

A Critical Review of Jes Adolphsen's *Problemer i Videnskab: En Erkendelsesteoretisk Begrundelse for Problemorientering* (1992)

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Abstract

This critical review examines Jes Adolphsen's *Problemer i Videnskab*, positioning it as a foundational text for problem-based learning (PBL) within higher education. Amidst the neo-liberal constraints that have diminished philosophical engagement among students, we argue that this book proposes a much-needed transformative approach to scientific literacy. The review proceeds in three steps: First, we consider the book as both a source and resource; second, we show how the book opens a space for students to engage in PBL; and third, we explore how the books incite students to think about problems in relation to society.

Keywords: Problem-based Learning; Philosophy of Science; Practical and Theoretical Problems; Societal Problems

Introduction

An elementary understanding and basic literacy in the philosophy of science should be considered essential to anyone pursuing a degree from a university. Today, however, few read philosophy of science out of their own volition, least

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of all students. With the structural constraints of the neo-liberal university, courses such as *examen philosophicum* quickly became a relic of the Humboldtian era of education. No real alternative has since taken its place and instead, a generation of students have been produced that either take science for granted or treat its underpinnings with apathy. At best students can regurgitate some cookie-cutter approaches based on abstract concepts of ontology and epistemology – neither of which they find much use in later in life. They leave the university with a positivistic understanding of science centred around notions of objectivity and values of disinterest that they were already familiar with when they arrived. If students do not possess theoretical and scientific literacy after receiving their degree, then the philosophical foundation of higher education is not doing well.

It is against this situation that we will assess Jes Adolphsen's '*Problemer i Videnskab: En Erkendelsesteoretisk Begrundelse for Problemorientering*' [Problems in Science: An Epistemological Justification for Problem-based Approaches] as an introductory text to problem-based learning. We will argue that the book is useful for providing students and teachers with an introduction into theoretical and scientific literacy. To be literate at something is akin to having proficiency at playing a game, of having familiarity with the basic moves, the available strategies and most common tactics. It is not merely about being a good spectator who can appreciate the efforts of others, but also, and more importantly, about being able to turn knowledge into action. Our argument follows three steps: First, we consider the book as both a source and a resource. Second, we show how the book opens a space for students to involve themselves in the process of problem-based learning. Third, we show how the book encourages students to think about problems in relation to society more broadly.

The book as a source and resource

Adolphsen's *Problems in Science* can be read both as a source and a resource. As a source, the book offers a view into the academy of the late twentieth century. The style of writing gives the reader a sense of the changes within academic writing since the book was written. As such, the book constitutes an antidote to the formulaic and unembellished writing style of today; it is both lucid and punchy, while still being very appealing to the reader. The reader gets a real sense of the author and that the philosophy of science is neither a disinterested nor an impassionate discourse. In many ways, the style of writing closely resembles Adolphsen's direct and at sometimes confronting teaching style. For instance, the book commits the fundamental crime that it refuses to cite its biggest influences. Rather, Adolphsen shortly cites Marx, Popper, the late

Wittgenstein, and others in the introduction and unassumingly notes that references to these neither contributes nor weakens the argument of the book. The book makes an argument, and it is the responsibility of the author that it is sensible and coherent.

What makes the book interesting as a resource is that it is an attempt to ground the most basic problems in the philosophy of science in the concept of the problem itself. The central argument of the book is that “problems” are central to all knowledge production. Thus, if we orient the scientific enterprise accordingly, a range of long-standing debates in philosophy of science are resolved. Accordingly, the book is focused less on the pedagogics of problem-based learning and more about why and how to apply the problem-based approach as well as the epistemological foundation for such activities. Thus, it is as a resource, we argue, that the book can be used to teach students the theoretical and scientific literacy. The direct argumentation certainly can provoke those who disagree to ask questions.

Opening a space for students to do problem-based learning

The second quality that we want to bring forward is how the book opens a space for students to get familiar with problem-based learning. Appropriately, the book starts with the modes of thought in which the students already exist and are familiar with. That is the comfortable world of common-sense knowledge. The knowledge and habits of thought found here are scientifically speaking unproductive and therefore must be unlearned. Accordingly, the book rejects the image of learning and education as an accumulative exercise in which we can build upon prior experience. Education is innately cathartic; it is a process of change. The students must change their being –they must *become* something other than what they were when they arrived at university– and this journey starts with a confrontation of what they already are, what they take for granted, with the things that are natural where they come from.

This pedagogical approach of starting with immediate reality of common-sense knowledge that the students are already embedded in can also be found elsewhere in the philosophy of science. The first obstacle to scientific knowledge is always common-sense knowledge, which prevents us from apprehending problems scientifically. The only way to overcome this state is through problematization, that is, to *demonstrate* a problem – to go from rough (often contradictory) themes or a set of questions to a precise problem. Problems are not really problems until they have gone through a process of problematization.

The book uses this cathartic moment that students find themselves in when starting the quest for knowledge to teach about the distinction between practical and theoretical problems. A practical problem, Adolphsen tells us, is a problem in relation to our practices: Something in our surroundings, or with ourselves, that does not behave as we expect or desire. The criterion for a practical problem is that it can be solved by a coincidence; or that it can disappear without us knowing why it disappears. Thus, we can say that a practical problem is defined by not requiring cognition to be solved. In a world like ours, there are many practical problems: that we don't have money enough for the rent; or international problems such as war. We might not even know that we have a practical problem.

However, if we want to know *why* – why we don't have money for the rent, or why there is war, these practical problems turn into theoretical problems: they are about “perceiving the hidden mechanisms that determine phenomenon” (Adolphsen 1992, p. 30), and they do not simply disappear because the practical problem disappears.

Theoretical problems, according to Adolphsen, are therefore concerned with anomalies in relation to our knowledge or our theories about the world. Hence, a theoretical problem is an anomaly in relation to our prior knowledge or perception of the world. Theoretical problems often arise out of contradictions that we are directly confronted with in the form of practical problems. Thus, to every practical problem there is a corresponding theoretical problem: Why is the practical problem there?

Those who have studied at Aalborg University may have come across Adolphsen's, by design, outrageous story about him swinging a dead cat over his bike. He had come to do so, the story goes, because he had taken a dive over the bike as its front wheel suddenly blocked while going really fast down a hill. In the ditch where he landed, he found a dead cat, which he reasoned he could use to fix the bike. In this belief, he proceeded to swing the cat over the front wheel of the bike until it could spin again. As he anticipated this to happen again, he strapped the cat to the back of the bike. The episode repeated a few times, and swinging the cat seemed to work until he got a puncture and had to take the bike to the mechanic. Puzzled at the cat strapped to the bike, the mechanic explained that the real reason for the wheel blockage was that the bearings in the wheel had clogged up in the heat. The reason why swinging the cat had seemingly worked was merely because, in the time it had taken to swing the cat, the bearings would have cooled down as well.

The practical problem (the bike breaking down), the existence of common-sense knowledge (the swinging of the cat), and the theoretical problem and explanation (the bike-mechanics diagnosis) were all included in the story. The

delivery of complex ideas like these, in a straightforward language, is present throughout the book. Also, several criticisms of various common notions in positivistic science of objectivity and testability are put forward, questioning if theories can be evaluated and compared by some kind of universal approach using concepts like epistemology and ontology. Instead, the common lists of demands and criteria for what counts as a scientific theory are met with an unambiguous rejection:

“In most cases, it is of course an advantage if a theory is formulated in a clear and systematic manner. And it is wholly possible to call the theories on this part of the spectrum for scientific theories. However, it must be maintained, that this does not necessarily make them either true, coherent, or relevant” (Adolphsen 1992, p. 48).

This doesn't mean that theories should not be evaluated, but rather that doing so involves thinking – and this is where the book truly excels: in the pedagogical demonstration of thinking.

In the book, we read about how the great mystery of scientific theory is dispelled as merely an explanation that can only be evaluated by thought, about how a theory takes shape through concepts and models, and about how the minimum requirement of a theory is the conceptualization of a theoretical object. We read about theory traditions and theory buildings – we hear about how many theoretical problems consist of a contradiction between their general and specific levels of applicability. We read about the process of abstraction, and about German cartographers, who, as if picked out from a Borges story, misunderstood their assignment of creating the perfect map. The point of creating models is neither to leave the world alone, or to simply describe it, but rather it is to do something to it so that it is ordered according to purpose. We read about *relevance* and *perspective* through a story about how Adolphsen's son Peter threw a stone through the window (Adolphsen 1992, p. 70). We read about how methods and empirical work are not essential components of science, but they can of course be useful sometimes, even if there are rather costly affairs that lead nowhere. This is exemplified by an overconfident American anthropologist who mistakenly believed that a nomad society in Mongolia had a large population of castrated men after observing that everyone had a beard (Adolphsen 1992, p. 89). The book is filled with these small gems of insight and stories, delivered with an intimacy and rhetorical punch that is hard to come by in contemporary academic writing.

Throughout the book, Adolphsen demonstrates how to think about these parameters and how theories can be compared and assessed as answers to theoretical problems – theories that students themselves can read about and replicate in their own projects. Taken together, all these examples and

discussions are essential to acquiring what we above refer to as theoretical or scientific literacy.

Encouraging students to think about problems in relation to society

A recurring theme throughout the book is that science is but one human activity amongst many other activities. Thus, despite the ambition of the book not to explore the relationship between science and society more widely, there are still many aspects that point the reader in that direction. This also happens when taking the implications seriously of what Adolphsen calls the “internal paradigmatic process of science” (Adolphsen 1992, p. 23) – a model for the science that is less about methodological rigidity and more about the process of thinking in terms of theoretical problems and their explanations. What is interesting here is the status of the model in a socio-political context.

According to Adolphsen, the model is only politically neutral if the determination of something as a problem is an activity that does not predetermine a particular political orientation. There is no inherent emancipatory content in the model either. It is, however, political in the sense that it fundamentally calls into question the knowledge that we already possess. Thus, it is political in an epistemological sense: to formulate a theoretical problem will always be an act of questioning what we think we know.

Science deals with theoretical problems, which in turn have their basis in practical problems. The activity of scientific knowledge creation therefore has a close relationship in our shared practical problems. For this reason, scientific activity can never become a disinterested activity, which is not the same as saying that scientific activity should be guided by particular interests. However, once we ask what interests form the basis of scientific activity, we must supplement Adolphsen's foundational distinction between practical and theoretical problems with a parallel definitional set of *individual* and *societal* problems.

We all have our individual problems that can be more or less troublesome or consequential for our lives. To contemplate such problems is to adopt the perspective of an individual. These are my problems, mine to overcome with the means at my disposal. However, limited by our everyday lives and the recourses that it offers us, we are ultimately unable to solve all our individual problems; especially today, the more we become aware of this, the more we may feel confined by it. There is something outside of ourselves and our immediate social environment that prevents us from overcoming our

individual problems; forces towards which we are neither equipped mentally nor wilfully to deal with.

Take for example the problem of transportation. An individual might experience a problem getting to school or going on vacation, but when a lot of people are trying to do the same thing at the same time, it results in congestion on the roads which is an indication that there is some structural issue with our infrastructure.

In contrast to individual problems, what characterises societal problems is that they transcend, overlap, and interpenetrate the local milieu and inner life of the individual. However, like an individual problem, a societal problem still is a problem to someone – or rather, a societal problem is a problem that *we* have and share with others outside our immediate social milieu. In other words, societal problems are shared problems: they have to do with the organisation and coordination of the many individual milieux into a historical society in its totality. Societal problems are of public concern as they perceive our shared values and goals as endangered. Often when we debate such problems, we are neither certain of what our values and goals are, nor what exactly it is that endangers them. This only follows from the very nature of the societal problems, as they cannot be defined in the same way as individual problems. This is so because such problems often involve contradictions between different parts of the social structure, our possible individualities, or the historicity of both. To further complicate this image, these kinds of problems often have compounding effects: some social practices that may not have been problematic in and of themselves become so when combined with another set of practices. The range of societal problems is therefore in principle endless as society is constituted by increasingly complex social formations.

It might be obvious that the act of formulating societal problems as theoretical problems is the foundation for an effective social science. However, sciences dealing with other classes of objects are not except from the challenges associated with their theories about the world. Although this does not directly follow from the theoretical problems as previously formulated, these may be engaged in the production of social effects and thereby form constitutive elements of societal problem complexes.

Students therefore must learn how to master the concurrent process of problematization that occurs when individual problems become societal problems and when societal problems become theoretical problems. In this way, theoretical literacy is the convergence of theoretical and societal problems; the capacity to adequately define societal problems as theoretical problems. The primary way that science engages politics is in the form of problematizations: it

is only by exposing the inherent contradictions in the prevailing socio-political practices that science and knowledge become effective.

The distinction between practical and theoretical problems is central to this endeavour. Practical problems are always problems for someone as they derive from the contradiction between intention and possibility. When we attempt to solve our practical problems with actions or through social practices, it becomes a question of how good our knowledge and understanding are. Knowledge and action are intricately linked by theory. As fundamental parts of problem-based learning, it is therefore difficult not to situate the process of knowledge creation in a socio-political milieu. What *Problems in Science* therefore offers to students is a guide in the activity of science that prevents them from being useful idiots.

References

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