is biological/organic; mind is directed by natural impulses to interact with stimuli in its environment; mind responds to and reflects upon naturally arising impulses

*Ontology:* mind is a “thing” (organic and biological)

*Epistemology:* knowledge is a skill; knowledge is experience; knowledge is constructed

*Purpose of Education:* to help students solve real problems in practical situations

*Pedagogy:* teacher is facilitator; fosters mental development in students; provides stimulating environment for certain sorts of mental interactions like problem-solving activities

## *IV. View of Mind – Processor (informational, computational, neural)*

*Presuppositions:* mind is mechanistic; mind is synonymous with brain

*Ontology:* mind is a “thing” (machine)

*Epistemology:* Knowledge is information that is accessed, processed and stored; knowledge is also a *skill* (to control and manipulate the information); knowledge is

*inputted into* the mind; knowledge is *outputted out* of the mind

*Purpose of Education*: make available the widest variety of information for students to access and process

*Pedagogy*: teacher is inputter; design activities for students to improve their abilities to process information and to control and manipulate information

Of particular concern for Sheppard is the computational metaphor of mind. Citing Israel Scheffler's (1995) *Work, Education, and Leadership*, she stresses the serious problems with education adopting such a metaphor as it "leads to some severe restrictions on our normative notion of education" (p. 251). Specifically, it leads to "the emphasis on generic information-processing skills, learning processes, and strategic learning results in what has been characterized as *narrow training* rather than education." In summary:

The notion of education as consisting in a treasury of information, that is, in a so-called database, which can be called up at will by the computer operator or metaphorically by the mind of the student...is detrimental to any likely view of education as requiring understanding (p. 251).

An additional criticism of the computer metaphor, drawing from Anthony Kenny's (1991) *The Metaphysics of Mind*, Sheppard notes the conflation of *information* and *knowledge*. Suggesting we need to "emphasize the difference between the containing of information...and the possession of knowledge," she cautions that "it is possible...to have information about a particular topic without having any knowledge of that topic (p. 253).

### **The importance of studying metaphors of mind**

Studying metaphors of mind and considering their implications for education is a daunting task. To study metaphors of mind first requires the study of the history of mind

and as Sheppard suggests, educators “may be put off the task by a number of obstacles not the least of which is the technical nature of discussions of mind found in discrete bodies of literature such as those of cognitive science, cognitive psychology, and philosophy of mind” (p. 255). In particular, given its hold on education we ought to specifically “mak[e] accessible the fundamental assumptions of information-processing theory” (p. 255). Why is this so important? There is a danger in using a metaphor of mind as a *method* to inform education since we “have a tendenc[y] to shrink our vision of the world to our mode of access to it, and to identify our problems with those questions answerable by our chosen method” (p. 256). Summarizing, Sheppard argues that the “the transfer of computer language to education...tends to filter out ends and values that do not fit the metaphor... for example, ethical sensitivity, social perceptiveness and artistic expressiveness” (p. 256).

### **A Ghostly Interruption**

It is worth mentioning here that entangled in the debate over what metaphor of mind might be best or even *if* metaphors of mind are helpful is the messy problem of dualism and its vocabulary, including “mental/physical,” “body/mind,” and “mental states/brain states.” Barrow’s (2004) discussion of mind illustrates this point. Arguing against the computational metaphor of mind, Barrow distinguishes between brain and mind. As he writes,

Mapping the patterns and functions of activities of the brain no more accounts for mind (as we conceive it) than a scientific account of a rainbow accounts for the experience of seeing what we see. That is to say, a scientific explanation of what a rainbow is, which gives us a causal explanation of the emergence of the

phenomenon, stops short of saying anything about the phenomenon itself. The mind is defined as a set of mental states, which are supervenient on certain material states of affair. To put the same point another way, the genetic inheritance and other empirical truths about the brain are necessary to and limit the options in respect of mental states they may give rise to. But there is no reason to suppose they determine the mental states and no reason to deny the existence of the mental states (Barrow, p. 269).

Barrow goes on to describe mind *conceptually* as “experiences of mental states such as consciousness, memory, the formulation of propositions” and that being conceptual, mind cannot be “discredited by any empirical research” (p. 269). He further describes mind thus:

What is wrong with the idea of a set of circumstances that gives rise to something that takes on a life of its own? And surely this is more or less what common sense would say is the case with human language: we formulate ideas, perhaps originally because we are who we are and situated where we are, but once the ideas get going they take on a life of their own. And that life is what we refer to as mind (p. 271)

Specifically distinguishing between the brain and mind, Barrow notes that in his view, “there is nothing inherently problematic about the idea of the physical brain giving rise to an immaterial supervenient phenomenon” (p. 270). While acknowledging the philosophical debate over the material and the immaterial, the mental and the physical, and brain and mind, Barrow claims (with which I disagree) that such debate and questions that arise from the debate are “of very little practical consequence” (p. 270). In summary he writes that,

...unless someone can demonstrate that our sense of mind is a delusion, then our

premise must be that it is not a delusion (since we experience it and believe in it). And none of the scientific data about the material brain implies anything about the mind being a delusion (p. 270).

I agree with Barrow that none of the scientific data about the material brain implies anything about the mind being a delusion. I also agree with his assertions that “all psychological theories have hitherto lacked an adequate theory of mind,” and that behaviorists, in an extremist move, simply deny “the indisputable phenomenon of mind” (p. 277). He is also correct in my view that “psychology of whatever species has confined itself to theories of cause and effect in behaviors.” But to claim that what we ought to concern ourselves with in education is “understanding the human mind and human action, rather than the brain and behavior” (p. 277) is to accept, as Searle says, the conditions and the vocabulary set by Descartes and his dualist thesis. There is no mental and physical divide. There are no mental states and brain states. There is no monism, materialism, physicalism, behaviorism, functionalism, et al, without an acceptance *first* of Descartes’ idea of dualism. The inherited vocabulary haunts us.

Haunting, in his concluding remarks about brain and mind, Barrow resurrects the Cartesian ghost by alluding to Gilbert Ryle’s *The Concept of Mind* and his “ghost in the machine” argument:

We are neither mere animals, nor machines; we cannot satisfactorily be studied as if we were inanimate or mindless beings. To understand us it is necessary to understand our thinking in the sense of what we think rather than how our brains function. There *is* a ghost in the machine and novelists make it their business to understand ghosts (p. 278).

As noted, Barrow's thoughts are important as they remind us of the complex history and vocabulary of mind with which we must contend, a vocabulary and history that is perhaps exacerbated when we turn to metaphors of mind.

### **Reification and reduction – more consequences of the computer metaphor**

Saljo (2002) suggests that there is a “tendency of research traditions in...human learning, development, and communication, to use metaphors and analogies that construe human mental activities...in terms of physical objects” (p. 389). Further,

In modern cognitive science where computer metaphors (information processing and information storage) have been foundational for the discipline... [there is a] tendency to reify human activities...the consequences of this tradition of reification are significant for the human sciences (p. 389).

Reification through the use of computer metaphors and information processing theory indeed has consequences for education. It is worthwhile to repeat how far the current metaphor of mind reaches in to our practice, dictating how we view knowledge, education and assessment. As noted in Chapter 2, John Searle's Chinese Room thought experiment provides an illustration for public education's current allegiance to a computational view of mind (Sheppard, 2001) and its particular influence on assessment practices. Searle (2004) describes the metaphor of mind as “one of the most exciting developments in the entire history of the philosophy of mind in the twentieth century” (p. 45). As he writes,

To many of us who participated in the developments...it seemed like not merely an exciting development, but at long last a solution to problems that had beset philosophers for more than 2000 years. The idea was based on a convergence of

work in philosophy, cognitive psychology, linguistics, computer science, and artificial intelligence. It seemed that we knew the answer to the question that faced us: the way the system works is that the brain is a digital computer and what we call the 'mind' is a digital computer program or set of programs. We had made the greatest breakthrough in the history of philosophy of mind: mental states are computational states of the brain. The brain is a computer and the mind is a program or set of programs (p. 45).

Noting in *The Rediscovery of the Mind* (1992) the acceptance that “the brain ... is an information processing system ... [i]t is just a fact about biology that the brain functions to process information” (p. 223), Searle goes on to describe how mind came to be metaphorically understood as a computer and how such a metaphor allows for mind to be observable:

The mind just is a computer program and the brain is just one of the indefinite range of different computer hardwares (or 'wetwares') that can have a mind. The mind is to the brain as the program is to the hardware ... because the mind is a computer program, and because a program can be implemented on any hardware whatsoever ... the specifically mental aspects of the mind can be specified, studied, and understood. (p. 43).

In *Consciousness and Language*, Searle (2002) further makes explicit the technical aspects of the computer metaphor, using the example of his dog to show how cognitive scientists believe the mind “processes” information. As he notes,

My dog, Ludwig, is very good at catching tennis balls. For example, if you bounce a tennis ball off a wall, he is usually able to leap up and put his mouth at precisely the point the ball reaches as he grasps it in his teeth. How does he do it? ...According to the current explanatory models in cognitive science, Ludwig performs an information-processing task of enormous complexity. He takes in

information ... processes it through the visual system until he produces a 3D representation of the external world and inputs that representation into the motor output system (p. 107).

As discussed in Chapter 2, Searle's critique of this metaphor of mind culminates in the Chinese Room thought experiment. Arguing that completion of language-based tasks in a series of procedural steps do not constitute *understanding*, the argument can be applied to public school assessment practices. Relying on rubrics to assess students, educators may indeed be exemplifying Searle's Chinese room. Assuming, for example, that a student understands a passage she read because it *looks like* she does or because she completes a task matching a teacher-created rubric, is comparable to the faulty logic exposed in Searle's thought experiment. Further, as noted in Searle's dog example, the computational explanatory model assumes a student takes in information, processes it through the visual system until she produces a 3D representation of the external world and inputs that representation into the motor output system. Examples of this faulty logic, in the context of the BC Ministry's curriculum language, and how it impacts educational practice, are the subjects of the next section.

### **The computer metaphor and assessment practices**

BC Ministry of Education's (2006) *English Language Arts Kindergarten Integrated Resource Package*, as an example, states that teachers should encourage students to collect examples of good writing so that they can "develop a shared understanding of what good writing looks like" (p. 25). To help students understand what good writing *looks like* teachers are also encouraged to assess using rubrics. This practice is justified as objective measurement of what a student knows or understands in a given

subject area. Consider BC Ministry of Education's (2008) rubric used to assess Grade 4 students' writing in the province's *Foundational Skills and Assessment Test*. Often the language used in an assessment rubric is sufficiently vague, perhaps to plug in with ease the vast possible responses students might give. Noteworthy is that in order to distinguish a student who is "not yet within expectations" from a student who "meets expectations," the rubric writer might change only one or two words in the rubric description. For example, some of the measures of a student whose writing is "not yet within expectations" are as follows,

*Purpose or topic may be unclear; ideas are not developed; relevant details are largely absent; little development; unfocused beginning and middle; commonly used words are often spelled incorrectly; capitals, periods may be misused; over-use of pronouns (p. 8).*

Some of the measures of a student whose writing is "within expectations" are described as,

*Purpose or topic is somewhat focused; ideas are partially developed; few relevant details; unevenly developed; somewhat focused beginning and middle; commonly used words are generally spelled correctly; over-use of pronouns (p. 8).*

These are partial excerpts from the assessment rubric but notice that much of the language is *procedural* and does not account for the thinking, understanding or subjective perspective of the student writer. And how could a packaged rubric do so? It also presumes, as discussed earlier, that thinking, knowledge and understanding are assessable. To this latter point, the assessment rubric is really no different than Searle's codebook in the Chinese room. A student can meet expectations much like Searle can

pass the test in Chinese, but have no substantive understanding. Also problematic is the student who is classified as “not within expectations.” While it is possible that the student does not understand, it does not *necessarily* follow that because the student has not followed the procedural steps according to the rubric that the student does not understand.

Another rubric used for assessment is in the province’s *Foundational Skills and Assessment Test*. This particular rubric is designed to assess a student’s understanding of a literary passage. Again, the rubric language is vague, formulaic and subjective. What the words on a rubric mean are subjectively interpreted by an assessor and vague language provides more room for an assessor’s subjective interpretation. In short, that assessors use identical rubrics does not make the assessment objective. That assessors use identical rubrics composed of *words* neither avoids the problem of subjectively interpreting what the words in the rubric mean nor avoids the larger problem of interpreting what a student supposedly knows or understands. Some of the rubric measures to assess the student who is “not yet within expectations” include:

*Response is generally inaccurate; demonstrates limited understanding or a misreading of the passage and/or the task; limited comprehension of the passage; brief and/or simple; no elaboration of ideas; purpose may be difficult to discern; no evidence of interpretation or relevant insight (p. 4).*

Some of the rubric measures to assess the student who “meets expectations” include:

*Response is partially accurate; may lack support; may be incomplete. Demonstrates an understanding of the gist of the passage(s) and task; some comprehension of the passage and/or task is evident; includes some details;*

*minimal relevant elaboration; purpose may not be clearly conveyed; may include interpretation or insight in a simplistic way (p. 4).*

And the rubric measures to assess the student who “exceeds expectations” include:

*Response is accurate; supported with text-based information; Demonstrates a thorough understanding of the passage; clear, detailed, and elaborated; purposeful; integrates specific, relevant details from passage(s) in response to the task; may show interpretation or insight (p. 4).*

Another example of how procedures or “box checking” inherent in a rubric reduce the “un-assessable” to *something* observable and measurable for teacher assessment, is the common use of work habit rubrics (See Figure 5). A student’s habits with respect to effort are reduced to *performances* or outward *behaviours* where G indicates good work habits, S indicates satisfactory work habits and N indicates that work habits that are *not* satisfactory. The following is an example:

## WORK HABITS

Name:

	Good (G)	Satisfactory (S)	Needs Improvement (N)
<b>Preparation</b> Comes prepared to class with books, binder and supplies	Consistently	Sometimes	Rarely
<b>Organization</b> Keeps an organized binder and adheres to due dates	Consistently	Sometimes	Rarely
<b>Participation</b> Takes on appropriate amount of work (including speaking and leading) in class, group, partner and individual situations	Consistently	Sometimes	Rarely
<b>Cooperation</b> Works well with others and is respectful of classmates, the teacher, and guests	Consistently	Sometimes	Rarely
<b>Classroom Work Ethic</b> Uses class time wisely and is always on task; asks for help when needed; is not distracted by socializing or electronic devices	Consistently	Sometimes	Rarely
<b>Following Instructions</b> Follows verbal and written instructions	Consistently	Sometimes	Rarely
<b>Independence</b> Self-directs and takes initiative	Consistently	Sometimes	Rarely
<b>Meeting Deadlines</b> Hands in all work on the due date	Consistently	Sometimes	Rarely
<b>Being on time</b> Arrives on time and is seated and ready to work when the bell rings	Consistently	Sometimes	Rarely
<b>Completion of Assignments</b>	0-1 missing/late assignments	2-3 missing/late assignments	4 or more missing/late assignments

Comments:

### Figure 5. Work Habits Rubric

As with the prior examples, rubric language is such that often a word here or there is simply changed in the description of the next level of the rubric. This shows the packaged, formulaic and algorithmic format of the rubric, a format that is designed so an assessor can plug in a student's performance with ease, as well as give the appearance that it is an objective assessment. Further, as earlier noted, the modifiers, "consistently," "sometimes," and "rarely" are still subjective. The difference between what counts as "consistently" and "sometimes," for example, varies from assessor to assessor, and is a matter of subjective interpretation.

Consider another rubric example, the "general class rubric" from Rubricsforteachers.com (see Figure 6). This rubric is used to supposed assesses work habits replacing the letter format with a numerical format where 4 is excellent and 1 is poor:

GENERAL CLASS RUBRIC					
Name _____ Date _____					
Class _____ Period _____					
Criteria					Value
	4	3	2	1	
<b>Ability to Focus</b>	Always reads quietly the entire time; does not talk or interrupt others.	Usually reads quietly the entire time; tries not to talk or interrupt others.	Wanders around, reads a little; may talk and interrupt others on occasion.	Wanders around; talks, and interrupts others.	_____
<b>Activity Level</b>	Takes a physically active part in game or activity all the time.	Takes a physically active part in game or activity most of the time.	Requires reminding daily to participate in game or activity.	Does not participate in game or activity.	_____
<b>Creativity</b>	The student work demonstrates a unique level of originality.	The student work demonstrates originality.	The student's work lacked sincere originality.	The piece shows little or no evidence of original thought.	_____
<b>Eye Contact</b>	Holds attention of entire audience with the use of direct eye contact.	Consistent use of direct eye contact with audience.	Displayed minimal eye contact with audience.	No eye contact is made with the audience.	_____
<b>Following Directions</b>	Responds to teachers instruction without hesitation all the time.	Responds to teachers instruction without hesitation most of the time.	Responds to teachers instruction after non verbal cues are used.	Rarely responds to teachers instruction.	_____
<b>Total:-----</b>					_____
<b>TEACHER COMMENTS</b>					

From: Rubricsforteachers.com

**Figure 6. General Class Rubric**

Use of rubrics such as these is expected and commonplace in provincial public school classrooms from Kindergarten through Grade 12. They are considered to be objective measurements of a student's effort and what a student knows and understands. Some colleagues correctly critique the writing, composition and application of rubrics. The rubrics are too general as they "formula-ize," homogenize and over-simplify the complex and irreducible. Not only is the framing of rubrics problematic, rubrics focus educators on procedural objectives rather than on education or deep understanding. Students are assessed on whether or not they have completed the requisite number of steps to *prove* understanding and not whether they have actually understood (which is not measurable in the first place). Further discussion of these points and examples of other rubrics will also be presented in Chapter 5.

Teachers are focused on checking off boxes and highlighting indicators on a rubric while students are asked to do the same on self and peer assessment rubrics. Some students joke that it is unnecessary to read a peer's work when assigned a peer

assessment task. “Just highlight things on the rubric and it looks like you’ve done it,” they say. As Searle’s Chinese room thought experiment helps to reveal, because of an allegiance to a certain metaphor of mind, educators may be confusing task completion, procedures and box checking on rubrics with understanding. What it *looks like* or what it is *compared to* may be falsely equated with what it *is*. Nietzsche’s (1873) thoughts on metaphor are once again instructive here. Task completion and following procedures should not be equated with understanding. What it *is* remains inaccessible, immeasurable and “undefinable” for a teacher. As Nietzsche writes,

We call a person ‘honest’, and then we ask ‘why has he behaved so honestly today?’ Our usual answer is, ‘on account of his honesty’. Honesty! ... We know nothing whatsoever about an essential quality called ‘honesty’; but we do know of countless individualized and consequently unequal actions which we equate by omitting the aspects in which they are unequal and which we now designate as ‘honest’ actions. Finally we formulate from them a qualities occulta which has the name ‘honesty’. We obtain the concept, as we do the form, by overlooking what is individual and actual; whereas nature is acquainted with no forms and no concepts, and likewise with no species, but only with an X which remains inaccessible and undefinable for us (p. 257).

## **Mind is an ecosystem**

Like Sheppard (2001), Stein (2014) correctly critiques the computational view of mind in his work, *Your mind is not a computer program it’s an Ecosystem*.<sup>12</sup> A recent doctoral graduate from the Harvard Graduate School of Education and a member of Harvard’s *Project Zero*, Stein argues that “IQ and reductive standardized tests fit well

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<sup>12</sup> Stein, Zachary (2014) ‘Your Mind is not like a computer it’s like an ecosystem’ *Independent School Magazine*, National Association of Independent Schools at: <http://www.zakstein.org/your-mind-is-not-like-a-computer-its-like-an-ecosystem/>

with a computational metaphor of mind,” and that “IQ is just a measure of the size and strength of your central processing unit.” The computational metaphor of mind, he says, “plays directly into one-size-fits-all ideas about education and pedagogy.” Pointing out how “educators are not computer programmers and students are not passive machines,” Stein stresses that “metaphors about our minds matter because they impact how we understand and work with students.” He is also correct in my view that the current computational metaphor “contributes to the perpetuation of educational injustice and the deepening alienation of our students.”

While I agree with Stein’s characterization of the computational metaphor of mind and its hold on education, unfortunately he seems seduced to create another metaphor. It is important to repeat that any metaphor of mind inherits the unsettled historical debate about mind. As well, any metaphor of mind inherits the problematic vocabulary we use to discuss it, including dualism, monism, materialism, mental, physical et al.

Of interest is Stein’s particular criticism of the computational metaphor as just “another reductive tool trying to measure student success.” Employing just another metaphor of mind, however, is arguably seeking a “better” reductive tool to try and measure student success. In other words, the metaphor of mind he creates still makes mind an empirical “thing” and it still makes mind measurable, reducing it to a set of skills. Rather than addressing the confused, conceptual problems with mind, its history and how metaphors of mind necessarily *inherit* this confusion and conceptual problems, Stein offers a new metaphor, “based on the new science of learning, and *the new and better metaphor for the mind it implies.*”

The new and better metaphor for mind, embedded in Piaget's psychology where mind is "best understood as an evolving organism—living, growing, and self-regulating in a metabolic relationship to its environment," is that mind is an ecosystem. As Stein describes the ecosystem metaphor, mind is a "a complex and dynamic system, always in process, always changing, growing, and becoming more diverse and differentiated." Extending the metaphor, Stein notes that "ecosystems also become more integrated and specialized, filling up their niches and fostering symbioses." They are "composed of a wide variety of independent and yet co-evolving species, so there is not one central unit that can serve as an overall measure of the ecosystem." He goes on to say that ecosystems (minds) are "sensitive and actively responsive to the larger environments in which they are nested" and as a consequence, they "can be easily disrupted and thrown off balance, but...are generative and creative, self-regulating, and self-transcending." While ecosystems (minds) "evolve, they display non-linear growth, with jumps, dips, regressions, and daily and seasonal changes and rhythms." Like every mind, "every ecosystem is unique." Like two different minds, "give two ecosystems the same input and you should not expect the same output." This ecosystem metaphor of mind, as with any metaphor of mind, has embedded within it assumptions *about* mind. Any discussion of mind is tangled in the historical debate, including whether it is separate from body, a concept, identical to brain, just behavior, just causal relations or just a computer program. Any discussion of a metaphor of mind is similarly and *necessarily* entangled. And in the context of education, a metaphor of mind (as noted earlier) assumes a particular view of mind, a particular view of knowledge, a particular view of education and a particular view of assessment.

Also of interest with the ecosystem metaphor (one I mention here as it is becoming more popular) is that like the computer metaphor, it makes mind observable and therefore measurable and assessable ... just like an ecosystem in nature is. As Stein notes, to understand the ecosystem (or the mind), you “must take multiple measurements in a variety of places across a variety of time scales.” Subtly, the crucial move is made here so that mind is reduced to ideas and *skills*. As he says, like a mind,

...imagine that each different skill and idea you have is like a living organism...All of your skills and ideas are co-evolving, sometimes joining together to create higher-order skills, and sometimes differentiating into sub-skills as they are refined relative to environmental niches. Your skills and ideas also compete for energy and exercise, as growing one set of skills, like playing violin, takes up the time and energy that would be needed to grow a different set of skills, such as doing algebra.

For Stein then, mind is an “ever-changing, context sensitive, ecosystem in process, with no central tendency or summary statistic” where it “may have highly evolved skills in some contexts, and primitive ones in others.” Absent is a deep questioning of the assumption that mind is some measurable and assessable “thing.” Missing an important contradiction, on the one hand, Stein critiques the computational metaphor of mind as socially unjust because it reduces mind and tries to measure student success. On the other hand, however, he offers the ecosystem metaphor of mind to help us “chang[e] the way we think about the nature of the mind and *how to measure it*.”

## **Final Thoughts**

We use metaphors of mind, on some level, in an attempt to help us understand

mind. Further, we mistakenly believe that knowledge and understanding in others can be made accessible and observable. But As Saljo (2002) correctly points out:

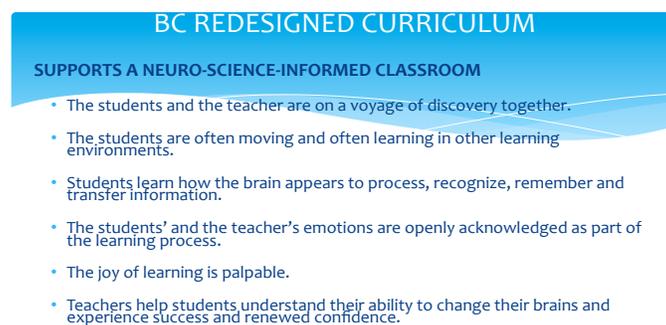
Phenomena such as learning, thinking, development...can never be observed as such (i.e. at the psychological level. Correlates at the biological level may be observable, but these entities—neurochemical signals, blood flow etc.—are symptomatic and thus polysemous with respect to their psychological interpretation). We have to make inferences about them on the basis of observable activities such as what people *do* or *say* (393).

Perhaps to make these inferences, we believe we need to turn to metaphors and to this need educators ought to pay closer attention. Using a metaphor to describe mind, while both forgetting that we are using a metaphor and failing to examine the history and connotations of the metaphor, may have more serious implications for the future and may be doing more harm than we realize. As Feldman (2006) recommends:

It should not disturb us that some mystery remains in our theories of the mind; science is only one way of understanding the world. For anything that can be measured, even indirectly, science is the path to understanding. But for some (currently) immeasurable questions like what it would be like to be someone else, other approaches—introspection, interaction with others, the arts, and arguably philosophical arguments—can yield superior insights. It is profoundly unscientific to assume that our current science is able to provide the best understanding of all of human experience (p. 332)

Though Feldman is right that science cannot explain or understand all of human experience, educators in particular should be humbled by the fact that mystery remains in our theories of mind. We should be humble because we behave and act as though there is no mystery, even if we think there is. Further, we should be humbled and alarmed at the

hold the current metaphor of mind has on education, asking ourselves *why* it has such a hold. As Feldman suggests, “[n]eural computation methods *appear to be required* because they make it possible to capture the evidential, situational, multi-faceted character of human thought and to propose explicit mappings to brain structures” (p. 341). Consider this point with respect to the view of mind (neuroscientific) assumed in the BC government’s new curriculum language in Figure 7 below:



**Figure 7. BC Redesigned Curriculum**

Lakoff and Johnson (1980) caution that despite its usefulness, a metaphor can limit and prejudice our ability to think. As they suggest, “[m]ost of our concepts are abstract concepts like time, emotions, communication, the mind” (p. 198). When we use a metaphor to try and explain such concepts, we are only able to define “certain aspects of an abstract concept” (p. 198). So while “we understand abstract concepts in terms of metaphorical definitions” such definitions can only “capture part of the concept” (p. 198). Frustration with the inadequacy of metaphors to completely and precisely describe mind has historical significance. Plato, for example, struggled with metaphors to describe mind, including a wax tablet and an aviary. This sense of inadequacy may be due to the limitations a metaphor imposes on the concept in question, and/or the abstract nature of the concept in the first place. Maybe there are some concepts that we just do not

understand and while using a metaphor for clarification can create imaginative discussion, such use might also unintentionally limit, constrain or confuse us. As Kennedy (2012) summarizes, “[i]n the past, metaphor was considered to be merely a rhetorical device, a function of language” and “[now] cognitive scientists...use computer models, such as neural networks, to approximate mechanisms in the human brain and perceptual systems that we do not yet fully understand” (p. 281).

It does not follow that philosophers, psychologists and educators should not continue to try and understand what we mean when we talk about mind. It does follow, however, that educators should proceed with caution. As Walters (2004) says of metaphors they “provide an escape hatch from the prison house of language...let us know how we are confined. Such awareness is two-sided: it enables us to see the metaphoric in what is taken as literal, and...to make-believe that metaphors are literally true” (p. 157). Educators take notice of the use of metaphor and consider the limits of employing a particular metaphor of mind. Most importantly, take note of the presuppositions of knowledge, understanding, learning and assessment of learning, embedded within any metaphor of mind. Otherwise we enter a “prison house” ... and take our trusting students with us. Finally, we might consider Bertrand Russell’s (1928) thoughts about “machines and emotions” before we construct more mechanistic metaphors of mind: “machines are worshipped because they are beautiful and valued because they confer power; they are hated because they are hideous and loathed because they impose slavery (p. 64).

## **Chapter 4. Minding concepts**

### **Introduction**

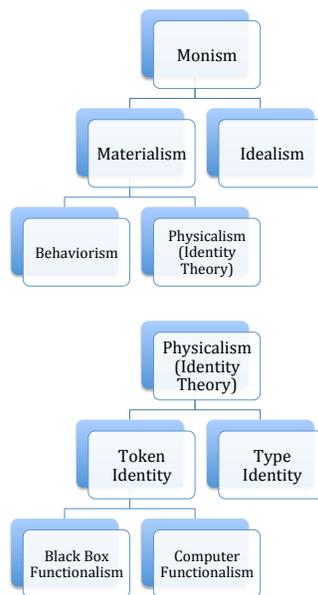
...Partly because we have failed to do the conceptual work, educational theory and practice have ended up with a false view of what it is to be human, and hence a false view of education. We have a mechanistic view of humans, and see their flowering as merely a network of skills, their values in mere terms of utility, often economic, while the intricate imaginative possibilities of the mind are reduced to processes (Robin Barrow, 2010, p. 23).

Robin Barrow is right that failing to do conceptual work has consequences for education and leaves us with a mistaken view of who we are. It is odd that professional development for educators does not routinely include topics from philosophy of mind in order to enrich and encourage dialogue about views of mind, knowledge, education, and assessment. Given this gap, I have initiated dialogue in both personal settings and school settings to probe these important issues. In this chapter, I share and explore teachers' views on mind, and how such views might influence their views of knowledge, their concept of education and the limits of assessment. I begin with a conceptual inquiry, again investigating conflicting perspectives of mind. The inquiry is then followed by an informal discussion of teachers' responses to questions about the concept of mind and their related perspectives on assessment.

Throughout the discussion, scholarship and vocabulary from philosophy of mind is used to expose some of the philosophical problems we face – problems deeply rooted in our confusion about mind. Reference to curriculum is also occasionally made to further investigate an allegiance to a particular and confused view of mind. As noted in

the prior chapters, given the *mind-knowledge-education-assessment* relation, the discussion best begins by addressing the confusion surrounding the concept of mind.

Recalling from Chapter 1 that current views of mind are a product of the historical debates from philosophy of mind, the figure below (as in Chapter 1) outlines the historical development of mind from the perspective of John Searle (2004):



**Figure 8 (1). Family Tree**

As previously noted, educators fall victim to Cartesian error and its subsequent problematic vocabulary, beginning with the terms dualism and monism. To recap, “substance dualism” is the idea that we can divide the world up into two different realms, where the mind and the body are two separate substances: the mental and the physical. Rejection of dualism, spawns monism – the most popular of which is materialism – where the only reality that exists is material and physical. Materialism gives birth to our current mechanistic view of mind, that it is a processor - computational, informational or neural. Remembering this family lineage is crucial to understanding how educators

remain hostages of a specific view of mind embedded in Cartesian dualism. This background motivates the conceptual inquiry, to which I now turn.

## **Conceptual Inquiry**

It is well known that in the course of discussion, reading, writing, or making any kind of statement we become aware of certain pitfalls in the use of language. Some of the more obvious of these are common knowledge, and come under the general heading of ‘clear thinking’: how to avoid fallacies, how to recognize prejudice, and so on...[but] it is more important to stress the pitfalls that occur in more subtle forms...we allow words to guide our thinking, instead of guiding our own thinking consciously and critically. Just as psychoanalysis is intended to free us from domination or bewitchment by our own emotions and feelings of which we are unaware, so the analysis of concepts teaches us to avoid the pitfalls of language which are only dangerous because we are unaware of them (John Wilson, 1963, p. 39).

John Wilson’s call to carefully analyze our concepts is important advice for educators. In his work, *Thinking With Concepts*, Wilson cautions that, “because we are dominated and bewitched by language...[i]nstead of using language, we are in a very real sense used by it” (p. 39). To his point, this section outlines some of the confusion about mind, beginning with a discussion of the difference between the *conceptual* view of mind and the *empirical* view of mind. Again using scholarship from philosophy of mind, primarily the work of P.M.S. Hacker, I draw attention to some particularly fallacious thinking about mind, suggesting that such thinking negatively impacts education. As previously mentioned, the recent publication of *Neuroscience and Education: A Philosophical Appraisal* (2016), particularly the work of Williams and Standish who also use Hacker’s work, shows that philosophers of education are beginning to recognize the

importance of using scholarship from the philosophy of mind to examine and critique educational practices. Despite these important contributions, however, there is still much work to be done. Scholars remain entangled in the Cartesian vocabulary (such as “mind-brain”), and continue to accept the erroneous assumptions from the history of philosophy of mind (such as the mental-physical divide).

### **The concept of mind**

In *Learning Our Concepts*, Megan Laverty (2010) argues that “it is difficult to say what concepts are, and yet everyone recognizes their centrality for human communication and life.” Further, she writes that concepts “enable us to distinguish flowers from trees, have a preference for the colour blue, admire an individual as courageous, and to mature as a parent,” summarizing that “our concepts express the differentiations that matter most to us” (p. 27). Given the number and complexity of concepts in education, educators must make them a priority for study. Further, given that complex concepts in education are also inter-related (mind-knowledge-education-assessment), a careful analysis of the concept of mind, in particular, is required.

Gilbert Ryle (1949) in *The Concept of Mind* argues that mind is not an object or thing, but rather a *concept*. Ryle critiques Descartes’ separation of mind and body as an erroneous “double-life theory” and as a “category mistake”:

The representation of a person as a ghost mysteriously ensconced in a machine derives from this argument...as is true, a person’s thinking, feeling and purposive doing cannot be described solely in the idioms of physics, chemistry and physiology, therefore they must be described in counterpart idioms...the human body is a complex organized unit, so the human mind must be another complex

organized unit, though one made of a different sort of stuff and with a different sort of structure...as the human body, like any other parcel of matter, is a field of causes and effects, so the mind must be another field of causes and effects (p. 8).

Arguing that the mental need not be separated from the physical, Ryle goes on to reject Cartesian dualism, pointing out that there is no reason to believe that thoughts belong to a *mental* category and that actions belong to a separate, *physical* category. Known as the “ghost in the machine” argument, Ryle summarizes that there is not a mind that exists separately inside of a body, and that thoughts and ideas are neither “things” nor do they have a locale that is the mind.

Describing a different theory of mind, Howard Gardner (2008), esteemed psychology professor at Harvard Graduate School of Education and current senior director of Harvard’s *Project Zero*, outlines his view noting that there are five different types of minds. Similar in format to his earlier distinctions of multiple intelligences in *Frames of Mind: The Theory of Multiple Intelligences* (1983), Gardner describes the Disciplined mind, the Synthesizing mind, the Creating mind, the Respectful mind and the Ethical mind in his work *The Five Minds for the Future*. Briefly, the disciplined mind has “genuinely mastered more than one discipline and can integrate them” (p. 18). The synthesizing mind (or the synthesizer) “keep[s] his eyes on the big picture, while making sure that adequate details are secured and arranged in useful ways” (p. 19). The creating mind “take[s] chances, venture[s] into the unknown, risk[s] failure, buoyed by the hope that another break-through may be in the offing” (p. 20). The respectful mind “is cosmopolitan [and] gives others the benefit of doubt, displays initial trust, tries to form links, [and] avoids prejudicial judgments” (p. 21). And the ethical mind recognizes

“rights and responsibilities attendant to each role and... behaves in accordance with the answers that he has forged, even when such behaviors clash with his own self-interest” (p. 21).

Barrow (2004) in *Language and Character*, describes mind in this way:

...the phenomenon of mind is surely indisputable. That is to say, deluded or otherwise, we experience mind in action on a daily basis – we weigh up the options, we remember a promise made yesterday, we wonder whether a prediction will come true, we tell a lie, we make a choice, we are aware of our guilt, we cannot hide our sorrow – and of all this we are conscious. Broadly speaking, what we mean by mind is the capacity to have such and similar experiences (p. 268).

And Daniel Dennett’s (2009) idea of mind is that, “[there isn’t] a form of inner vision; there is no mind’s eye...when you have a pain, it isn’t like having a penny; the pain isn’t a thing that is in there” (p. 75). As previously discussed, philosophers, psychologists, educators and others may have different views of mind, including that it is a concrete *thing*, or that it is an abstract *concept*. That the debate continues as to whether or not mind is a concept, an object, synonymous with brain, embodied or disembodied is unsurprising and is arguably healthy. But for it to continue to be healthy and productive, confusions and unchecked errors in the debate require clarification. Philosophy of mind continues to offer scholarship and a vocabulary to do so.

### **Confusion between the conceptual and the empirical**

Conceptual propositions are different from empirical propositions. While a simple point, the debate about mind is unnecessarily hampered by confusion about this distinction. Clarifying the distinction between the empirical and the conceptual, Hacker

(2014) argues in *Seven Misconceptions About the Mereological Fallacy*, that empirical propositions,

...are, for the most part, bipolar, that is they can be true and can be false. Whether a proposition is true or false depends on what is the case. For example, the proposition 'This rose is red' is true if the rose is, in fact, red. Hence understanding an empirical proposition is to know that if the proposition is true, then things are thus-and-so, and also to know that if it is false, then things are not so (p. 1079).

These types of propositions are different from conceptual propositions, which are,

...not bipolar and do not have the possibility of being true and the possibility of being false. For example the grammatical (also called: conceptual) proposition 'Every rod has a length' is true but cannot be false, for there is no such thing as a rod without a length. Similarly, 'Every human being has a body' cannot be false, for there is no such thing as a human being without a body. One cannot, for conceptual reasons, investigate empirically whether a rod has a length or whether someone has a body (p. 1079).

With respect to the topic of mind, confusion about the distinction between the empirical and the conceptual is exacerbated by the fact that neuroscientists, concerned with matters of *empirical* investigation, are muddled in *conceptual* confusion about what mind *is*.

As Hacker notes about the empirical/conceptual distinction,

...it is misguidedly thought that resolving *conceptual* problems involves finding truths expressed in ordinary language, i.e. the common sense expressed by the man in the street. But the rules investigated through conceptual studies are not studied to highlight *empirical* beliefs. *Conceptual* problems are not *empirical* problems but conceptual ones that arise as the result of misunderstanding or misusing words. These words may be words used in our everyday discourse, but

also the technical words used in science (p. 1080).

Why is this important? If there is confusion about a concept, then the confused, imprecise language used to discuss the concept bleeds into other areas. In the case of mind, if we are confused about the *concept* of mind, then how we talk about mind will also be confused. Such confusion about mind contaminates empirical studies, as well as the *interpretations* of empirical studies: “Neuroscientific research that proceeds from conceptually flawed premises is likely to yield incoherent empirical questions” and, therefore, “...philosophy matters deeply for the proper conduct of neuroscience” (Patterson, 2003). Further and importantly, if *mind* is assumed to be synonymous with *brain* (identity theory) as neuroscientists assume, then there are two significant problems: first, neuroscientists are constrained by Cartesian dualism and its subsequent erroneous vocabulary including monism, materialism and identity theory. Second, the conceptual is confused with the empirical. To the first problem of neuroscientists inheriting Cartesian error, Patterson (2003) notes,

Once the Cartesian paradigm took hold, it fell to neuroscientists to work out its implications at the experimental level. For two generations (from Sherrington to his protégés) modern brain scientists remained fundamentally Cartesian (i.e. they adhered to the Cartesian explanatory framework of the relation of mind to body). The third and current generation of neuroscientists repudiated Cartesian dualism, replacing the mind with the brain as the explanatory locus of human psychological and emotional capacities...but merely replacing the mind with the brain falls short of a repudiation of the structure of the Cartesian explanatory system.

And to the second problem of the resulting conflation of the conceptual and the empirical Hacker (2013) points out that,

...it is mistaken to suppose that Cartesian dualism is refuted by the results of empirical research. Consider the Cartesian assumption that the immaterial mind interacts with the material body. This is not an empirical statement that can be tested, since it is not intelligible to talk about an immaterial substance. A substance is something which we can identify, but there are no criteria of identity for the mind defined as an immaterial substance. We do not know how to identify the mind as an immaterial substance, how to measure this substance, and so forth. And since there are no criteria to identify the mind, it is senseless to say that the mind has causal powers and can, therefore, interfere with physical processes. What kind of empirical evidence can someone provide if he argues for example that the mind causes a voluntary movement? How can we determine that an immaterial substance causes this movement if we cannot identify this substance? (p. 1086).

Hacker summarizes that debates about mind and brain and questions about the distinction between mind and brain are, therefore, "...not an *empirical* problem but a *conceptual* one generated by a picture embedded in our language" (p. 1088). The debate is properly a philosophical debate and "...not a scientific one. It calls for conceptual clarification, not for experimental investigation" (Bennett and Hacker, 2001, p. 511). One cannot conduct experiments as to "...whether brains do or do not think, believe, guess, reason, etc.)... until we are clear about the meanings of these phrases" (p. 511).

### **The mereological fallacy**

With a particular focus on neuroscientists' conceptual confusion about what brains *do*, Hacker describes the "mereological fallacy" where a *part* is falsely equated

with the *whole*. As an introduction to the fallacy, Bennett and Hacker (2002) first reference Francis Crick (1994), Gerald Edelman (1994), and Colin Blackmore (1977), critiquing these neuroscientists' views that the brain thinks, hears, believes and sees. Further, such talk is "linguistic innovation, introduced by neuroscientists, psychologists and cognitive scientists" (p. 511), and there is "simply *no such thing* as the brain's thinking or knowing, seeing or hearing, believing or guessing... these forms of words make no sense" (p. 511). Bennett and Hacker contend that neuroscientists who make *mind* synonymous with brain erroneously assert that the brain has cognitive, perceptual and volitional capacities. Crick (1994), for example, incorrectly asserts that "what you see is not what is really there; it is what your brain believes is there...your brain makes the best interpretation" (Hacker and Bennett, 2001, p. 510). Edelman (1994) incorrectly asserts that the brain can "categorize, discriminate, and recombine the various brain activities occurring in different kinds of global mappings" (p. 510), and Blackmore (1977) incorrectly asserts that "neurons...have intelligence [and] present arguments to the brain based on the specific features that they detect, arguments on which the brain constructs its hypothesis of perception" (p. 510). The reason these assertions are all incorrect is their conceptual confusion. It is not that the claims are *false*, but rather that the claims *do not make any sense*. In particular, the neuroscientists have committed the mereological fallacy.

Citing Wittgenstein (1953) in *Philosophical Investigations*, that "only of a human being and what resembles (behaves like) a living human being can one say: it has sensations; it sees, is blind; hears, is deaf; is conscious or unconscious," Bennett and Hacker (2001) describe the mereological fallacy thus: "the mistake of ascribing to the

constituent parts of an animal, attributes that logically apply only to the whole animal, we shall call ‘*the mereological fallacy*’” (p. 513). This fallacy is distinguished from the *mereological principle*:

...we say that a man gripped the handle, and also that his hand gripped the handle, that he slipped and that his foot slipped. Here there is nothing logically awry. But the psychological predicates apply paradigmatically to the human being (or animal) as a whole, and *not* to the body and its parts...But the range of predicates that are our concern, i.e. those that have been invoked by neuroscientists, psychologists and cognitive scientists in their endeavors to explain human capacities and their exercise, have no literal application to parts of the body; in particular, they have no intelligible application to the brain (p. 513).

Arguing that, “it is not that as a matter of fact brains do not think, hypothesize and decide, see and hear, ask and answer questions,” Bennett and Hacker clarify that “it makes *no sense* to ascribe such predicates *or their negations* to the brain” (p. 512). The brain cannot see but it isn’t blind. It cannot hear but it isn’t deaf. It does not make decisions but it isn’t indecisive. (p. 512). As they summarize, “only a *human being* can intelligibly and literally be said to see or be blind, hear or be deaf” (p. 512).

As to *why* neuroscientists commit the mereological fallacy, Bennett and Hacker offer that they are unthinkingly adhering to a “degenerate form of Cartesianism.”

Specifically,

...the predicates that Cartesianism ascribes to the *mind*, the present generation of neuroscientists apply unreflectively to the *brain* instead...these scientists proceeded to explain human perceptual and cognitive capacities and their exercise by reference to the *brain’s* exercise of *its* cognitive and perceptual capacities (p. 512)

or, as Patterson (2003) summarizes, “merely replacing the mind by the brain leaves intact the misguided Cartesian conception of the relationship between the mind and behavior, merely replacing the ethereal by grey glutinous matter.”

## **The Computational/Neural metaphor of mind and education**

Descartes’s influence continues to be deep and pervasive and...he still casts a long shadow across contemporary cognitive neuroscience. More than four centuries after Descartes’s birth, neuroscientists still labor under one form or another of his world picture, even while claiming to reject it (Bennett and Hacker, 2002, p. 49).

Further stressing the Cartesian hold, Bennett and Hacker (2003) point out that Descartes’ thesis “led to the idea that the mind was separate from the body in all respects...[and] inevitably casts a long shadow over neuroscientific reflection” (p. 26). Because of its reliance on research from contemporary cognitive neuroscience, Descartes also casts a long shadow over education, the effects of which are evidenced in our allegiance to the current view of mind dominating educational practice, curriculum and assessment. Cartesian error and the mereological fallacy, in particular, flood education. This is why there is an urgency to include in our dialogues about education important ideas from philosophy of mind. As Bennett and Hacker write,

It is true that we do, in casual parlance, say that computers remember, that they search their memory, that they calculate, and sometimes, when they take a long time, we jocularly say that they are thinking things over. But this is not a literal application of the terms ‘remember’, ‘calculate’ and ‘think’. Computers are devices designed to fulfil certain functions for us. We can store information in a computer, as we can in a filing cabinet. But filing cabinets cannot remember

anything, and neither can computers (p. 1085).

Applying the earlier discussion of the mereological fallacy, the idea that the brain is some type of processor - neural, informational or computational is simply nonsensical and “it is a misconception to assume that the senses receive ‘unprocessed information’” (p. 1089.)

Further, it is incorrect to assume that the brain *processes* anything:

Of course, we cannot see unless the visual cortex is functioning normally, but we see with our eyes, not with our brain...we cannot remember something unless our hippocampus is functioning normally, but we remember something, not our hippocampus...we cannot walk unless the motor cortex of the brain is functioning normally, but that does not mean that we walk with our brain and that the brain is the organ for locomotion (p. 1089).

With this background of conceptual confusion about mind - the fallacy and the particular erroneous view of mind – there is an obvious interest in investigating teachers’ views on mind. Are teachers aware, for example, of the degree to which a view of mind relates to views of knowledge, education and assessment? Has the conceptual confusion about mind crept into education at the pedagogical level where teachers have signed on to a view of mind as a processor? To what degree has neuroscience influenced teachers’ thinking about mind and brain? These questions and others motivated my interest in discussing with teachers their views on mind. Indeed, it is somewhat ironic to subject a discussion of the conceptual to an empirical inquiry – formal or informal. To this point, what follows is *related* to the conceptual discussion but is not intended to or used to *prove* propositions about the conceptual per se. In short, the inquiry is informal and motivated by a naïve curiosity to see if there is confusion about the concept of mind among teachers. I also concede the irony using the same inherited, erroneous Cartesian

vocabulary to explore its influence and hold on educational discourse, policy and practice.

## **Teachers in (and on) mind**

In this section, I begin with a short summary of the background and context of some of my informal discussions with teachers. To be clear, this is *not* a formal, empirical study. Rather, it is a collection of ideas from casual, engaging conversations with teachers about mind. I conclude the chapter with some final thoughts about how such discussions might inform teacher education, and how empirical research for those interested in doing so might well be conducted in the future to more formally explore teachers' views on mind.

Teacher training programs do not require students to have any course work in philosophy of mind. While philosophy of education is often an elective course in faculties of education, views of mind and the history of mind are not adequately presented, if at all. This is weird, if not remiss, given the connection among the concepts of mind, knowledge, education and assessment, as earlier noted.

Over the last decade, during casual discussions with teachers and students, I have noted a keen interest about views of mind and their relationship to views of knowledge and education. Further, though philosophy of mind is of some interest to philosophers of education, there is little in the academic literature that closely examines different concepts of mind and how they align with or at least frame concepts of knowledge, education and assessment. As such, a conversation must begin among primarily pre-

service teachers but also educators and policy-makers to raise awareness about this important connection.

Citing George Allan, John Bennett (2003) in *Constructing Academic Community: Power, Relationality, Hospitality, and Conversation* notes that "...the internal meaning of a college resides not in its mission or purposes but in its conversation" (p. 59). Further, whether the form of the conversation is casual or formal, "...common to all the forms should be the opportunity genuinely to engage with others" (p. 59). And while such conversations or engagements may take the form of an informal exchange,

...others are potentially transformative – and all can generate new concepts and personal insights. Without conversation as its heart, no institution is a college or university – regardless of its other purposes or activities (p. 59).

Considering this call, I have initiated conversations with teachers using philosophy of mind as an entry point. Probing educators' ideas about mind, such conversations were initiated with various public school teachers from school districts in the Greater Vancouver area of British Columbia, Canada. Discussions involved teachers from elementary and secondary schools, inner city schools and schools from more affluent areas. Some teachers were from smaller schools (400 students; 30 staff members) and others from larger schools (2000 students; 90 staff members). Further demographics of the schools include programs such as fine arts, applied skills, athletics, French immersion and Aboriginal education, encompassing diverse neighborhoods in terms of both culture, language, and socio-economic status.

Sometimes discussions focused on philosophical views such as one's world view and one's view of mind. Other discussions focused on assessment such as distinctions amongst the terms skills, knowledge and understanding; whether the intentions and beliefs of others are observable and measurable; and how personal feelings and experiences may influence assessment of students. What follows is a summary of these informal conversations. Throughout the discussion, vocabulary from the history of philosophy of mind is also used to contextualize the conversations.

### **Discussion of views of world and views of mind**

In dialoguing with teachers about whether the world is *one* or divided into different realms, I took to simplifying the vocabulary from philosophy of mind thus:

- *The world can be described as two separate realms - physical and mental (also referred to as Dualism)*
- *The world can be described as three separate realms - physical, mental and spiritual (referred to as Trialism)*
- *The world can be described as one realm which is entirely physical (Monism of a Physicalist or Materialist flavour)*
- *The world can be described as one realm which is entirely mental (Monism of an Idealist flavour)*
- *The world can be described as one realm which is entirely spiritual (another type of Monism)*
- *The world can be described in some other way*

Interestingly, some of the teachers seem to prefer the *trialist* conception of world - a stronger view than dualism – that the world consists of *three* separate realms: the physical, the mental and the spiritual. What is particularly interesting about teachers who hold this trialist world view are their ideas about mind. As background and review, in philosophy of mind, dualists hold that mind is something *separate* from the body while monists deny separation of mind and body. Further, monists of the materialist kind are also typically identity theorists - the view that mind is either identical with the brain or is a feature of the brain. Arguably, these types of monists generally subscribe to identity theory in order to maintain that there is in fact only *one* substance (the physical) and not *two* (the physical and the mental).

In discussions with teachers about their view of mind and how (if at all) it differs from the brain, I typically contextualized the conversation using the following questions:

- *Is Mind just the brain, where “mind” is simply just another word for brain (Identity Theory/Monism)?*
- *Is Mind something separate from the brain (Dualism)?*
- *Is Mind a feature of the brain (Identity Theory)?*
- *Is Mind something else?*

Some of the teachers prefer identity theory where mind is either a feature of the brain or just another word for the brain. I find this interesting, given the preference for the trialist view of world. That is, it is curious to prefer a trialist view of world but hold a monist view of mind. I expected that a monist view of mind where brain and mind are identical, or mind is just a feature of the brain would line up with a monist view of world - one

physical realm. I did not expect that teachers who hold a monist view of mind might also hold a trialist view of world where world is separated into three separate realms.

Equally curious were discussions with teachers about their views on the mind-body problem. Some prefer the idea that mind and body are “one.” This is again curious. The preference here seems *consistent* with the idea that mind and brain are essentially the same or one, and consistent with a monist world view that the world is one realm. It strikes me as *inconsistent*, however, when teachers who hold that mind and body are one, *also* hold a trialist world view where world is comprised of three separate physical, mental and spiritual realms. Perhaps this can be partially explained by competing interests and/or seemingly incompatible beliefs. In one discussion, for example, a teacher shared that while she “believes science proves that the mind really is just the brain,” she also describes herself as “a spiritual person” who thinks that “science can’t explain things like faith, intuition or love.”

Further conversations about the mind-body problem focused on the distinction between *mental* states and *brain* states. In these conversations, I would typically frame my questions in the following way:

- *Are mental states simply brain states (explicable by neuroscience)?*
- *Are mental states separate from brain states (and not explicable by neuroscience)?*

Some teachers say that mental states are simply brain states and are explained by neuroscience. In one discussion, for example, a teacher commented that “when you say you are mentally thinking about something, you are talking about the brain...mental is

just a reference to the brain so neuroscience can explain that.” While not as strongly, this preference seems to generally support identity theory where mind and brain are identical or mind is just a feature of the brain. As noted earlier, this seems consistent with a monist account of the world, but inconsistent with a dualist world view.

In discussions with teachers about the brain and how the brain *works*, I contextualized the dialogue using the following questions:

- *Is the brain an information processor?*
- *Does the brain function like a computer?*
- *Is the brain both an information processor and functions like a computer?*
- *Neither?*

In these discussions, teachers seem to prefer the idea that the brain is an information processor, or that it is both a processor and functions like a computer. In a particular conversation, the teachers asked, “how else do you explain what the brain does?...it takes in information and then it processes it...isn’t that thinking?” I find this interesting considering my concern that a particular view of mind guides educational thinking and most certainly influences pedagogical theory, practice and assessment. As noted in previous chapters, “processing” language be it neural processing, information processing or just processing, along with its implied corresponding view of mind, is replete throughout North American curriculum documents and assessment practices in elementary, secondary and post-secondary schools. Further, as also earlier noted this particular view of mind leads to a particular view of what counts as knowledge, what

counts as education and what counts as accurate assessment of the extent to which an individual has been educated.

### **Discussions about Assessment**

Views of mind inform assessment practices and assessment practices necessarily focus on that which is observable – behaviour, writing, speaking, drawing, etc.. In short, assessment assumes a *behaviourist* account of mind. As mentioned in prior chapters, behaviorists hold that mind is like a black box and as such is not observable. Behaviour, on the other hand, is observable. Making a crucial move in the history of philosophy of mind, behaviorists resolve that mind really just *is* the behavior of the body and therefore mind or the mental is explicable in terms of observable behavior.

Curious as to what teachers think about the behaviourist view, I contextualized the dialogues about assessment practices by probing whether assessment of what students think, know, learn and understand can be made on the basis of analyzing *behaviour*.

Specifically, I used two statements:

- *What another thinks, believes or desires IS observable by analyzing his/her behaviour*
- *What another thinks, believes or desires IS NOT observable by analyzing his/her behaviour*

In these conversations, teachers equivocate. I find this interesting as it is assumed by our assessment practices that what students learn, know and understand *is* observable by looking at their behaviors. It is assumed that what is “in” students minds can be assessed

by observing, for example, their actions, writing, speaking and performances.

Sometimes these conversations with teachers turned to more specific discussion about whether or not thoughts, beliefs and desires of others are observable. Again, considering how assessment is primarily based on what students write and say, this is an important dialogue to have with teachers. In these types of discussions, I generally used three questions:

- *Is what another thinks, believes or desires observable (based on what another writes or says)?*
- *Is what another thinks, believes or desires observable (but not based on what another writes or says)?*
- *Is what another thinks, believes or desires just NOT observable?*

In these conversations, teachers have different views. Some teachers believe that what another thinks, believes and desires is observable based on writing or speech, while other teachers believe it is not. This is interesting and provokes two questions: First, if we hold that what another thinks, believes and desires *is* observable based on what she writes or says, are we not committed to behaviorism? We would be holding that student *behaviours* (in this case, writing and speaking) tell us what is going on “in” students’ minds. This is significant as it supports the idea that there is a one-to-one correspondence between what a student is thinking, believing or desiring and the student’s behaviour. Or, that what the student thinks, believes and desires just *is* their behaviour.

Second and most curiously, given that assessment practices necessarily rely on observable behaviours, if one holds that another’s thoughts, beliefs and desires are

observable but *by some other means* beyond writing and speaking, what possibly could these other means include? Body language? In one discussion, a teacher noted just that: “You can’t read another person’s mind unless you’re psychic but if you look at their body language, you can tell a lot about what they’re thinking.” Assuming for the moment that it is even possible to observe what another is thinking, believing or desiring, how else could a teacher observe and objectively assess what a student is thinking, believing or desiring if not by the student’s spoken or written words?

As discussed in previous chapters, if the concepts of knowledge and understanding are *not* reduced to observable behaviours or skills, they remain “invisible” to a third person observer and are therefore unassessable. To this point, and given the confusion surrounding the concepts of knowledge and understanding (and their conflation with skills), I have dialogued with teachers about whether or not they see a distinction amongst the terms *skills*, *knowledge* and *understanding*. Generally, teachers say that skills, knowledge and understanding are all different. This is important in light of the reductions we casually make of knowledge and understanding to skills. In related dialogues then, I have conversed with teachers about our ability to assess skills, knowledge and understanding. In these discussions, I contextualize the questions as follows:

- *Can teachers accurately assess skills?*
- *Can teachers accurately assess knowledge?*
- *Can teachers accurately assess understanding?*

The teachers with whom I dialogued generally held that skills and knowledge are different and that they are both assessable. These discussions lead to an important question about knowledge: Even though there is a distinction between knowledge and skills, if knowledge is nonetheless assumed to be assessable, doesn't that necessarily mean it is observable? And if so, how is it observed?

While some teachers say both skills and knowledge can be assessed, there are significant debates as to whether or not understanding is assessable. While some say it is not, others say it is. This provokes the following questions: To what extent have teachers been convinced that the concept of understanding is reducible and observable? If they have been convinced, is it motivated by a need to make understanding assessable?

Because of the importance of understanding or deep learning and its focus in curriculum language in particular, I have had many discussions with teachers about assessing students in this regard. In these conversations, I frame my questions in a quantitative way:

- *Do you think that teachers assess 100% of what a student understands?*
- *Do you think that teachers assess more than three-quarters of what a student understands?*
- *Do you think that teachers assess between half and three-quarters of what a student understands?*
- *Do you think that teachers assess less than half of what a student understands?*

Again, there is usually debate in these conversations but the teachers with whom I spoke generally say they assess about half (or more) of what a student understands. Sometimes the discussions would turn back to a distinction between knowledge and understanding. In one discussion, for example, a teacher commented that, “you can tell when someone knows something by asking them about it but you don’t always know if they understand it...knowledge and understanding are related but knowledge is easier to see.” I find it very interesting that to date, no teacher has told me that they assess 100% of what a student understands.

Wondering about the personal experiences of teachers with respect to the assessment of understanding, the conversation often turned to teachers’ memories of their own experiences in school. In these discussions, for example, some remark that they recall receiving a passing grade in a course despite their self-assessment that they did not understand the course material. One teacher commented, for example, that “I have no idea how I passed that course.” Another teacher, with respect to a science class, said that “I shouldn't have passed...I didn’t understand any of it.” This is striking for a number of reasons. If we self-assess that we do not understand something but a teacher assesses we do, which assessment is correct? Of course it is possible that students are given a passing grade because of a teacher’s perception of student effort, participation or even likeability. The strength of the relationship and the history with the student are also possible explanations. That said, one would expect that a passing grade in a course would equate with a passing level of understanding *of* the course. Let us assume that one is the best assessor of what one does or does not understand. It is troubling then that in recalling

their personal school experiences, some teachers were assessed by *their* teachers to have a passing level of understanding, when their own self-assessment was that they did not.

A teacher's feelings for a student and how such feelings might impact their assessment practices is another topic of interest arising out of these conversations. Challenging and querying the assumption that assessment is *objective*, some teachers say that they are influenced by likeability when they are assessing a student. Despite using the so-called objective rubric tool, some teachers say that likeability or a "gut feeling" precede their check marks on a rubric. In one conversation, for example, a teacher remarked that, "I know right away whether or not I'm going to get along with a student and I'd like to say that it doesn't influence my marking but it does." These types of conversations are most intriguing. Regardless of the push to make assessment practices objective through the use of rubrics, for example, the practices arguably remain subjective. And one cannot escape this subjectivity as practices are employed by and *through* the rich, complex experiences, histories and subjective perceptions of teachers. Further, the push to make assessment practices objective may be grounded in a confused, erroneous assumption that concepts such as knowing and understanding, can be observed and assessed from a third person perspective.

## **Final Thoughts**

Describing a method of conceptual analysis used by the philosophers of education, Paul Hirst and R.S. Peters, Laverly (2010) summarizes that,

Generally speaking, analytic philosophers of education embraced the

task of analyzing central concepts like education, teaching and knowing, confident that their findings would resolve educational problems and improve educational practice and policy (p. 32)

A close analysis of concepts such as mind, knowledge, education and assessment will not *resolve* our educational problems but may very well improve our practice and policy.

Analyzing our concepts and learning to distinguish the conceptual from the empirical, at the very least, will raise awareness of some of our deep assumptions in practice and policy. Informal conversations with teachers, for example, suggest there may be confusion about the concept of mind. There is confusion about what “it” is or is not, “its” relationship to brain, and whether “it” is an abstract concept or a concrete object. At the very least, the dialogues suggest an interest but lack of awareness about the *mind-knowledge-education-assessment* relation. Further, while teachers may lack background in the history of philosophy of mind, they are intellectually curious about it. As noted earlier, the lack of awareness is understandable as teachers are not required to be versed in and in fact may be daunted by vocabulary from philosophy of mind. Monism, dualism, identity theory, materialism, not to mention the density of scholarship in the fields of cognitive and neuroscience may be intimidating even off-putting. But if such ideas were made more accessible and more “palatable” to teachers, how might such study impact their views of mind? Knowledge? Education? Assessment? It might be an idea to further investigate teachers’ views on mind, perhaps in a more formal, rigorous and empirical study. The connection among the ideas of mind, knowledge, education and assessment is a fairly simple and non-controversial connection, but if teachers are not asked to consider it, how is the negligence unintentional though it may be influencing pedagogical

practice? More importantly, how is the negligence impacting students?

## **Chapter 5. Minding the mush**

### **Introduction**

Robin Barrow (2010) remarks that, “educational discourse in general and perhaps debate in teacher-education in particular has to a considerable extent reverted to the ‘mush’ ... albeit ‘mush’ of a far more complex and sophisticated texture than in the past” (p. 11). Matters of mind in education are no exception. How is it that they too have reverted to the mush, albeit mush of a complex and sophisticated kind? As discussed in this dissertation, the preferred view of mind for educators is one where mind is made visible, and this is understandable. To assess students, teachers must assume that a student’s writing, speech, demonstrations and performances as observed through projects and assignments, are representations of thinking, knowing and understanding. The assumption of this one-to-one correspondence where invisible concepts are supposedly made visible by reducing them, however, pulls educators into the mush.

In this chapter, I examine the concepts of invisibility and visibility as they relate to assessment practices and our current view of mind in education. I also examine how these concepts are discussed and used in some of the literature. As the current trends in assessment practices significantly draw from scholarly work at Harvard’s Graduate School of Education, my examination of the literature will focus here and on their various assessment projects. This closer examination is required as it reveals our continued commitment to a certain view of mind, and that the view align with a scientific picture of the world – a view where mind is and remains visible so that is assessable.

I begin the examination with a theoretical discussion of the concepts of visibility and invisibility in Plato's stories of *The Ring of Gyges*, *The Allegory of the Cave* and *The Divided Line*. The use of these stories should not be construed as an endorsement (or lack of endorsement) of Plato's view of mind. Rather, they are used narrowly to argue how educators, committed to a particular view of mind, are assessing the least important aspects of education - skills and task completion - because they are *visible*. Ironically, the most important aspects of education - deep understanding, wisdom and enlightenment - are *invisible* rendering them un-assessable.

Next, I examine how the concepts of invisibility and visibility are discussed in literature about education, specifically exploring how they are discussed in relation to learning, knowing, understanding and assessment. Ludwig Wittgenstein's (1953) analogy of a thread is instructive here: "in spinning a thread we twist fibre on fibre. And the strength of the thread does not reside in the fact that some one fibre runs through its whole length, but in the overlapping of many fibres" (p. 32). My interest is to highlight how the concepts of invisibility and visibility are additional fibres in the thread - a thread we might term the "reduction project." As discussed generally in the dissertation, a key focus of the reduction project is to reduce knowledge and understanding to behaviors, performances and skills, all of which are visible and therefore assessable. Given this focus, and because of their relevance to the concepts of invisibility and visibility, to the reduction project, and to BC's new curriculum, I examine the history and background of Harvard Graduate School of Education's *Making Learning Visible* project and *Project Zero*. These projects, their histories, and related initiatives - including Skill Theory,

Lectica, and the eco-system metaphor of mind - currently inform the *mind-knowledge-education-assessment* relation.

Following this analysis, and as introduced in Chapters 2 and 3, I add to the argument that assessment rubrics arise from a particular view of mind where mind is reduced and supposedly made visible. Specifically, since they are tied to Bloom's (1956) *Taxonomy of Learning*, assessment rubrics allow for the illusions of visibility, measurability and assess-ability. I offer some examples of how such rubrics are used at the post-secondary level and how they are becoming increasingly (and unsurprisingly) popular. Their popularity is obvious with a simple Google search. Packaged, make-your-own-rubric sites are abundant where concepts such as thinking, knowing and understanding are casually reduced to a pop up/drop down menu of surface features. In some cases, rubric sites are created and endorsed by respected scholars and universities, and in other cases, a flourishing, corporate business. As part of this discussion of assessment rubrics and their relationship to the concepts of invisibility and visibility, I again use vocabulary from John Searle's work on consciousness. I introduce his descriptions of epistemic and ontological subjectivity and objectivity, in part, to rescue and enlighten us with respect to our current view of mind in education.

I conclude with some thoughts as to how educators might ascend from the mush and negotiate a release from their Cartesian captor. Returning to John Searle's call to abandon erroneous assumptions and vocabulary from the history of mind, I summarize how as hostages of Descartes, educators might be liberated or as Wittgenstein (1953) suggests, how we might as a fly get ourselves out of the bottle.

## **Family Matters**

As our commitment to a certain view of mind strengthens, where mind is made visible, the reduction project in education intensifies. There is a strong push to reduce the conceptual to a skill or a behavior, to make learning *visible* so it can be assessed, and to rubric every step to ensure assessment is objective. The following “family tree” reminders, along with background reminders from earlier chapters, are required here to proceed with discussing invisibility and visibility as they relate to the *mind-knowledge-education-assessment* relation:

### **Roots of the Family Tree**

- 1) The computational view of mind arises from functionalism and both are really just versions of materialism, where the mental is reduced to the physical.
- 2) Dualism is the “parent” of mind (mental) and of body (physical).
- 3) The body (physical monism) is the parent of materialism (who is therefore a grandchild of dualism).
- 4) Materialism is the parent of behaviorism and identity theory (who are therefore siblings, and also great-grandchildren of dualism).
- 5) Identity theory is the parent of functionalism and computationalism (who are therefore siblings, and also nieces of behaviorism).
- 6) Computationalism is therefore a grandchild of materialism, a great-grandchild of monism, and a great-great grandchild of dualism.

## Background

- 1) Assessment practices, I contend, move between computationalism (where mind is a processor - computational, informational or neural), and its “ancestor” that is behaviorism (where mind or the mental is reducible to behaviors, actions and performances). This movement is always rooted, however, in the greater family tree particularly the grandparent that is materialism and the great-great grandparent that is dualism.
- 2) If the only reality that exists is material or physical, and if mental states have a real existence, they must be reducible to (be *nothing but*) physical states of some kind (Searle, 2004, p. 34).
- 3) With the materialist’s move of reducing the mental that is unobservable to the physical that is observable, the mental then “becomes” visible.
- 4) It is assumed in assessment practices that thinking is a skill. That is, since thinking is not measurable (because it is not observable) it is improperly reduced to a skill, which *is* measurable because it is observable.
- 5) It is assumed in assessment practices that learning is behavior. That is, since learning is not measurable (because it is not observable) it is improperly reduced to *nothing but* behaviors such as actions, performances and demonstrations - all of which *are* measurable because they are observable.
- 6) It is assumed in assessment practices that knowing and understanding *just are* completing tasks and displaying skills. That is, since neither is measurable (because they are not observable) knowing and understanding are improperly reduced to tasks and skills, which *are* measurable because they are observable.

Given the moves and assumptions listed above, supposedly the mental can be *seen* and is therefore measurable and assessable. With these family tree and background reminders then, I now turn to the analysis of the concepts of visibility and invisibility.

## **On Invisibility**

...[how should we address] issues that always seem to have the power to bewilder us...how are we to talk about the value of goodness or justice (or education)...[and] resist the spell that science seems to cast over epistemology...[we should not be] interested in the search for stable, eternally sound foundations and certainty and may very well regard that search as part of the problem: something from which we need to be released by a kind of therapy (Smith, 2014, p. 35).

Educators may require therapy and Richard Smith offers timely advice for those who believe education is in crisis. As noted in Chapter 2, Andy Davis (2008) in *The Limits of Educational Assessment* stresses that, “questions arise about the motivation of those who wish to hold firmly to their perspectives and to resist the therapy. How, if at all, can they be persuaded to relinquish their grip?” (p. 1). It makes sense that educators assess students’ observable performances and actions (because they *can*) and do not assess students’ understanding or enlightenment (because they *cannot*). As discussed, constrained by government-imposed curriculum language where learning goals, prescribed learning outcomes, evidence and proof reign supreme, educators are asked to focus on that which is *visible* and *measurable*: behaviors. Logically, educators are not expected to focus on the *invisible* or *immeasurable*. It turns out, however, that immeasurability and invisibility are not tolerated. How they become part of a reduction project will be discussed at length later in the chapter.

Given the constraints of curriculum language, well-intentioned educators may be hired to simply observe and document ... and their jobs depend on it. How did we find ourselves in this crisis? We might begin by looking at our culture where, generally speaking, the *looks* or *appearances* of things are overvalued. Perhaps we have become a culture that privileges the visible, oppressing the invisible. To some extent, this is reasonable for it is difficult to appreciate and understand that which cannot be seen. Educational policy-makers require that assessment practices be grounded in visible, measurable outcomes, as how can educators assess or measure the invisible? While reasonable, privileging the visible and oppressing the invisible has consequences. For example, if x cannot be observed, then x cannot be measured or evaluated. And if x cannot be measured or evaluated, then maybe x is not important, worthwhile or even “real.” Such thinking leads to unintended consequences in education where the substantive albeit invisible aspects of education are sacrificed: understanding and enlightenment, both of which are invisible and immeasurable but surely important and worthwhile.

The extent to which we privilege the visible is apparent in educational literature, particularly literature focused on the importance of language when framing learning outcomes. Though noted and discussed in prior chapters, it is important to briefly summarize the language restrictions and the call thus far to focus on observable, measurable behaviors, actions and performances:

- Learning outcomes must be built around a *verb* so that they are measurable and observable.

- Words such as *knowledge* and *understanding* have to be avoided because you can't measure them.
- Documenting student learning must align with observable behaviors.
- Documenting student learning is easier if you first specify what you want students to *do*, and use *verbs* that involve specific *actions*.
- Use of action words (verbs) create alignment with the *thinking skills* of knowledge, comprehension, application, analysis, synthesis and evaluation outlined in Bloom (1956).

### **Visibility and invisibility – minding philosophy in education**

With these language restrictions in mind, it is worthwhile to analyze how the ideas of visibility and invisibility are used in historical and philosophical dialogues about education. John Locke's thoughts on education, for example, are generally understood in the context of his empiricist beliefs. As an empiricist, Locke suggests that we rely on that which is *observable* through our sensory experiences to interpret and know our world. Further, humans learn, develop and are educated through such experiences. As earlier referenced in Chapter 1, arguing that mind is like a blank slate, Locke asserts that one's *tabula rasa* is filled with sensory experiences from an observable world. His empiricist view in general and view that the "workings" of mind are visible in particular, imply significant assumptions – assumptions that some educational policy-makers hold today. Perhaps this partially explains why ideas like wisdom and enlightenment are sidelined and observable actions and performances are embedded in current assessment requirements. But Locke also writes, that "in truth the ideas and images in men's minds

are the *invisible* powers that constantly govern them.” Contemporary empiricists may concur with Locke about mind’s invisible powers, but that to which we should attend in education are *visible* performances and actions. This is consistent with the behaviorist’s account where mind is a black box, is invisible, and therefore *just is* actions, performances or behaviors. To be clear, it is not that there is anything wrong with attending to the visible, but rather that it is incomplete. And to address this shortcoming, assessment language is used to reduce (and supposedly make visible) the irreducible and the invisible.

As previously discussed, policy-makers assume a particular view of mind and in so doing assume mind is visible. Assessment policies align with this view requiring and expecting teachers to observe, measure and assess. But exactly *what* are teachers assessing? What follows is a discussion of Plato’s work as it relates to assessment practices. The description of his divided line, in particular, is used to explicate the significance of the invisible and the visible, and to demonstrate how our current view of mind is paradoxically shifting us away from the most wonderful aspects of education. If nothing else, the examination will provide an opportunity for some much-needed therapy.

### **Plato and some revealing therapy**

The idea of invisibility in Plato’s *Republic* provides educators with another entry point to discuss the *mind-knowledge-education-assessment* relation. Plato’s stories of the *Ring of Gyges* and the *Allegory of The Cave* along with his description of *the divided line* offer educators a creative perspective on *what* we are assessing. Further, the stories illustrate that because assessment is logically limited to the visible, the most substantive

parts of education - understanding and enlightenment - are *left out* given their invisibility and therefore immeasurability.

### *The Ring of Gyges*

Plato's *Ring of Gyges* story illuminates these points about assessment. In the dialogue, Plato proposes a thought experiment in which we consider how we would behave if we possessed a ring that made us invisible. Glaucon's assertion that no one would be so incorruptible that he could, "bring himself to keep away from other people's property and not touch it, when he could with impunity take whatever he wanted...kill anyone, free all those he wished"<sup>13</sup> leads him to conclude that man only *appears* just or virtuous so that he may protect his reputation and avoid punishment. No one possesses "an iron nature" and were the just man and the unjust man both given invisibility rings, Glaucon argues that their "actions would be in no way different from those of the other and they would both follow the same path."<sup>14</sup> Suppose that Glaucon is wrong, however, and that there *are* incorruptible men who would never steal even if invisible. Perhaps such men believe that stealing (in and of itself) is wrong. Suppose further that such a just man and an unjust man (who *would* steal if he were invisible) both refrain from stealing while at market. In this case, the just man does not steal because he believes that stealing is wrong (in and of itself). The unjust man does not steal because he wishes to *appear* virtuous, protect his reputation and avoid punishment. While inwardly, each man's thoughts and motives are clearly different, outwardly their behavior is identical. They both *appear* just. From the perspective of an observer then, there is a sense of inaccessibility, immeasurability and invisibility with respect to the private understandings

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<sup>13</sup> See Plato, *Republic*, Book II, 360b, Trans. G.M.A. Grube, Indianapolis: Hackett Publishing Co. Inc., 1974.

<sup>14</sup> See Plato, Book II, 360c.

of the just and the unjust man. This is analogous to the educator's sense of inaccessibility, immeasurability and invisibility with respect to a student's private understandings. The analogy is not perfectly parallel but there are important insights as to what educators can "see" and therefore assess. Certainly educators can imagine a student who "outwardly" *appears* to understand the theme of a novel or a concept in history, as evidenced in a test mark or a verbal response to a question in class, when in fact the student does not understand. Similarly, it may *appear* that a student does not understand the theme of a novel or a concept in history, as evidenced in a test mark or a verbal response to a question in class, when in fact the student does understand. Educators would agree that assessment tools are limited to measuring and assessing the visible, such as what a student can *do* or if a student can complete a particular task. But would educators agree that they are incapable of measuring and assessing understanding? Not because they are incompetent or are using inefficient tools, but because understanding is invisible and therefore immeasurable. As earlier stated, actions and performances *are* measurable and assessable because they are visible. But an immeasurable and un-assessable concept such as understanding, which is so because of "its" invisibility, is arguably a more significant and influential aspect of a student's education.

### *Allegory of the Cave*

Like the *Ring of Gyges* story, Plato's *Allegory of the Cave* and related description of *the divided line* offer educators opportunities to reflect on: current assessment practices, how embedded within such practices is a particular view of mind, and how confusion persists (as discussed in Chapter 3) between the conceptual and the empirical.

In his allegory, Plato describes human beings as prisoners in a cave who, tied in chains since birth, watch shadows on a cave wall mistakenly believing the shadows to be reality. One prisoner eventually breaks free from his chains, discovering reality outside of the cave and “seeing the light.” Wanting to similarly enlighten his fellow prisoners, he returns to the cave to explain his experience and inform the prisoners that while he has “seen the truth,” they see mere shadows of the truth. Predictably, his fellow prisoners are not persuaded.

The prisoners’ dark cave is ironically the world of sight or the world of the *visible*, while the journey out of the cave to seek enlightenment and understanding is a journey toward the intellectual world of the *invisible*. As Plato writes,

...the prison-house is the world of sight, the light of the fire is the sun, and you will not misapprehend me if you interpret the journey upwards to be the ascent of the soul into the intellectual world according to my poor belief, which, at your desire, I have expressed, whether rightly or wrongly God knows. But, whether true or false, my opinion is that in the world of knowledge the idea of good appears last of all, and is seen only with an effort; and, when seen, is also inferred to be the universal author of all things beautiful and right, parent of light and of the lord of light in this visible world, and the immediate source of reason and truth in the intellectual; and that this is the power upon which he who would act rationally either in public or private life must have his eye fixed.<sup>15</sup>

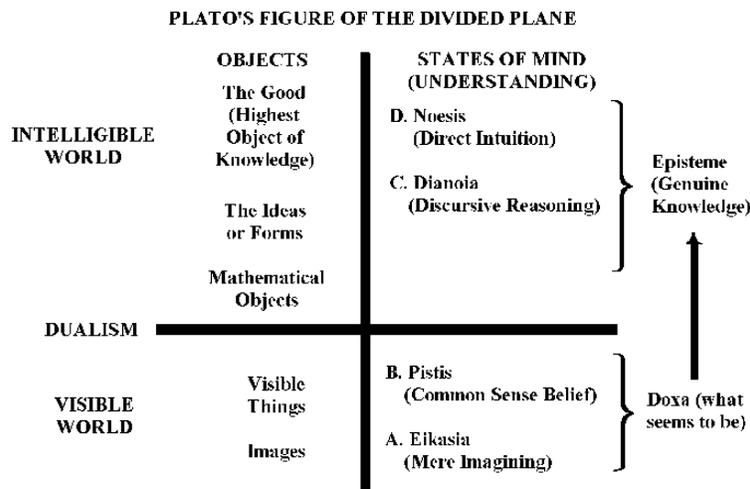
“Seeing” in the invisible realm outside of the cave is *conceptual*. But “seeing” in the visible realm within the cave is *empirical*. Considering these different notions of seeing, it is significant that Plato follows this dialogue with the description of *the divided line*, a related discussion to the *Allegory of the Cave*.

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<sup>15</sup> See Plato, *Republic*, Book VII, 517b.

*The Divided Line*

Like his *Allegory of the Cave*, Plato’s description of *the divided line* is an interesting entry point to dialogue about assessment practices. It is important to re-mention that the use of Plato here is not an endorsement (or lack of endorsement) of his view of mind, epistemology or metaphysics. Rather, his distinction of the visible and the invisible are narrowly used to discuss the irreducibility of the concepts of knowledge and understanding. Consider the following diagram (Figure 8), where Plato places *noesis* (understanding) and *dianoia* (reasoning) highest on the line, while *pistis* (opinion) and *eikasia* (images) are lowest on the line. The movement along the divided line mirrors the prisoner’s ascent out of the cave. That is, we all begin as prisoners engaged by what we see with our eyes, “shadowy images” on the cave wall (*eikasia*). These shadowy images gradually frame our opinions of reality (*pistis*).



**Figure 9. Plato’s Figure of the Divided Plane**

In a cliché sense, we are all prisoners of our own beliefs. Eventually, however, we break free of our self-imprisonment and develop reason (*dianoia*) ultimately moving out of the darkness of our cave toward enlightenment and understanding (*noesis*). Understanding,

in this sense, might be described as “seeing” *conceptually*. But importantly, it is beyond the seeing with one’s eyes (*eikasia*), experienced *empirically* whilst in the cave.

The journey out of the cave also mirrors the ideal journey of a student toward enlightenment and understanding. Peter Losin (1996) in *Education and Plato’s Parable of the Cave* describes how this journey is central to the idea of education and the role of the educator. As he writes,

...the upward journey out of the cave into daylight is the soul's ascent to the intelligible realm. The educator's task is a matter of turning souls around...Such reorienting of souls has affective or desiderative dimensions as well as cognitive ones. Early education... wakes up the spirited part of the child's nature and enables it to work together with reason, imbuing the soul with that order and grace necessary for later cognitive development (p. 49).

Losin further notes that “the cave is the region accessible to sight or perception [empirical]; the world outside and above the cave is the intelligible region accessible not to perception but to reasoning [conceptual]” (p. 50). For a student, the realm of the visible or sensible are the lowest forms of “mental” experiences, occurring deep within the cave. Such perceptions nonetheless shape a student’s opinions of reality. Significantly, reason and understanding, the highest forms of mental experiences, are conceptual and beyond the visible or the sensible, occurring in the realm of the *invisible*.

### **Implications for assessment practices**

Plato’s descriptions of *the divided line* and the journey out of the cave help educators acknowledge the consequences of privileging the “shadowy images” of the visible. Perceptions take place deep within the cave in the realm of the visible. But

perceptions can be faulty and superficial. Implicit in our assessment practices is a particular view of mind, and with our tools, we measure *only* visible activities, superficial though they may be. Further, as assessment tools necessarily focus on the visible, educators assess only a student's lowest "cave experiences" or *pistis*: their perceptions and opinions of "shadowy images." It is significant that a student's highest experiences - enlightenment and understanding (*noesis*) - are conceptual, invisible and therefore immeasurable, for it means that the most important aspects of education are un-assessable.

Does government-imposed curriculum language ultimately force educators to keep students in the realms of *pistis* and *eikasia*? As stated, it is not so much that assessment of the visible is wrong but that assessment is necessarily limited to the empirical and is therefore incomplete. In addition, there is a risk of oppression where mistakenly, the invisible and immeasurable are rendered unimportant. To this point, Heessoon Bai's (2003) comments are instructive: "[the] so-called hard sciences that deal with the observable and measurable became socially privileged. The core reason for the privilege here is the ability to control and manipulate" (p. 22). Given that they are situated in the realm of the invisible and therefore the immeasurable, ideas such as *dianoia* and *noesis* do not enjoy social privilege, and are unlikely to reform assessment practices any time soon. An empirical vocabulary including *proof*, *accountability*, *evidence*, *data* and *support* seems a requirement of any worthwhile idea of education and any tool of educational assessment. Given the influence that these privileged paradigms and their accompanying methods have on education, government-imposed assessment practices privilege the visible (such as actions and performances) and oppress the

invisible, such as understanding and enlightenment. In short, that which is conceptual and invisible cannot logically be observed or measured. That which is empirical and visible *can*. For a view of mind to have empirical respectability then, mind (and all of “its” *contents*) must be measurable and assessable. How can this be achieved? Specifically, how can the invisible, immeasurable and un-assessable be made visible, measurable and assessable? Mush, otherwise known as a reduction project.

### **Reviewing causal and ontological reductions**

As discussed in Chapter 2, John Searle’s descriptions of causal and ontological reductions are relevant background to the examination that follows. A *causal reduction* is where we say that “As are causally reducible to Bs if the behavior of As is *entirely causally explained* by the behavior of Bs, and As have no causal powers *in addition* to the powers of Bs” (p. 83). Something like solidity, as an example, can be *causally reduced* to just molecular behavior because what causes a thing to be solid are really just molecules behaving in a certain way. The features of solid objects, such as impenetrability, are *causally* explained by the molecular behavior.

An *ontological reduction* of something is when we say that As are *nothing but* Bs. In other words, we carve off the surface features and simply re-define the “thing” in terms of those surface features. Using consciousness as an example, Searle notes that you can do a causal reduction and say that consciousness is *caused* by neuronal firings in the brain, but you cannot do an ontological reduction and say that consciousness is *nothing but* neuronal firings in the brain. For in so doing, you would carve off the essential part of consciousness, or its first-person ontology.

In education, understanding (deep learning) and knowing are improperly *causally reduced* to skills and at other times to behaviors such as actions, performances and demonstrations. They are also *ontologically reduced* so that they are *nothing but* skills or behaviors. As previously noted, this reduction makes it seem as though understanding and knowing can be observed, measured and assessed, when in fact, both are ultimately subjected to an eliminative reduction. The reduction project is necessary, though, to maintain a certain *physical*, “scientifically-legitimate” view of mind. Why is this a problem? As discussed throughout this dissertation, there is a *mind-knowledge-education-assessment* relation. Any view of mind, including mind as an information processor, computational processor, neural processor or ecosystem, is necessarily a hostage of its Cartesian ancestry. As such, embedded within *any* view of mind, is unsettled metaphysical and epistemological debate that is the history of mind. This debate then drips into our conceptions of knowledge, education and assessment, at present creating the need for a reduction project.

### **Making learning visible – the ongoing reduction project**

The Faculty of Education at Simon Fraser University awarded a \$50,000 *Cmolik Prize for the Enhancement of Public Education in British Columbia* to the Surrey School District for its project, *Making Learning Visible: A 360° Transformation*. The Cmolik prize is,

...awarded annually...[to] recognize recipients who have developed and implemented an invention, innovation, concept, process or procedure that enhances educational practice in the K-12 public school system in BC. The award was endowed to the Faculty of Education, Simon Fraser University by Russ and

Ellen Cmolik. The prize arises from their passion for education and inspirations gained by their visits to schools around the world. It encourages practitioners, researchers, administrators, and policy makers to enrich teaching and learning, particularly to stimulate a desire to learn and to develop life skills to become productive and responsible members of our community.<sup>16</sup>

That Surrey's *Making Learning Visible* project received the award provokes the following questions:

- Why does learning have to be visible and what (or who) is threatened if it turns out that learning isn't visible?
- Are learning, knowing and understanding generally accepted as empirical "things" rather than concepts?
- Is there agreement as to what *counts* as learning, knowing and understanding?
- Most importantly, are any of "them" (learning, knowing and understanding) *in fact* visible?

### **Making invisible *thinking* visible**

In *Making Thinking Visible*, Professor David Perkins at Harvard's Graduate School of Education, suggests that we have to "get past the problem of invisibility" and that "part of the challenge is that the very invisibility of thinking is itself invisible. We don't notice how easily thinking can stay out of sight, because we are used to it being that way."<sup>17</sup> In arguing that we have to get past the problem of invisibility, Perkins, a founding member of *Project Zero*, and whose background is in mathematics and artificial

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<sup>16</sup> See <https://www.sfu.ca/education/cmolik-prize.html>

<sup>17</sup> See David Perkins, *Making Thinking Visible* at <http://education.jhu.edu/PD/newhorizons/strategies/topics/thinking-skills/visible>

intelligence, presumes that we *can*. Specifically, he presumes that we can in fact make invisible thinking visible, and presumes that invisibility is in fact a problem. But what if thinking (and knowing, understanding and perhaps even education) is just that ... invisible, conceptual, irreducible and *out of sight*? If Perkins's point is that thinking, knowing and understanding are visible by their *effects* including performances, actions and demonstrated skills, then his point supports a *behaviorist* account of mind and supports a reduction of these complex concepts. These problems will be discussed in more depth later in the chapter.

Perkins also writes, "thinking is pretty much invisible" and that "mostly, thinking happens under the hood, within the marvelous engine of our mind-brain" (p. 1). This is important as he equates mind with brain (identity theory). He goes on to describe "simple ways" that thinking is made visible and offers advice to teachers:

One of the simplest is for teachers to use the language of thinking...consider terms like hypothesis, reason, evidence, possibility, imagination, perspective ... routine use of such words in a natural intuitive way helps students catch on to the nuances of thinking and thoughtfulness that such terms represent (p. 2).

Citing Ritchhart's (2002) *Intellectual character: What it is, why it matters, and how to get it*, Perkins suggests that an additional method to "make thinking visible is to surface the many opportunities for thinking during subject matter learning. Thinking *routines* are helpful tools in this process." He describes thinking routines as "simple patterns of thinking that can be used over and over again and folded easily into learning in the subject areas" and that they "have a public nature, so that they make thinking visible, and students quickly get used to them" (p. 2). Encouraging that "once one begins a campaign

to make thinking visible, the opportunities seem to be endless” (p. 5), Perkins focuses on what making thinking visible should *look like* in a class setting. As he describes:

The notion of visible thinking helps to make concrete what such a classroom should look like and provides a kind of compass to point the way. At any moment, we can ask, "Is thinking visible here? Are students explaining things to one another? Are students offering creative ideas? Are they, and I, using the language of thinking? Is there a pro-con list on the blackboard? Is there a brainstorm about alternative plans on the wall? Are students debating interpretations?" (p. 5).

### **Making invisible understanding visible**

Also wanting to make the concept of understanding visible, in *Putting Understanding Up Front*,<sup>18</sup> Perkins and Blythe (1994) argue that they “firmly believe that understanding deserves special attention.” The reason it does is because “what use are students to make of the history or mathematics they have learned unless they have understood it?” and that “among the many agendas of education, surely understanding must rank far up on the short list of high priorities.” Noting that “at the heart of teaching for understanding lies a very basic question: What is understanding?” Perkins and Blythe offer their definition by first briefly discussing knowledge: “We all have a reasonable conception of what knowing is. When a student knows something, the student can bring it forth upon demand—tell us the knowledge or demonstrate the skill.” I disagree with Perkins here that we all have a reasonable conception of what knowing is. As discussed in Chapter 1, matters of epistemology are hardly agreed upon and settled. What

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<sup>18</sup> See David Perkins and Tina Blythe (1994), *Putting Understanding Up Front*, February 1994 | Volume 51 | Number 5 Teaching for Understanding Pages 4-7

knowledge is, what counts as knowing, and how one determines what another knows are all matters of significant disagreement within the broader field of epistemology. Further and noteworthy is that in Perkins's view, knowing *becomes* visible through speech (telling) or through the demonstration of a skill. Understanding, at first, seems different from knowing, as the writers argue that, "understanding is a subtler matter, which goes beyond knowing." But then they then describe their view of understanding as,

...consonant with both common sense and a number of sources in contemporary cognitive science. Our "performance perspective," in brief, says that understanding is a matter of being able to do a variety of thought-demanding things with a topic—like explaining, finding evidence and examples, generalizing, applying, analogizing, and representing the topic in a new way.

It is significant that they describe understanding as *being able to do* something – a description that is central to British Columbia's new curriculum model of "Know-Do-Understand," discussed later in the chapter. Summarizing understanding, the authors describe "it" as, "being able to carry out a variety of performances that show one's understanding of a topic and, at the same time, advance it." Further, they term the performances "understanding performances or performances of understanding." They caution, however, that not "every student performance is an understanding performance," and that understanding performances must "take students beyond what they already know." Finally, also linking understanding, or "a performance" to developing curriculum and learning goals, Perkins and Blythe write, "while some teachers often engage students in understanding performances, their curriculum may lack the focus provided by thinking in terms of carefully selected generative topics and goals for understanding."

## Making assumptions visible

Such assumptions about learning, understanding and mind require closer analysis. First, as noted in Perkins's *Making Learning Visible* paper, he subtly equates mind with brain – a move that turns the concept of mind into something concrete and empirical. He also assumes that learning, or what goes on “under the hood” (in a student's head) can be made visible. With respect to his paper on understanding, of note is that understanding is ontologically reduced and *just is* a performance. Significantly, once reduced to a performance, understanding supposedly becomes visible. Why are Perkins's views and work so important to any discussion of the *mind-knowledge-education-assessment* relation? To answer this question, I examine the connection between Perkins' work and Harvard Graduate School of Education's *Project Zero*, including the project's history, psychological roots, and implicit commitment to a particular views of mind. I then discuss how this connection is relevant to the assumptions we hold with respect to our current view of mind in education. While I acknowledge the rich backgrounds and scholarly contributions of *Project Zero*'s many respected professors, a rigorous examination of the project (and its related initiatives such as *Making Learning Visible* and *Lectica*) is appropriate, given its influence on our current assumptions about mind and subsequent assumptions of knowledge, education and assessment. *Project Zero*'s reach, for example, is far – so far that it is referenced in and frames new curriculum in the province of British Columbia. To this point, it is worthwhile to consider the following assumptions in BC's “transformative curriculum” in the context of what follows in the examination:

Throughout the learning process, teachers and students intentionally gather

evidence to inform teaching and learning. The teacher creates rich tasks, engages with the students in setting criteria, establishes exemplars, and leverages the power of questioning to allow for ongoing, timely, descriptive feedback to the student. This process assists students in moving forward toward their learning targets and goals... Teachers document student learning over time using collections of student work and demonstrations to create a profile... Students, teachers, and parents, use criteria and rubrics to determine the standards met and the level of performance attained. Through multiple means and varied strategies, the students' learning is made visible, and their successes celebrated. In this process, new learning goals and targets are established and ways to support the students learning described.<sup>19</sup>

Finally, given *Project Zero's* connection to *Dynamic Skill Theory* (developed by Harvard professor, Kurt Fischer), this theory will also be discussed here as it connects to the *mind-knowledge-education-assessment* relation. Specifically, Skill Theory furthers the reduction project, allowing for invisible concepts (such as knowledge and understanding) to be reduced to behaviors and skills, and forms the basis of the eco-system metaphor of mind. Hopefully this closer examination will motivate educators to notice the men behind the curtain.

#### *Project Zero – assuming visibility*

In *Making Learning Visible Through Pedagogical Documentation*, Carol Anne Wien (2013) citing *Project Zero* describes how,

...a leap in understanding occurs when educators grasp that documentation is more than a record or retelling of an experience that shows what children said and did... Documentation offers insight into children's thinking, feeling, and worldview. When we make their ideas and working theories about the world

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<sup>19</sup> See BC Ministry of Education's new curriculum, <https://curriculum.gov.bc.ca/redesigning-assessment>

visible to others, we may then study those views with others to broaden our perspectives and our responsiveness (p. 2).

Wien adds that “we discover what we did not yet know how to see” and that “pedagogical documentation inserts a new phase of thinking and wondering together between the act of observation and the act of planning a response” (p. 1). Similarly, in *Visible Learning, Visible Learners*, Mardell, Rivard and Krechevsky (2012) cite *Project Zero* noting that, “making learning visible entails documenting the learning process as a way to demonstrate, shape, and deepen learning...[it] makes learning public and enables children and adults to react and build on earlier learning (p. 12). The authors further comment that,

...making learning and learners visible strengthens the learning group, informs curriculum, and helps teachers understand the teaching and learning process more deeply. Making learning visible allows assessment of the learning processes as well as products, helping teachers connect curriculum to individual children and their needs (p. 19).

The BC Ministry of Education (2015) also cites *Project Zero* as one of the key sources for its transformative curriculum. Justifying the high quality of their research for the new curriculum, the Ministry writes:

Trends in national and international jurisdictions have been reviewed and authorities on curriculum and assessment design have been consulted. Transformational work has been informed by a wide variety of researchers, including Sir Ken Robinson, Lynn Erickson, Grant Wiggins, and organizations such as Harvard (Project Zero).

So what is *Project Zero* and how is it connected to the *Making Learning Visible* project

(MLV)? On their MLV website,<sup>20</sup> at Harvard Graduate School of Education, we learn that the project,

*Making Learning Visible* has a goal to create and sustain powerful cultures of learning in classrooms and across schools that nurture individual and group learning. Though the project focuses on using documentation as a central pillar of group learning, MLV is ultimately a project about democracy. By learning in groups, we also learn about the cultures and values of others. By seeing how these unique perspectives influence the learning process, we gain a greater understanding of what we learn as well as each other.

We also learn that MLV is a project that is part of Harvard's larger project that is *Project Zero*<sup>21</sup>:

Founded by the philosopher Nelson Goodman at the Harvard Graduate School of Education in 1967 to study and improve education in the arts...Goodman believed that arts learning should be studied as a serious cognitive activity, but that 'zero' had yet been firmly established about the field; hence, the project was given its name...Professors David Perkins and Howard Gardner...continue their active involvement with Project Zero by serving on its steering committee, participating in conferences, and through their own research projects. Project Zero ...[is] expanding to include investigations into the nature of intelligence, understanding, thinking, creativity, cross-disciplinary and cross-cultural thinking, and ethics.

#### *History of Project Zero – assuming psychological perspectives*

In the early 70s, when Nelson Goodman retired, David Perkins and Howard Gardner took over direction of the project. During this time, *Project Zero* “focused their attention principally on empirical work in the area of cognitive psychology” since there

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<sup>20</sup> See *Making Learning Visible* website at Harvard Graduate School of Education, <http://www.pz.harvard.edu/projects/making-learning-visible>

<sup>21</sup> See *Project Zero* website at Harvard Graduate School of Education <http://www.pz.harvard.edu>

“was an increased desire...to look at issues like problem solving, critical thinking, and brain organization.” *Project Zero* adopted a “cognitive view...involving mental processes fully as powerful and subtle as those used in the sciences and public policy.” *Project Zero* was said to reflect “the Cognitive Revolution of the time--countering both the behaviorist past of psychology and the overly romantic view of the arts.” Later, however, with the U.S. Department of Education’s report, *A Nation at Risk*, *Project Zero* makes an important shift in the 80s: “by 1990 PZ had a very different feeling than it had in 1970 (philosophical and conceptual) or in 1980 (when primarily psychological research was funded by governmental grants).” Multiple Intelligences took center stage, and the focus became critical thinking skills and creative thinking skills. With this focus, *Project Zero* begins to examine questions such as “what do thinking and learning look like...what is understanding and how does it develop?” These inquiries currently continue with “more recent work that emphasizes a performative view of understanding, a dispositional perspective on thinking and a focus on visible thinking.”

*Project Zero*’s current focus is on assessment. Cautioning that assessment should *not* focus on a particular product, the priority is “a focus on documenting a combination of learning processes and products as a way to inform pedagogical decisions.” This helps educators in “making the classroom environment rich with the documents of thinking processes, and making their own thinking visible.” This history of *Project Zero* and its particular interest in making thinking visible is important background to understand the reduction project. Learning is made visible by reducing the conceptual to the empirical - behaviors such as actions, performances and demonstrations. Similarly, knowing, thinking and understanding are made visible through a reduction to skills or behaviors.

These points will be discussed in more depth later in the chapter.

*Project Zero and Skill Theory – assuming thinking is a skill*

In their work, *The Development of Dynamic Skill Theory*, Harvard professors Zheng Yan and Kurt Fischer (founding president of the *International Mind, Brain, and Education Society*, founding editor of the journal *Mind, Brain, and Education* and currently focusing his work on educational neuroscience)<sup>22</sup> introduce *skill theory* as similar to “examining a car that is moving on the road or studying a river that is running on the riverbed.” Fischer and Yan hold that, “skill theory is designed to unpack but not dissect human development...to understand the development of human mind and action in all their complexity” (p. 2). They go on to describe the historical roots of skill theory:

In the late 1960s and the early 1970s, the intellectual environment in the behavioral sciences in American universities was mixed: Piaget’s structuralism (constructivism) was starting to become a mainstream theoretical school, while classical behaviorism remained strong in the training of new developmental psychologists. Both behaviorism and constructivism had fundamental influence on the initial construction of dynamic skill theory (p. 4).

Further, during this period, renowned psychologists at Harvard University including Jerome Bruner, Erik Erikson, Lawrence Kohlberg and B.F. Skinner, “made deep marks on development of the theory” (p. 4). Of significance in skill theory’s history is its psychological roots (most interestingly, its behaviorist roots) and that the theory originates with Fischer’s doctoral work from 1970. The “dissertation entitled, *The*

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<sup>22</sup> See paper, *The Development of Dynamic Skill Theory*, Kurt Fischer & Zheng Yan, Harvard University Graduate School of Education <http://www.gse.harvard.edu/~ddl/articlesCopy/SkillTheoryDevelopKFFinalCorr.1201.pdf>

*Structure and Development of Sensory Motor Actions*...followed the behavioral tradition of conducting a series of strictly defined empirical studies of animal learning in a laboratory” (p. 5). Noteworthy in the dissertation is Fischer’s description and definition of *skill*:

...skill is a concept that is context-based and task-specific. I...had extensive knowledge of behaviorist concepts such as context, task, and stimulus control...Focusing on analyzing specific activities of individual people or animals...we could find only one concept that directly included both person and environment in the same entity – skill. A person can have a skill for building with a particular set of toy blocks, telling a story about one’s family, cooperating with mother and father at the dinner table, operating Grandmother’s sewing machine...or doing analysis of variance with a computer statistics program (p. 6).

This characterization of skill is central to the reduction project. Curiously, in other works, Fischer et al critique what they term traditional, standardized methods of assessment as too reductionist given that learning, knowing and understanding are non-reducible (Whitehead, 2005, p. 105). As discussed later, however, Fischer et al employ a reduction in their own forms of assessment by reducing thinking, knowing and understanding to skills or to behaviors (actions, performances and demonstrations). Fischer’s skill theory and ideas about assessment also become the basis for the ecosystem metaphor, as discussed in the next section, later developed by Zachary Stein.

*Skill Theory and its offspring: assuming the ecosystem metaphor of mind*

In Chapter 4, Zachary Stein’s (2014) work was discussed with particular attention to his ecosystem metaphor of mind. Another scholar from Harvard Graduate School of Education and a member of *Project Zero*, Stein supports the idea that mind can be

measured. Measurement is made possible through his metaphor where thinking is reduced to the visible. As referenced earlier,

...imagine that each different skill and idea you have is like a living organism...All of your skills and ideas are co-evolving, sometimes joining together to create higher-order skills, and sometimes differentiating into sub-skills as they are refined relative to environmental niches. Your skills and ideas also compete for energy and exercise, as growing one set of skills, like playing violin, takes up the time and energy that would be needed to grow a different set of skills, such as doing algebra... you are an ever-changing, context sensitive, ecosystem in process, with no central tendency or summary statistic. You may have highly evolved skills in some contexts, and primitive ones in others.

Equally noteworthy, in his dissertation *Tipping the scales: social justice and educational measurement*, Stein (2014) attributes the development of his thesis and metaphor to his teachers and the organization, Lectica Inc., the relevance of which is discussed later in this section. As Stein notes, Lectica Inc. is “the brainchild of Theo Dawson, another of my truly amazing teachers,” and Dawson’s “impact on my thinking has been so significant that she might reasonably be listed as a co-author of this work.” Why is this important? As noted in Chapter 3, Zachary Stein supports a particular metaphor of mind. Mention of Stein is important here as he is considered a leading scholar in educational thought. Significantly, his ecosystem metaphor is borne out of Piaget’s psychology and Fischer’s skill theory. As Stein himself writes:

A better metaphor (and the one I had intuitively built while growing up) can be traced to the great Swiss psychologist and epistemologist, Jean Piaget. Piaget argued that the mind is best understood as an evolving organism—living, growing, and self-regulating in a metabolic relationship to its environment. More

recently, a group of Neo-Piagetians, headed by Harvard's Dr. Kurt Fischer, has begun talking about the mind as an ecosystem.

Stein develops the ecosystem metaphor then noting "multiple measurements in a variety of places across a variety of time scales" is more authentic and a more just measurement of learning than traditional, standardized testing. As he says of linking this metaphor of mind to assessment:

As all this sunk in, I partnered with Kurt Fischer and Dr. Theo Dawson to build a non-profit dedicated to reforming standardized testing infrastructures, based on the new science of learning, and the new and better metaphors for the mind it implies. Lectica, Inc. is poised to supplant traditional forms of standardized testing and potentially usher in a new status quo in which each student can be viewed as a unique and evolving ecosystem of skills and ideas...part of securing a more just future for all students requires changing the way we think about the nature of the mind and how to measure it.

As referenced earlier in this dissertation, Stein cautions that one ought to "mind the metaphors you use to talk and think about the nature of the mind. They have the power to change lives, for good or ill." Indeed.

*Lectica, Inc. – assuming assessment of the invisible*

Developing the ecosystem metaphor of mind, Stein, along with other members of *Project Zero* including Gardner, Fischer and Perkins also develop complementary assessment practices in their business, Lectica Inc.. This organization is self-described as "leading an assessment revolution" and, as noted above, "poised to supplant traditional forms of standardized testing and potentially usher in a new status quo in which each

student can be viewed as a unique and evolving ecosystem of skills and ideas.”<sup>23</sup> As background, Lectica’s website describes how,

...founders have spent the last 18 years developing a set of learning tools that will transform educational testing. Our approach combines the learning sciences, the art of teaching, and richly diagnostic measurement. The result is a new kind of assessment infrastructure, one that supports the development of learners and educators while fostering effective teaching and mentoring practices.

These learning tools are their online “Lecta Tests” - a type of assessment that, “targets a specific set of skills and concepts, such as those involved in managerial decision-making, ethical reasoning, mindfulness, and self-understanding.” As an example, they note how “managerial decision-making assessment examines skills like decision-making process, contextual reasoning, and perspective taking and seeking.” Further, “every assessment is accompanied by rich diagnostics and learning suggestions.” Citing Fischer et al’s work, Dawson and Stein (2011) in *Virtuous Cycles of Learning*<sup>24</sup> describe the creation and importance of this latest assessment tool, a particular type of Lecta test, called the DiscoTest<sup>25</sup>:

At the core of the DiscoTest initiative are a growing number of subject specific, research-based, embedded, formative, and diagnostic assessments, all of which are standardized to Fischer's Skill Scale (Fischer, 1980; Fischer & Bidell, 2006) through the use of the Lectical Assessment System (Dawson, 2010; Dawson Tunik, 2004).

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<sup>23</sup> See <https://www.lectica.org>

<sup>24</sup> See Theo Dawson and Zachary Stein (2011) *Virtuous Cycles of Learning: Redesigning Testing During the Digital Revolution* (p. 1-26), originally presented at Ettore Majorana Center for Scientific Culture, Erice (Sicily), Italy, as part of the International School on Mind, Brain, and Education

<sup>25</sup> See Dawson and Stein’s reference in *Virtuous Cycles of Learning* ‘in latin, disco means to learn and now serves in English as the root for such words as discourse and discovery’ (p. 13)

They give an impressive history and discussion of this assessment tool, noting its revolutionary ability to “provide real time developmentally appropriate feedback to students...[and] systems level profiles of learning for administrators, and unprecedented micro and macro developmental data for researchers.” This “new science of learning,” including Discotests and the elaborate, algorithmic giant that is the Lectical Assessment System, assumes learning is empirical, observable, measurable and therefore assessable. It is important, therefore, to notice the *mind-knowledge-education-assessment* relation here. Embedded within the assessment assumptions of Discotests and Lectica is a particular view of mind where mind is a visible ecosystem. And the ecosystem view of mind leads to a particular view of knowledge – that “it” (knowledge) is skills or behaviors. This view of knowledge ultimately determines assessment practices where learning, knowing and understanding are reduced to behaviors or to skills. Behaviors and skills can be observed using rubrics - rubrics that give the impression that the entire assessment process is objective and scientific. These points are obvious in the following excerpts from descriptions of “Discotests” and Lectical assessment tools. The cited examples referenced below are used specifically to demonstrate and stress 1) the complexity and problems with a view of mind; 2) how a particular view of mind carries historical baggage and error; and 3) how any view of mind leads to the use of a specific vocabulary, with respect to what gets to count as learning, knowledge, understanding and assessment:

We [Lectica, Inc.] view learning as a kind of virtuous cycle...a process that is deeply biological...this view can be placed under the banner of constructivism...theorists in this tradition have broadened the research horizons of constructivism into neuroscience, computer science and the field of Mind

(Dawson and Stein, 2011, p. 9).

Cognitive and behavioral learning scientists, evolutionary psychologists and neuroscientists have repeatedly rediscovered this most basic mechanism of learning...More recently neuroscientists have observed that neurons in the neo-cortex act in cohorts where repeated stimulation of the network in a variety of contexts fine tunes the emergence of specific patterns...we argue that whether viewing the human learning from the perspective of neurons or behavior, success depends on engaging in a virtuous cycle (p. 10).

...the [assessment] process begins by selecting subject area specific concepts and skills...using methods from cognitive developmental psychology (p. 14).

Both knowledge and cognitive skills develop through a series of hierarchically organized levels or stages...development within a level manifests as an increasingly elaborate repertoire of knowledge and skills (p. 14).

Assessment involves creating a common scale along which student performances, learning sequences, rubrics and learning resources are all aligned...We call this process rational reconstruction...rubric construction...requires identifying clear evidence of conceptual learning sequences and describing how specific concepts develop over time (p. 16).

Of particular interest in the Lectical Assessment System are the assumptions made about assessment. The term *rational reconstruction*, for example, is curious suggesting that the capacity to reason can simply be reduced to performances and actions and assessed using an appropriately aligned rubric. Further, while there is an implicit acknowledgement that abstract concepts are different than concrete, empirical “things,” the researchers use rubrics to reduce the conceptual to the empirical by turning concepts into performances and actions. Notably, however, the assumption that the conceptual *can* be reduced to the empirical is unexamined and unquestioned.

## **Reduce and Rubric: making the conceptual empirical and the invisible visible**

Making the invisible visible in education is supposedly achieved through the use of the assessment rubric. In Chapter 2, I introduced and discussed the reducibility project in the context of specific ministry language used in BC's new curriculum. The push to use rubrics as a primary assessment tool, in particular, was noted. Considering this background, along with discussion in the current chapter, I now summarize the use of rubrics, their necessity for the "success" of a reduction project, and their key role in the *mind-knowledge-education-assessment* relation.

### **Skillifying education - the reach of a view of mind**

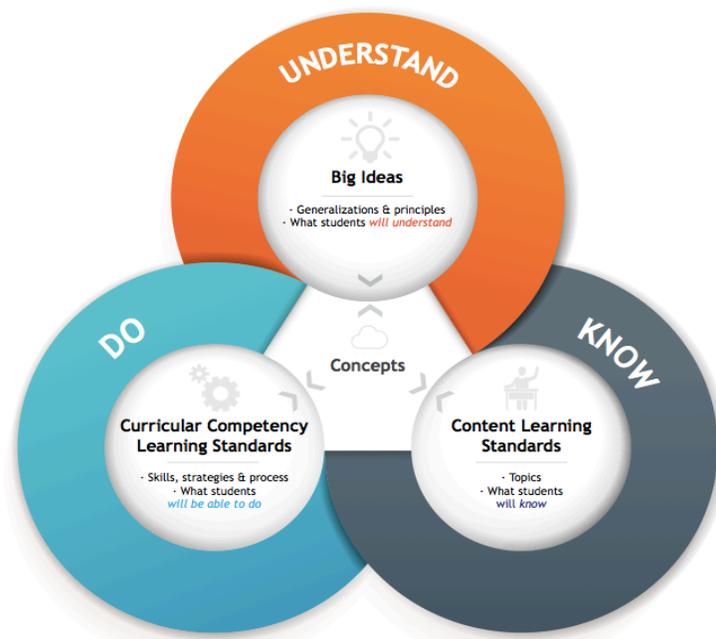
The ecosystem metaphor of mind, the development of Skill Theory, the *Making Learning Visible* project, *Project Zero*, and the historical and psychological roots of each, demonstrate the depth and scope of scholarly work that psychologists Fischer, Perkins, Gardner and Stein have contributed to education. These contributions also demonstrate the pervasiveness and reach of their work. The pervasiveness and reach, in particular, are significant as their metaphor of mind where mind is an ecosystem, leaves us with a "bushel of problems." To summarize, the ecosystem metaphor:

- is rooted in (and mostly resembles) the computational metaphor of mind to which it is supposedly in opposition
- has historical roots in behaviorism and cognitive psychology both of which have physicalist, monist roots
- reduces mind to the physical, making mind identical to brain

- reduces the conceptual to the empirical
- makes thinking, knowing and understanding reducible to behavior or to skills
- is grounded in skill theory (itself rooted in a psychological view of mind)

*Tentacles*

This metaphor of mind and these scholars’ work are foundational to our provincial curriculum in British Columbia. At the beginning of the chapter, I noted that BC’s new curriculum references *Project Zero*. The Ministry’s (2015) “Know-Do-Understand” model of learning in the new curriculum (See Figure 9) resembles Project Zero’s *Making Learning Visible* project and assumes their view of mind.



**Figure 10. Know-Do-Understand**

The British Columbia Ministry writes of their Know-Do-Understand curriculum model that:

All areas of learning are based on a Know-Do-Understand model to support a

concept-based competency-driven approach to learning. Three elements, the Content (Know), Curricular Competencies (Do), and Big Ideas (Understand) all work together to support deeper learning...All areas of learning have been redesigned using this model.

School districts have already implemented the Know-Do-Understand model in curriculum design and assessment expectations (see Figure 10). Notice, too, the structure, language and specific reference to “making learning visible” in Delta School District’s template for teachers:

UNDERSTAND DO KNOW	What curriculum will be addressed? Big Ideas _____ Curricular Competencies _____ Core Competencies _____ Content _____	What will count as evidence (success criteria) of understanding? How will this criteria be communicated to or created with students?
		What Essential or Driving Question will frame the learning?
What thinking habits, skills or strategies will help students develop understanding? How will you help uncover and support student thinking?		What FORMATIVE ASSESSMENT strategies will you use to evaluate student learning and adjust your teaching? Where will students have the opportunity to share their understanding in order to receive feedback, revise and improve?

Source: Delta School District 2

SCAFFOLDING LEARNING FOR STUDENT SUCCESS

What are possible ways students might become engaged or curious about this task? <ul style="list-style-type: none"> <li>• Where does the topic 'live' in the world? Who are the current people working in this field?</li> <li>• Why would someone care about this topic? What do you find interesting?</li> <li>• What might students find interesting, controversial or shocking?</li> <li>• How might the curriculum be tuned into a problem, a puzzle, or a decision to be made?</li> <li>• Where might students have the opportunity to predict, design, solve, test and/or improve their own ideas, theories, solutions or creations?</li> <li>• How might there be an authentic audience or purpose for the task?</li> <li>• How will you introduce the task and 'hook' the students?</li> </ul>	What opportunities are there for developing literacy or numeracy skills or integrating Aboriginal Perspectives?	How will the learning be made accessible for ALL students to succeed? (Universal Design, Differentiated Instruction, learning supports, multimodal resources, etc.)
	How will you provide opportunities for student voice and choice?	

MAKING LEARNING VISIBLE

How might the PROCESS of learning be documented and valued?	How will student thinking and understanding be shared and improved by others? Is there a possible audience for students to share their learning with?	How will you design opportunities for students to reflect on their learning?
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Source: Delta School District 2015

**Figure 11. Making Learning Visible**

As discussed in Chapter 2, despite the newness of the curriculum, embedded within the language is an old behaviorist and functionalist view of mind. Learning and knowing, for

example, are often used interchangeably, and are reduced to skills or *competencies* so that learning is supposedly observable. After closer analysis, however, core competencies just turn out to be a list of skills, descriptors or behaviors. The thinking competency, for example, is described as “specific thinking skills as well as habits of mind and metacognitive awareness.” Reductions are made so that if you *can*, or if you are *able*, then you must *know*. Ontological reductions are made where the knowing competency is *nothing but* an outlined set of behaviors, checklists or completion of various stages. Contradictorily, the British Columbia Ministry writes that assessment is “tied to learning *not behaviors*” but then goes on to describe the assessment of competencies as sets of behaviors, habits of mind and performances. Reducing knowing supposedly makes “it” observable and assessable. To review, in order to justify assessment practices, so-called objective rubrics are created and employed using the method of “if *this*, then *that*.” If there are xs, ys and zs in the student’s assignment and if I can check these items off on a rubric checklist, then the student has learned and knows.

Understanding (deep learning) is no exception and easily becomes part of the reduction project, as earlier noted, with Perkins’s description of “understanding performances.” Reducing understanding or deep learning to behaviors seems increasingly acceptable as evidenced, for example, in Professor Welmer’s (2012) work *Deep Learning vs. Surface Learning: Getting Students To Understand the Difference*.<sup>26</sup> Suggesting how “sometimes our understanding of deep learning isn’t all that deep” Welmer makes a list for teachers and in so doing, reduces understanding to performances or behaviors.

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<sup>26</sup>See Welmer (2012), *Deep Learning vs. Surface Learning: Getting Students to Understand the Difference*

<http://www.facultyfocus.com/articles/teaching-professor-blog/deep-learning-vs-surface-learning-getting-students-to-understand-the-difference/>

Qualifying that “lists that are this behaviorally focused do oversimplify complex processes like deep learning,” she argues that “they are still enormously helpful at making clear what deep learning might look like when you try to do it.” The following are some of her examples. What Welmer terms *cognitively passive learning behaviors (surface learning approaches)* include “I came to class; I reviewed my class notes; I made index cards; I highlighted the text.” What she terms *cognitively active learning behaviors (deep learning approaches or understanding)* include “I wrote my own study questions; I tried to figure out the answer before looking it up; I closed my notes and tested how much I remembered; I broke down complex processes step-by-step.”

*Some final words about the reduction rubric relation*

The significance of the rubric as a tool of reduction - a necessary tool to keep the current view of mind on life support - cannot be overstated. Further, given the influences of the *Making Learning Visible* project, *Project Zero* and *Lectica*, it is unsurprising that rubrics are increasingly becoming a requirement of university course outlines and assignments. In some cases, universities have created an entire “how-to” website to assist professors and teaching assistants in the construction of rubrics. Consider the following two examples of many, one from the University of Colorado, Denver (see Figure 11) and the other from University of California, Berkeley (see Figure 12), as evidence of the trend:

## What is a rubric?

### Rubrics: As easy as apple pie!

Here's an example of a rubric for an apple pie. "Below Expectations," "Meets Expectations" and "Above Expectations" are the rating scale indicators of recipe, apple filling and crust criteria. The indicators are filled in with descriptors of each level of quality.

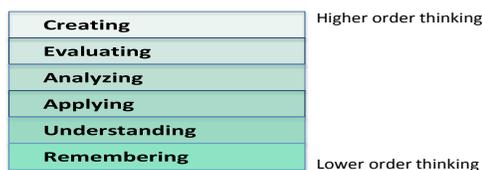
#### Rubric for Apple Pie

	Below Expectations	Meets Expectations	Above Expectations
Recipe Followed Correctly	Recipe has not been followed correctly and the pie does not have the correct proportion of sugar, spices and crust	The recipe has been mostly followed correctly with approximately the correct proportion of sugar, spices and crust	The recipe has been followed correctly and the pie has the correct proportion of sugar, spices and crust
Apple Filling	The apples for the filling were not cut and prepared correctly	The apples for the filling were mostly cut and prepared correctly	The apples for the filling were all cut and prepared correctly
Crust	Top and bottom crusts are not light and flaky	Top and bottom crusts are mostly light and flaky	Top and bottom crusts are very light and flaky
Pie Baked Evenly	Pie is not baked evenly throughout and does not have an even-colored golden brown crust	Pie is baked mostly evenly throughout and the crust has a mostly even-colored golden brown crust	Pie is baked evenly throughout with an even-colored golden brown crust

Figure 12. Creating a rubric

### Taxonomy of Learning Objectives: Explain what You Want Students to Do

#### Cognitive Processes



Students often have trouble with the language of an assignment because it does not tell what kind of intellectual work the assignment calls for. Students may simply summarize (show what they understand), when you want to see them analyze or apply something. The intellectual task can be meaningfully distinguished using verbs supplied by Bloom's Revised Taxonomy of Educational Objectives in the Cognitive Domain.

See Anderson, L. W. and David R. Krathwohl, D. R., et al., eds. *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. Boston: Allyn & Bacon, 2001.

#### Definitions and Verbs: Bloom's Taxonomy (Revised)

##### Creating

Generating new ideas, systems, syntheses, products, or perspectives  
Designing, constructing, planning, formulating, producing, inventing, composing

##### Evaluating

Articulating a rationale for a decision or course of action  
Checking, critiquing, experimenting, judging, assessing, appraising

##### Analyzing

Distinguishing among parts of something to explore functions and relationships  
Comparing, organizing, breaking down, interrogating, finding the elements

##### Applying

Using information learned in one situation in a different situation  
Implementing, carrying out, categorizing, using, executing, applying (e.g., a paradigm or concept)

##### Understanding

Explaining ideas or concepts  
Interpreting, summarizing, paraphrasing, classifying, explaining

##### Remembering

Recalling information  
Recognizing, listing, describing, retrieving, naming, finding, matching

GSI Teaching & Resource Center | Graduate Division | UC Berkeley

### Figure 13. Taxonomy of Learning Objectives

Notice that Berkeley's instructions for rubrics are again tied to Bloom's (1956)

*Taxonomy of Learning*. This is typical of both public school and university requirements, as earlier discussed, and is important for the reduction project to be successful.

Everything *must* be reduced to a behavior (performance, action or demonstration) or to a skill – a higher ordered skill, lower ordered skill, learning skill, thinking skill,

understanding skill, creative skill or critical-thinking skill. Rubrics have become such a booming business that there are several on-line businesses creating and selling them.

“Rubistar” is one of many examples where learning, knowing and understanding are mashed together into various performances, actions and behaviors, and inserted into

efficient, user-friendly, formulaic menus. How is it possible that complex concepts from epistemology end up simplified and reduced such that they fit into a generic pop-down

menu on Rubistar? Vocabulary from philosophy of mind may again provide us with some much-needed clarification.

## **Epistemic and Ontological subjectivity and objectivity**

John Searle's distinctions of epistemic subjectivity and objectivity and ontological subjectivity and objectivity provide another interesting entry point to discuss problems in education. In particular, Searle's distinctions help us examine our assessment practices, as they relate to knowledge and understanding. In the context of his description of consciousness, Searle distinguishes between epistemic and ontological subjectivity and objectivity. These distinctions are not intended to reify the concepts of knowledge and understanding but rather show the significance and error of their continued reduction in education.

### **Epistemic objectivity and epistemic subjectivity**

To use Searle's (2004) example, that I know Van Gough was born March 30, 1853 is *epistemically objective* in that it can be empirically settled and is not a matter of opinion. That I know Van Gough is a better painter than Picasso is *epistemically subjective*. It is a matter of opinion and it is not something that can be empirically settled. Again using Searle's examples, mountains, rivers and tectonic plates exist and are *ontologically objective*. They exist regardless of someone's opinion about them and their existence is something that can be empirically settled.

## Ontological objectivity and ontological subjectivity

Pains, tickles and itches, Searle suggests, exist and are *ontologically subjective*. They exist in so far as I experience them and are a first person experience. But, as Searle stresses, it doesn't follow that we can't have an *epistemically objective* study of the *ontologically subjective* (pains, tickles and itches). I go to the doctor, for example, because I have a pain in my leg. The doctor conducts tests, does research, reads medical journals and uses scientific principles to do an *epistemically objective* analysis of pain. The fact that my first person experience of pain is *ontologically subjective* to which the doctor does not have access does not preclude the doctor from conducting her *epistemically objective* study of pain in general.

Consciousness, Searle argues, has a first person *subjective ontology* or what it is *like* to be in a particular conscious state. This is irreducible but that doesn't prevent us from having an *epistemically objective* study of consciousness, as any anesthesiologist will tell you. But, and this is key, you cannot have an *epistemically objective* study of the *content* of another's conscious state. Why? You do not have access to the state, objectively or otherwise. You cannot study the depth, richness and qualitative aspects of someone else's conscious state. The first person "content" is irreducible and inaccessible. A crucial point to remember here is that what can be *epistemically objectively* studied is empirical.

Using consciousness (and the vocabulary to describe it) as an analogy for assessment is instructive to educators. A student's deep learning or understanding properly belongs in the *epistemically subjective* category and as such, is not a matter to be

empirically settled. One could also argue that deep learning is *ontologically subjective* and is irreducible. Obviously, the subjective and the irreducible are not observable. If, however, understanding were erroneously reduced, say, to a performance so that it is observable, then understanding can be moved from the *epistemically subjective* category in to the *epistemically objective* category. It can also be moved from the *ontologically subjective* category in to the *ontologically objective* category. For the reduction project to be successful in education, these moves (erroneous and improper as they are) need to be made. Assessment practices are justified if they are scientifically and objectively employed. And, for assessment practices to be so, *what* is assessed - in this case knowledge and understanding – need to be observable. Since they cannot be empirically observed, knowledge and understanding must necessarily be reduced to behaviors (actions, demonstrations and performances) or to thinking *skills*. In other words, knowledge and understanding *just are* behaviors. From where do these behaviors come? The mind, immaterial as it is, is not an option unless mind *just is* brain and therefore physical. Alternatively, mind could be given “material” status through a metaphor. Either of these options will do.

## **Conclusions and Recommendations**

When all is said and done people do not associate education with such things as health, wealth, fame, popularity, charm, happiness, esoteric skills, or particular proficiency. They do not have to be part of some power-conspiracy or even confined to 21<sup>st</sup> century Western society to see that ‘she’s obese, she must be uneducated’ or ‘how happy she is, she must be well-educated’ are silly remarks. Everybody who thinks about it recognises that education is about developing the kind of mind or understanding one admires. What kind of understanding is to be

admired will of course partly reflect our current understanding (of understanding amongst other things) and our values, but that does not invalidate the point that education is about developing worthwhile understanding. Yet while we all acknowledge this when we think about it, we live with policies and practices...that by and large indeed actually militate against this ideal (Barrow, 2010, p. 23).

As Robin Barrow suggests, educators live with policies and practices that militate against the ideal in education. Sometimes, however, our policies and practices are the result of our *own* unexamined assumptions and confusion, with which we do not have to live. Assumptions can be examined, confusion can be untangled, and clarity opens up possibilities for change.

### **Re-thinking getting real and getting ideal**

This dissertation examines the *mind-knowledge-education-assessment* relation, in part, to draw attention *to* the relation, but also to the assumptions and lack of clarity we maintain with respect to each of the concepts *in* the relation. Further, the dissertation is an urgent call to accept mind's primacy – an acceptance that will actually encourage the deep examination of assumptions necessary to gain a clearer understanding of the relation. Given the relationship among the concepts of mind, knowledge, education and assessment, educators must pay closer attention to our current view of mind and how an erroneous reduction of complex, abstract concepts ensues *because of* a commitment to a particular view of mind. As such, the following recommendations are offered:

- 1) Teacher education programs could include course work in philosophy of mind, including a rigorous examination of the problematic history and confused

- vocabulary associated *with* mind; an examination of metaphors *of* mind; and an examination of the *mind-knowledge-education-assessment* relation.
- 2) Professional development, in-services and workshops that focus on the *mind-knowledge-education-assessment* relation, including a specific examination of its connection to curriculum and assessment language, could be developed and offered to teachers by school districts.
  - 3) Educators might examine their co-dependent relationship with psychologist, Benjamin Bloom's Taxonomy and re-think the taxonomy's role in education.
  - 4) Educators might re-think mind, knowledge and understanding as *concepts*, all of which are the subject of deep, controversial, ongoing epistemological and metaphysical debate.
  - 5) Educators might re-think *what* we are assessing in education (task completion and in some subjects skill competency) and acknowledge that we are *not* assessing knowledge, understanding or "deep learning."
  - 6) Educators might consider that concepts such as knowledge and understanding are irreducible and invisible, and that we improperly reduce "them" to skills and behaviors because we are expected to assess them.
  - 7) Educators might consider how our current view of mind in education is steeped in behaviorism, cognitivism and neuroscience, and examine the consequences of such a view with respect to the *mind-knowledge-education-assessment* relation.
  - 8) Educators might examine how psychology and neuroscience are privileged disciplines in education and closely examine the consequences of their reign. We could investigate, for example, how privileging the discipline of *philosophy* in

education might initiate a pivot where education becomes a conceptual “endeavor” rather than an empirical one.

To consider these recommendations is to “do” philosophy. As philosopher Galen Strawson (2006) argues, “the object of philosophy is not just to state the truth in a domain where matters are often so very difficult, but to make it shine out” (p. 200). In education, we are in dire need of a paradigm shift<sup>27</sup> from the disciplines of psychology and science to philosophy, not only to pull us from the mush (albeit mush of a complex and sophisticated texture), but also to make our challenges *shine out*. To make this shift and to implement the recommendations also requires us to become more mindful of our language.

### **Words matter**

Peter Hacker (2014) suggests that “conceptual frameworks are constituted by the expressions we use, the words we use to talk about and interpret data we have before us, in phrasing the hypotheses we have, and in describing the interpretation we have.” Further, he cautions how the phrase, “*just words* is a terribly misleading phrase... words have consequences and connotations,” noting that “in the context of a courtroom, for example, where you are on trial for murder and the judge says *guilty*, it’s *just a word*, but that word has substantial consequences.”<sup>28</sup>

There are some things we just cannot see. I can see the pie you made in foods class but not your understanding of *Hamlet* in literature class. This is not to say that I am

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<sup>27</sup> See Thomas Kuhn (1962) *The Structure of Scientific Revolutions*, University of Chicago Press.

<sup>28</sup> See Peter Hacker (2014) Excerpted and transcribed from the interview, *Peter Hacker on the Mind, Neuroscience, Free Will*, (November)

*unable* to see your understanding but rather that it makes *no sense* to classify the concept of understanding as an empirical, visual experience. I can see your basketball skill in physical education class but not your knowledge of World War I in history class. This is not to say that I am *unable* to see your knowledge but rather that it makes *no sense* to classify the concept of knowledge as an empirical, visual experience. I see your skit performed in drama class, but not your knowledge and understanding performed in any class...because knowledge and understanding *are not* performances. I see your behavior but not what you are thinking because your thoughts are not “things” to see nor are “they” your behavior. Mind, knowledge, understanding, learning and education are not just words. They are words that when used have consequences and connotations. As discussed, given its deep, historical connotations, how we talk about *mind* - that it is identical to brain, is behavior and separate from body, for example - has far-reaching consequences. These consequences include how we talk about knowledge, how we talk about education and how we talk about (and use) assessment practices.

### *Forgetting the fairytales and negotiating the release*

At the beginning of this dissertation, I argued that talk of mind is rooted in a Cartesian picture of the world. Searle’s (1998) call cited in Chapter 1 is worth repeating here: “Along with the Cartesian tradition, we have inherited a vocabulary and with the vocabulary a certain set of categories within which we are historically conditioned to think about these problems.” Warning us further that, “the vocabulary is not innocent because implicit in the vocabulary are a surprising number of theoretical claims that are almost certainly false” (p. 14), educators might consider abandoning the vocabulary. Doing so releases them from their captor.

There is precedent for abandoning vocabulary. Consider the many words we no longer use because of their historical roots, their connotations or consequences. Racist words, homophobic words, words used to discriminate against people with challenges, or people's age, gender or economic status. True, words such as *mind* are not generally thought of as harmful or disparaging when used. Sometimes *how* we use a word is problematic while other times *the word* is the problem as is the case with words that connote racism and sexism. In what category is the word, *mind*? Is it how we use the word that is problematic, or is it the word that is the problem? In the context of education, I would place the word *mind* in the latter category given its Cartesian roots. The word is the problem. What would it be like were educators to abandon the word and its corresponding vocabulary? Would we lose anything?

- We can still talk about beliefs, intentions and desires
- We can still talk about learning, thinking, knowing and understanding
- We can still talk about education
- We can still be interested in neuroscience and the latest brain research
- We can still talk about the difference between the empirical and the conceptual

Though certainly not an exhaustive list, it is an important thought experiment.

How might we benefit? The absence of “mind” talk in education means that ...

- Metaphors *of mind* are unnecessary, releasing us from their connotations and consequences
- There is no mind/brain distinction, releasing us from the need to turn to

psychology, cognitive science and neuroscience to validate ourselves, our work, our students and the very concept of education

- There is no mental/physical distinction, releasing us from reduction projects
- There is no need for assessment reductions, releasing us from rubrics and the “*skillifying*” of concepts such as learning, knowing and understanding
- There is no need for tools and toolboxes because thinking is not a *skill* requiring a tool from a toolbox to assess, releasing us from assessing task completion and skill acquisition
- There is no need to try and make the invisible visible, releasing us from confusion and illusion

We do not need teachers to teach task completion. And at this time in our history, given the advancements in technology and the explosion of social media, we do not need teachers to teach skills. The Internet is full of “how to” sites where skills are easily self-taught. For the more social individual, numerous “how to” sites have interactive links to social media such that one can connect with the many who are also interested in acquiring the same skill ... this, all in a click.

One might ask how teachers proceed once “mind” talk is removed from our discussions about education. How, for example, might teachers talk about beliefs, learning, knowing, understanding and education? Acknowledging the conceptual “status” is an excellent start. As Robin Barrow states, and as noted at the beginning of this thesis, educators could engage in deeper dialogue about the distinction between the concrete and the abstract. An extensive analysis of this distinction, alone, would then

frame deeper dialogue about assessment. That is, following an analysis of the distinction between the concrete and the abstract, educators could focus on the limits of assessment. They might ask *why*, for example, there is an assumption that abstracts concepts (such as knowledge and understanding) are observable. Further, educators might re-think and discuss the *purpose* of assessment and *whom* it serves. Ultimately, a general “re-assessment” seems in order - a re-assessment of the purpose of assigning letter grades, percentages, or any numerical “value” to the conceptual, to the abstract, and to ideas.

Perhaps education without *mind* means teachers can focus on wisdom and enlightenment where students engage in dialogue about ideas and concepts. Such dialogues wouldn't be measured and graded, not because they no longer need to be but because they *cannot* be. It is not that ideas such as education, knowledge and understanding were measurable and now are not. They never were. The larger project, of course, is to engage others in a dialogue about the importance of carefully thinking through the differences between the conceptual and the empirical, both to interrogate the privileging of the empirical over the conceptual and to prevent the conceptual from being confused with and subsumed by the empirical. Indeed, the concept of education itself requires such a commitment from us. What better place to start such a dialogue than in our public schools, our universities and in particular, our universities' schools of education. John Searle says that a consequence of the dualist's split of mind and body is that it basically gives mind to the theologians and body to the scientists. If educators abandon mind talk maybe they could give the brain to the neuroscientists and give education to teachers.

It is ironic that in order to be released from the hold our current view of mind has

on education that we must first engage with and use the very language we might be better off abandoning. As referenced earlier, however, the way out of the fly bottle<sup>29</sup> is the way we got in. Curiously, we must first *go in* to find our way out. Such engagement must be our commitment, as to not do so leaves education a hostage.

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<sup>29</sup> See Ludwig Wittgenstein (1953) *Philosophical Investigations*

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