The Bridge Between Theory and Practice is Not More Theory: Replacing “Prescriptive Instructional Design Theory” with “Recommendation”

Beese, E. B.

Instructional Design Theory | Instructional Theory | Prescriptive Theory | Recommendation

A deep-rooted tradition in instructional design (ID) claims the production of “prescriptive instructional design theory” for practitioners as a major goal for scholarship. Against that tradition, this paper argues it was a mistake to conceive of ID scholarship’s most action-oriented knowledge products as “theories.” For one, it puts unnecessary distance between them and their intended practitioner users. As an alternative: this paper argues that ID can, like medicine, honor a generalized “recommendation” layer between theory and practice. A second consequence of the same misguided tradition threatens the long-term success of ID’s research agenda: ID scholars may erroneously proceed as if recommendations for practitioners are built, challenged, and justified in the same manner as standard scientific theories – and so fail, in multiple ways, to produce meaningful practitioner-facing knowledge products. The discussion should concern both ID scholars and

the practitioners who wish to be discerning consumers of practitioner-facing ID scholarship.

What kind of idea or proposition amounts to an academic "theory" in the field of instructional design? What is such "theory's" level of authority, in practice? And what is the optimal relationship between lay practitioners and the various abstract knowledge produced by instructional design scholars? These are heady questions, worthy of periodic discussion and re-discussion in the pages of a journal like JAID.

Instructional design (ID) scholars have their own internal debates on such questions. It is even an open question whether ID scholars ought to create their own theories ("originary" theories, in the parlance of McDonald and Yanchar [2020]) – and in so doing, transcend what Bednar et al (1992) identify as the received or traditional mandate for the field: that is, to adapt and translate theories from more "basic" disciplines, like psychology, for use by practitioners. Even assuming such "originary theory" production as a proper goal of the field, scholars have debated endlessly what such scholarly ID theories ought to look like -- and have identified numerous subspecies for them (Seels, 1997; Reigeluth and Carr-Chellman, 2009).

This paper will leave open the academic questions of whether instructional design (ID) scholars can and should produce theoretical knowledge in general, whether that theoretical knowledge is best classified as belonging to the academic field of ID, what various subspecies of theory ought to be distinguished in ID, and what such ID theories ought ultimately to look like. The debate at hand in this paper more nearly concerns ID scholarship's interface with practitioners.

Namely: the purpose of this paper will be to introduce and critique one specific, highly influential (and uniquely practitioner-facing) vision of ID theory that is rooted in some of the earliest and most influential texts in that field (Bruner, 1963; Snelbecker, 1974; Reigeluth, 1983). That vision is: that, in addition to "descriptive" (or, standard scientific) theories about observed regularities in instruction, a distinct theoretical output of ID scholarship ought to be "theories" that are "prescriptive" to practitioners about what to do in instruction or its design. This idea has been profoundly influential in the training of ID scholars since the 1980s, and has arguably become a de facto research agenda for academic IDs who intend to serve the needs of ID practitioners.

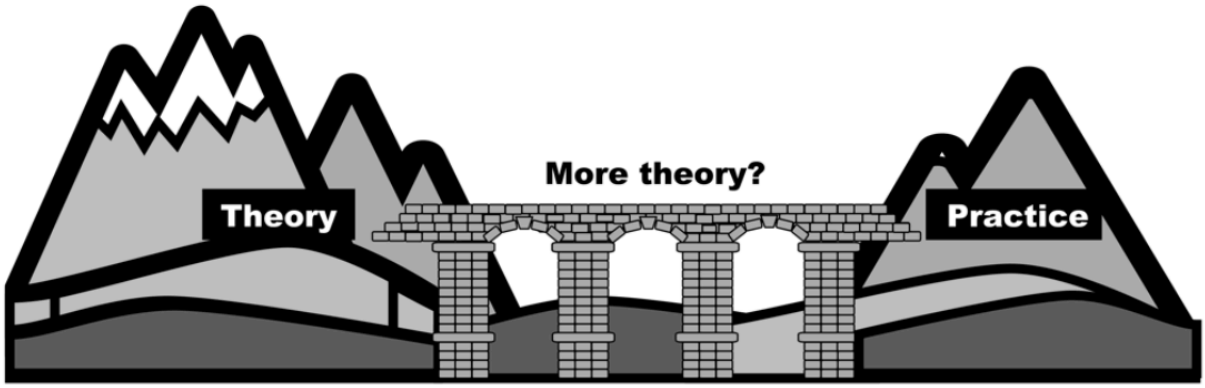
Even in its critique, this paper will accept the aforementioned early authors' shared assumption that a worthwhile goal of ID scholarship is to produce rigorous, empirically-informed generalizations for practitioners about what to do in instruction or its design. Because it extends this histori cal assumption about the role of academic ID, some readers may feel the present critique does not go far enough.[1]

Nevertheless, the present paper will strongly critique the tradition of calling or conceiving of this species of recommendatory scholarly knowledge product[2] as "theories," and propose, alternatively, that they be considered – by academics and practitioners alike – "recommendations," after an established tradition in analogous fields such as medicine and psychology. With the proposed change, it will be argued, comes a subtle yet deep reconceptualization of academic ID's research agenda and the way it serves practitioners.

The reasons for this critique, and the proposed alternative, are summarized below for later elaboration in the body of the paper.

Figure 1

Is the best bridge between theory and practice really "more theory"?



The Argument, In Brief

It will be argued that calling the most action-oriented knowledge products from academic ID "theories" puts needless, confusing distance between them and the practitioner audience they were created to serve. The idea that the infamous gap between theory and practice is to be bridged with yet another, more specialized species of "theory" does have a slightly ironic ring to it! (Fig. 1.)

Calling them theories, it will be proposed, has been especially unnecessary when there are alternatives close at hand that more readily communicate their nearness to practice. The term "recommendations" will be suggested as an alternative and compared against other alternatives (Fig. 2). "Recommendations" is ultimately preferred because it is widely used in other applied disciplines (e.g., medicine, psychology) to refer to highly collaborative, consensus-driven knowledge products that bridge scholarship and practice. Scholars, professionals, and professional organizations in those fields happily honor the distinction between generalized recommendations for practice and other, more basic scholarship (such as scientific findings and theories about regularities in the world.) Indeed, there exist specific norms in these fields for synthesizing and publishing these as distinctive knowledge products (Field et al 1990; American Psychological Association, 2002; CDC Guidelines and Recommendations Work Group, 2012; Brouwers et al 2016; Brouwers et al 2018; American Academy of Pediatrics 2019).

Figure 2

The bridge between theory and practice isn't more theory, but might be recommendation

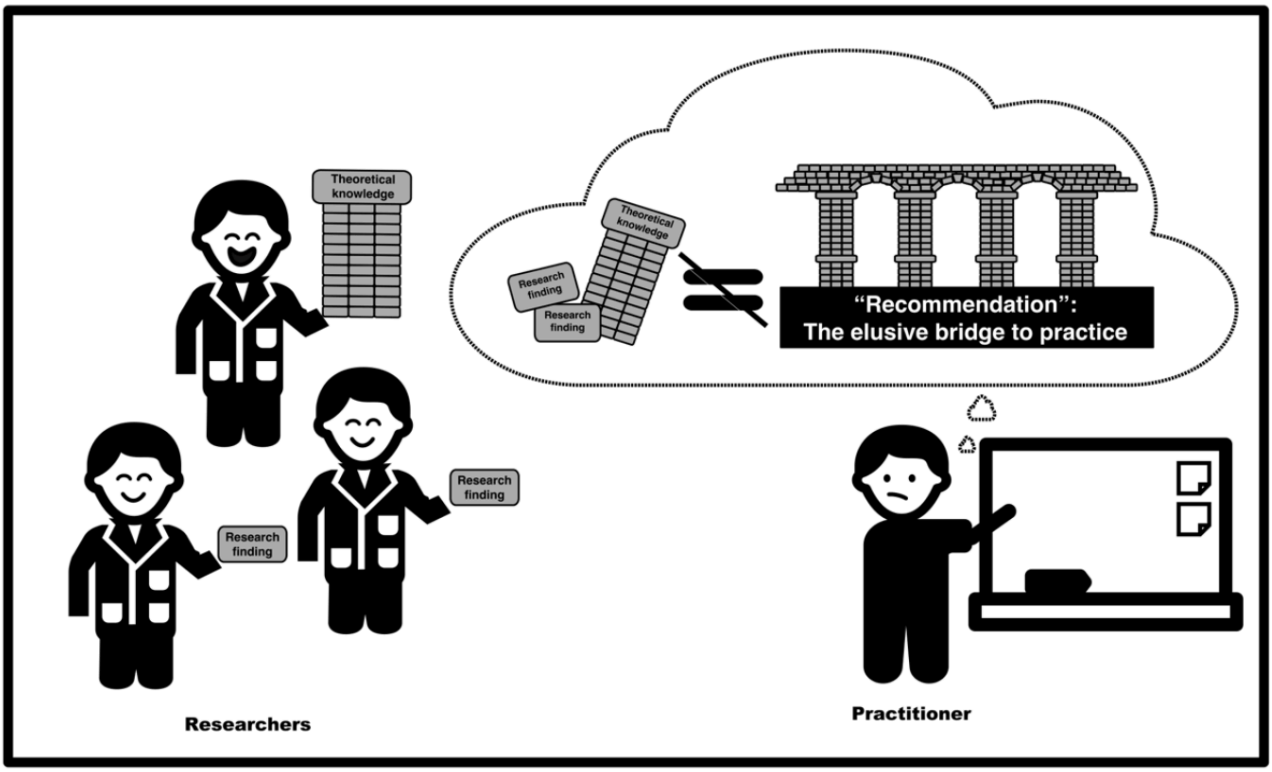
Next, it will be argued that simply conceiving of ID scholarship's generalized recommendatory knowledge products as theories seriously jeopardizes the field's research program, and thus ultimately undermines research-informed ID practice. Why?

Considering both (a) recommendations for what to do and (b) standard scientific theories, as species of "theory" -- in the manner proposed by Bruner and his successors -- risks obscuring the important differences in how these two distinctive knowledge products are built, justified, and updated over time.

Most importantly: the informational basis for a recommendation of what to do involves more kinds of reasons, in different argumentative relation to one another, than the informational basis for a "simple" scientific theory about regularities in the world (Hempel, 1961). Often the informational basis for a recommendation of what to do must deeply incorporate standard theories about regularities in the world as part of its information basis – but it cannot stop there. It must, furthermore, incorporate significant evidence and argumentation that is ethical and/or cost-benefit-related.

If the scholarly recommendation-building process in a field is formulated by false analogy to the scientific theory-building process, scholars risk forgetting these significantly greater demands of recommendation-building over "mere" standard scientific theory-building. Through neglect of the serious additional labor required to construct them, full "bridges to practice" (that is, full proper "recommendations" to practitioners) might remain chronically unbuilt. This conundrum, and its consequences for practitioners, is illustrated in Figure 3.

Figure 3



To avoid this mishap to the research agenda in ID and, consequently, to the research-informed practice of ID, it is the contention of this paper that instructional design scholars should respect – in both the name and shape of its work – the profound differences between scholarly recommendation-building and "mere" scientific theory-building.

Agenda for The Paper

Before hearing the paper's full critique of prescriptive ID theory as a concept, readers will be offered a history of this philosophically unusual idea, along with a critique of a common misattribution of this concept of prescriptive theory to Nobel Laureate Herbert Simon.

Next, the idea of prescriptive ID theory will be critiqued on its own merits. A range of available terms for this species of practitioner-facing scholarly knowledge product (e.g., "prescription," "guidelines," etc.) will weighted against each other, with an argument made in favor of using the term "recommendations."

After this, special attention will be returned to the confusions which attend the use of the word "theory" to refer to action-oriented knowledge products. First, it will be discussed that "theory" already has several alternative meanings to researchers and practitioners alike, and adding one more special use is unduly confusing.

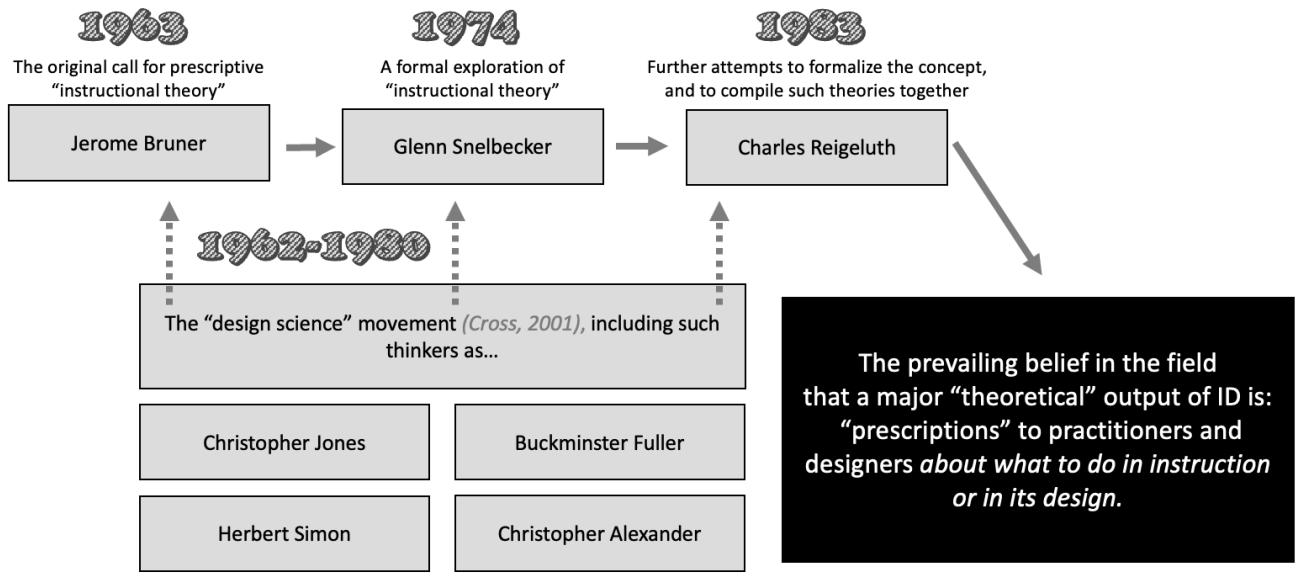
Finally, the paper will discuss in depth what is perhaps the most dangerous potential for confusion, when conceiving of ID's most action-oriented knowledge products as "theories": that the process for building recommendatory knowledge products will be conflated with the process for building standard scientific theory – leading to fundamental confusion in the research program for ID and undermining its ability to serve the needs of its practitioner audience.

The Concept of "Prescriptive ID Theory:" History, Variations, and a Critique

Where did the idea come from, that a major "theoretical" output of ID ought to be "prescriptions" to practitioners and designers about what to do in their practice or design? Before hearing the paper's full critique of this concept, with an offered alternative: both ID scholars and practitioners alike will benefit from understanding the history of this unusual idea, and considering what enduring value and what enduring pitfalls the field has inherited from it.

Figure 4

Brief history of "prescriptive instructional design theory"



In a 1963 conference address for the Association for Supervision and Curriculum Development (ASCD), Jerome Bruner made the following diagnosis: “Over the past several years it has become increasingly clear to me, as to any thinking person today, that both psychology and the field of curriculum design itself suffer jointly from the lack of a theory of instruction (p. 523).”

Bruner went on to express concern that “learning theory,” with its focus on simply describing causal regularities in the activities and results of instruction, had failed to tell practitioners what specifically to do to make learning happen. He posited the need a for a new kind of theory, “instructional theory” – also, like learning theory, empirical and rigorous – but which would be “prescriptive” instead of merely “descriptive” (p. 523). In a book (Bruner, 1966) that followed on the same theme, Bruner would describe the “prescriptiveness” of an instructional theory in this way: “A theory of instruction is prescriptive in the sense that it sets forth rules concerning the most effective way of achieving knowledge or skill” (p. 40, italics in original).

Bruner’s calls were influential. The idea caught on that there ought to be some scholarly knowledge product closer to practice than learning theory; and, from that point, “prescriptive instructional theory” was generally accepted to refer to such an aspirational scholarly product.

Early Criticisms of “Prescriptive Instructional Design Theory”

While his work was popular, not everyone bought into Bruner’s project for education research, nor believed it was prudently framed. In a biting review of Bruner’s book Toward a Theory of Instruction, educational psychologist David Ausubel (1966) dismissed Bruner’s particular demarcation between learning theory and instructional theory (with one being necessarily more useful to practice and more “prescriptive” than the other) as superficial and misleading.

Other scholars were concerned with the ambition, in the first place, to be prescriptive (that is, giving authoritative advice for action) at the same time as objectively scientific. At least one answer to Bruner’s call – a 1968 report published by the ASCD Commission on Instructional Theory – dropped the idea of prescription altogether, casting the new instructional theory as simply more “scientific theory” in education, this time perhaps just a little closer to the classroom than classical Thorndike-and-Skinner-style learning theories. Writing three decades later in 1997, and advocating purely descriptive theory development as the proper pursuit of ID scholarship, Norbert Seel noted the lack of a concept of “prescriptive theory” in the philosophy of science. “[O]ne can seriously doubt that there is such a strange thing like a prescriptive theory” (p. 356).

Broader Adoption of Bruner’s Vision In ID, Culminating in The Famous “Green Books”

Nevertheless, Bruner’s vision of prescriptive instructional theory percolated down through the years as an attractive research program for scholars interested in a practice-oriented disciplinary schism from educational psychology. In a 1974 monograph, educational psychologist Glenn Snelbecker took up the cause, anointing “instructional theory” as the proper goal of a necessary, distinct subfield in education. He defined instructional theory as “an integrated set of principles which prescribe guidelines for arranging conditions to achieve educational objectives” (p. 116).

Answers to these calls for prescriptive instructional theory came from the fledgling academic field of instructional systems design, which appeared as the proper heir of this new research agenda. Rigorous early efforts at such theory out of ID came from Charles Reigeluth and M. David Merrill and colleagues, with the elaboration theory of instruction (Reigeluth, Merrill, Wilson, and Spiller, 1980) and component display theory (Merrill, 1983).[3] These theories carefully elaborated high-level distinctions in variables related to the instructional presentation of content, and made generalized propositions from which researchers could derive falsifiable hypotheses.

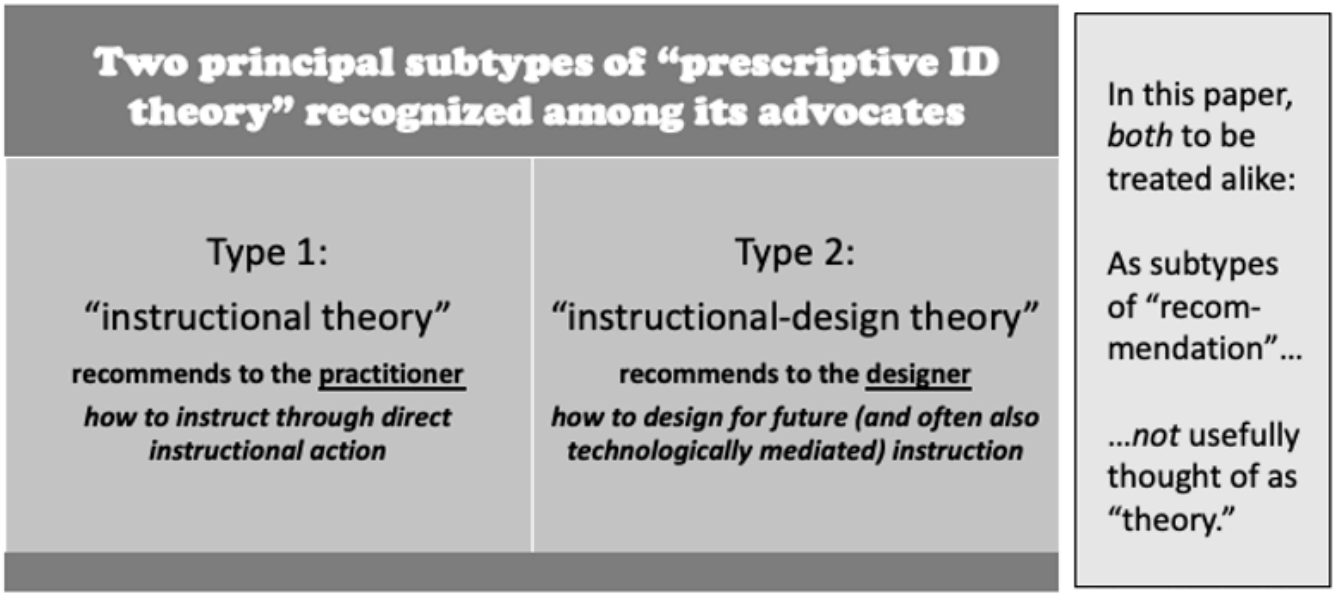
Then came perhaps the most influential development in the history of "prescriptive instructional design theory" as a goal for scholars in the field. In 1983, Charles Reigeluth compiled his first volume of a four-part series (Reigeluth, 1983; Reigeluth, 1999; Reigeluth and Carr-Chellman, 2009; Reigeluth et al, 2016) on "Instructional-design theories and models." Not only did these volumes establish the development of prescriptive instructional-design theories as a major research agenda for the field of instructional design, but they also offered wide-ranging examples of such prescriptive ID theories: from "Learning communities in classrooms" (1999, pp. 269-292) to "The problem-based approach to instruction" (2009, pp. 143-166) to "The simulation approach to instruction" (2009, pp. 167-198). Commonly known as "the green books" and popularly used as textbooks in Ph.D. programs in the field (see for example, the central role they play in Bostwick et al, 2014), Reigeluth's compilations have shaped understanding of the field's research agenda for generations of ID scholars.

Two Major Subtypes of "Prescriptive ID Theory"

Since its introduction as a major goal of ID scholarship, proponents of a prescriptive theory of instructional design have distinguished many subtypes and variants for it (Reigeluth and Carr-Chellman, 2009; Gibbons, 2014). Though it will have minimal impact on the arguments to follow, one distinction in particular bears acknowledgement before proceeding. That is: repeatedly, its advocates have delineated two major subtypes of prescriptive ID theory. Various terms have been employed to make the distinction; but the simplest set-out is perhaps given by Gibbons and Rogers (2009), who termed these two subtypes "instructional theory" and "instructional design theory," respectively (Fig. 5).

Figure 5

Two principal subtypes of prescriptive ID theory



The first subtype – "instructional theory" is essentially Bruner's. It recommends direct instructional actions, ostensibly to the person acting as educational practitioner – but also frequently to the designer who might incorporate such actions into technological designs.

On the other hand, a second subtype ("instructional design theory," in the Gibbons-Rogers account) recommends to the person acting as designer how to prepare for future – and also often technologically-mediated – instruction. (C.f. Branch and Kopcha's [2014] "instructional design models," and Reigeluth's "instructional-design processes" [1983]; later recast by Reigeluth and Carr-Chellman [2009] as "instructional-planning theories.")

The distinction between these two kinds of knowledge products is useful and well-taken. However, for the purposes of the present argument: they will be treated alike as putative theory-types in ID which are both better understood as subtypes of ID "recommendation." Because this paper is chiefly concerned with critiquing this point of similarity between them, it will use the phrase "prescriptive ID theory" to refer equally to both.

Influence from the Design Science Movement: History and Implications

Bruner's call for a prescriptive instructional theory came at a time of great import for academic design disciplines. Inspired by advances in operations research and the burgeoning field of computer science, the "design science" movement – associated with such diverse figures as Buckminster Fuller, Christopher Jones, Christopher Alexander, and Herbert Simon – was incipient at this time. Scholar Nigel Cross (2001) identifies the 1962 Conference on Design Methods in London as the moment in which the movement coalesced.

While, according to Cross, the earlier part of the 20th century had been concerned simply with "scientific design," –that is, the "reliance … upon scientific knowledge, through the application of scientific knowledge to practical tasks" (p. 51) –the "design science" of midcentury had loftier goals. It sought to essentially merge design with positivistic science, achieving a sort of scientific objectivity in design itself. The most radical wing of the movement held that design artifacts could be the objective findings of a fully systematic, scientific design process.

Cross notes that by about 1980, the major adherents of "design science" had moved on. After painstaking practice modeling design problems and their solutions, proponents had ceased to covet a fully logico-empirical basis for design; and had even come to appreciate the primacy of design in scientific research activity. Their venture had not been fruitless, of course; inquiries of the era resulted in useful empirical and mathematical decision-making tools to support design work.

However, the design science movement's rosiest ambition – that is, to achieve, through logico-empirical means, certainty to the point of objectivity in the processes and products of design, was put aside. Cross recognizes a subsequent trend, in schools of design, whereby the concept of "design as a reflective discipline" (Schön, 1983) replaced the concept of design as a science in and of itself.

Meanwhile, the influence of the pre-1980s design science movement is evident in the work of the major advocates for a prescriptive ID theory. Like the radiantly optimistic pre-1980s design scientists, these scholars hoped it possible that – with enough systematic scholarly labor – there could be created a comprehensive body of knowledge that objectively prescribed what to do in educational design or practice, under almost any given set of aims and conditions.

The actual program for systematically synthesizing this body of scientifically prescriptive knowledge in ID remained open for interpretation. But its overall motivation and orientation was straightforward. Like the pioneers of the design science movement, the scholars who advocated for prescriptive ID theory maintained a great optimism that instructional design researchers might gradually inquire our way across the infamous theory-practice divide, relying on the same set of credibility-conferring logico-empirical tools which have proved so successful in establishing traditional scientific knowledge about regularities in the world.

Acknowledgment of Bruner Et Al's Self-Consciously Novel Use of "Prescriptive Theory"

All of these authors, from Bruner onwards, well understood that there were differences between the new theory-building project they were proposing, and the theory-building projects in the traditional sciences –as their pains to distinguish its novel "prescriptive" nature demonstrate. They were not confused on this point. So why choose the word "theory"?

It is worth beginning with an acknowledgment that the word "theory" can, and does, mean many things in everyday usage as well as in diverse scholarly traditions! Famously, it can connote anything between a mere speculation (in its popular usage) to a practically canonical account of how the world works (in its strictest scientific usage).[4] It can be something empirically testable through gathering data in the world (in the sciences), or something purely analytic or interpretive in nature (as in math or the humanities).

It is easy enough to see which sense Bruner, Snelbecker, and Reigeluth were drawing upon when they chose the word "theory" to refer to their proposed new scholarly knowledge product. They were borrowing the connotations of "theory" from the traditional sciences – where "knowledge" is gleaned through rigorously systematic, logico-empirical means – and where "theory" is considered the very "vehicle of scientific knowledge" (Suppe, 1977, p. 3).

After all, they meant to establish scholarly ID as an explicitly scientific discipline; and, its knowledge products were to be, like traditional scientific theories:

- **broadly applicable** across a class of situations;
- grounded deeply in **a body of empirical facts** discovered through rigorous **scientific investigation**;
- **important** enough that anyone in the field ought to be familiar with them, and consider or account for them in future work.

Of course, the further aim of practical "prescription" was a major departure from traditional scientific theorizing; and they acknowledged this with their constant distinguishing of "prescriptive" from standard scientific "descriptive" (or sometimes "predictive") theory. However, for these scholars, the opportunity of establishing these appealing points of similarity (between this new scholarly knowledge product, and traditional scientific theory) justified the potentially confusing choice of name.

Their dream of rigor and generalizability, for ID's recommendatory knowledge products, was a credit to these early pioneers. But it will be the contention of this paper that the choice to emphasize what is shared, rather than what is not shared, between scholarly recommendation-building and standard scientific theory-building processes, ultimately creates more problems than any extra aura of credibility lent by "theory" is worth.

On a Flawed Appeal to Herbert Simon As the Father of "Design Theory"

This paper has traced the intellectual history of prescriptive ID theory back as far as Bruner. Meanwhile, ID scholars who would use the "theory" to refer to scientific knowledge products "prescribing" how to do or design, in a given domain, have frequently further appealed to Nobel Laureate Herbert Simon as establishing the precedent for such a species of knowledge product (e.g., Reigeluth and Carr-Chellman, 2009; Gibbons and Rogers, 2009; Gregor, 2006; Walls et al, 1992.) Claims that such a concept derives from such an authoritative figure deserve addressing. In brief, this appeal to Simon rests on a clear misreading of his work.

It is true that Simon did coin or at least popularize the term "design theory" in The Sciences of the Artificial; and so, to the extent these scholars use and attribute the term to him, they are correct. It is also fair to claim Simon's influence pervades the larger "design science" ethos; that is, a technical optimism that design can become more rigorous through the incorporation of powerful computing and decision analysis techniques.

However, "design theory's" proponents in ID have defined the term in a far more specific and tight-laced fashion than Simon ever did. The kinds of ID creations which Reigeluth and Carr-Chellman (2009) name prescriptive "design theories," Simon himself consistently called "designs," "prescriptions," "methods," or "programs,"[5] just like his colleagues in the design science movement.[6]

What did “design theory” mean to Simon, then, if he did not use it to refer to scientifically-created “methods for accomplishing goals” in given contexts (Reigeluth and Carr-Chellman, 2009, p. 7)?

To answer this question, it must first be understood how Simon used the word “theory” in general. In his writing, it was simply not a word Simon reserved to refer to the vessels of falsifiable knowledge claims, per its strictest sense in the traditional sciences. In *The Sciences of the Artificial,* he most frequently uses “theory” in one of its looser, everyday senses: that is, to refer to the *organized body of teachable knowledge on a topic*. Simon often used the word “theory” to refer to all that was valuable for instruction, in a given area, towards reproducing desirable practical actions in professionals (or even, sometimes, computer programs!).

When in his landmark essay “The Science of Design: Creating the Artificial” (1969, ch. 5) Simon proposes the creation of a “*design* theory” he is not then proposing, as he has sometimes been misread as proposing, *a new kind of discrete knowledge product*, the designerly counterpart to the standard scientific theory – instances of which might serve as competitive vessels of knowledge in a novel form of design-oriented inquiry dedicated to establishing truths about the preferability of some such competitors over others. Instead, with his call in this essay for a “theory of design” (which term Simon used more frequently, and interchangeably with, “design theory”), he was proposing no more, but also no less, than the creation of a respectable curriculum for the professional disciplines in the human activity of design, a point previously noted by Huppatz (2015).

Why Calling Them “Theories” was the Wrong Choice

The previous section has established that the decision to call generalized recommendatory knowledge products out of design fields “theory” is not easily justified through an appeal to Simon’s work.

That established, we can now turn to the next question: is such a decision – as advocated by Bruner, Reigeluth, etc. – well justified on its own merits?

This paper’s argument is that it is not. Knowledge products specifically recommending what to do in instruction or its design should not be conceived as “theories,” but something else; this paper will suggest “recommendations.” No matter how rigorous the design process, how well-informed the design-product, or how important it is to produce this kind of knowledge, it will be argued that using the word “theory” to refer to what are *scholarly recommendations for instruction and instructional design practice* was ill-chosen for two reasons:

1. It has put needless, confusing distance between these valuable, complex scholarly knowledge products and the practitioner audience they were ever intended to serve;
2. It has jeopardized researchers’ understanding of the important differences between two very distinct types of knowledge products – that is, knowledge of regularities in the world, and recommendations for what to do – which (nevertheless) have a complex interdependent relationship. And: through jeopardizing researchers’ understanding of their own work, it has undermined the broader cause of research-informed practice.

Interestingly, the original articulators of the vision of prescriptive ID theory acknowledged that others might not like this use of the word. In an opening chapter to his second volume in the “Instructional-design theories and models” series, Reigeluth writes with Carr-Chellman (2009, p. 7):

“Some people do not like the term theory for such goal-oriented or instrumental knowledge. Some of the terms that they prefer include: method, model, technology, technique, strategy, guidance, and heuristic. However, none of these terms captures the full scope of this kind of knowledge … We have found no other term that fits as well as design theory for capturing methods and when to use them.”

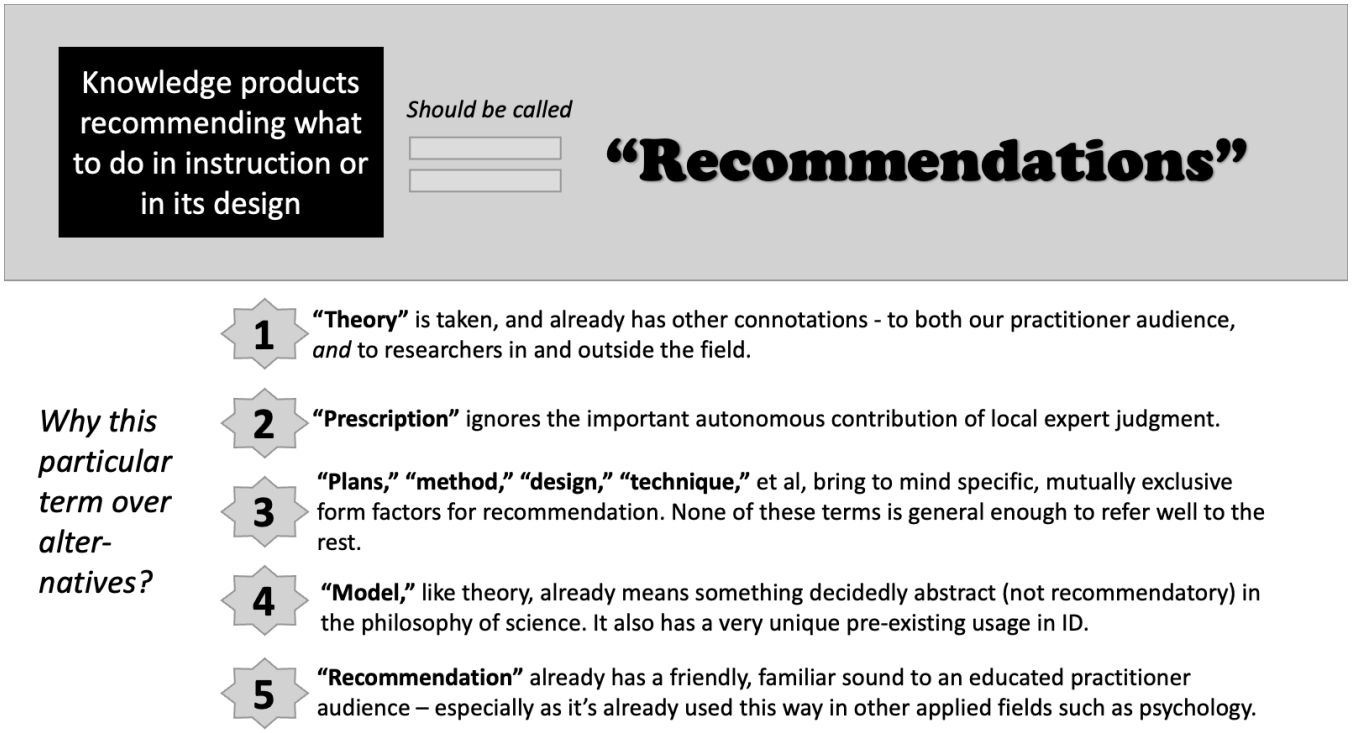
To that, this paper has a proposal: and it is the word “recommendations.” The class of complex, close-to-practice knowledge products which Bruner, Snelbecker and Reigeluth wanted to consider ID “theories,” the following sections will propose to consider “recommendations.”

Why “Recommendations” over its Alternatives

Why this particular term, over its alternatives? Here I will weigh some possible alternatives, and make the case for why “recommendation” has the advantage, in establishing how to properly think about this special class of knowledge product which many have wanted to call “prescriptive ID theory.” A summary of these alternatives and their advantages and disadvantages is given in Figure 6.

Figure 6

“Recommendations” vs. alternatives



Theories

The inadequacy of the word “theory” to refer to this proposed linking knowledge product from Bruner et al is the chief subject of critique in this paper, and will also be the subject of more detailed discussion in the next major section. To briefly recapitulate the present paper’s argument against it: Theory is already taken. It is used to refer to numerous other more traditional knowledge products in the academy, with an especially constrained (and important) usage in the traditional sciences from which ID scholarship most prominently draws (Kelly, 2004). Furthermore, its high academic tone – and colloquial contrast with “practice” – also negatively colors laymen’s perceptions of its relevance to practical decision-making under constraints. If instructional design scholars can use another word, they should.

Prescriptions

To that end: the word “prescription” is used often enough in definitions of “prescriptive ID theory” that it is a natural candidate. If a “prescriptive ID theory” is, according to many definers, essentially a “prescription,” our problem is easily solved.

However, I follow a critique of the aim of scholarly “prescription to practitioners,” by other contemporary scholars in design (Venable, 2013; Yanchar & Faulconer, 2011).[7] That is: placing scholars in a “prescribing” relation to practitioners and designers implies a troubling hierarchy between the two, wherein the proper function of practitioners and designers is not so much to think independently, but to carry out the orders of scholars! This particular critique goes back as far as Dewey (1899), who, concerned about implications of Hugo Munsterberg’s (1898) call for a novel “linking science” between psychology and education, warned about the potential evolution of a relationship of “obligatory prescription” between scholars and practitioners of such a discipline. “Prescription” is arguably too rigid and authoritarian in the relationship it implies with practitioners. Not to mention, it implies a level of down-to-the-moment-of-implementation detail in “recommending what to do” which is likely unrealistic, for a broadly generalizable knowledge product.

Models

All volumes of Reigeluth’s green books share the initial title Instructional design theories and models. The chief target of this paper’s critique is how those influential books used “theory,” and not “model” - chiefly because “theory” has received significantly more attention as a name for this species of practitioner-facing knowledge under discussion. Nevertheless, we shouldn’t neglect “model” entirely. Is it a better name, and a viable alternative?

Probably not. For one: in a persistent disciplinary quirk, the term “model” has come, in the field of academic instructional design, to apply quite consistently to a species of procedural recommendations to designers about how to develop instruction: from ADDIE to the “Dick and Carey model.” This local use (c.f., Andrews and Goodson, 1980; Gustafson and Branch, 1997) is so consistent and specialized among ID scholars that it is likely not worth repurposing the word within the field for much else.

But even if this major preexisting usage in academic ID didn’t exist, “model,” like “theory,” already has specialized usage in the sciences and in the philosophy of science which precludes its sensible repurposing to refer to a knowledge product which “says what to do.”

Whatever it is (and philosophers of science do argue definitions, of course) –whether it’s a knowledge product that is most properly expressed in either logical or mathematical or natural language terms; whether it is a true description of reality or metaphorical (Hesse, 1966); whether it is a special instantiation of a larger theory which makes that theory logically true (van Fraasen, 1989); and whether it is the handmaiden to full-fledged scientific theory, as traditionally conceived –or whether it is an underrated, autonomous vehicle of scientific inquiry that has been unjustly subsumed to theory (Morgan and Morrison, 1999): a model is certainly not a prescriptive or recommendatory knowledge product, in the sciences or philosophy of science.

Plans, Methods, Designs, Programs, and Techniques

I am in sympathy with Reigeluth and Carr-Chellman’s (2009) rejection of such words as “method” and “technique” to “capture the full scope of the kind of knowledge” product they sought to describe. Suggestions in a similar vein might include “design,” “plan,” or “program.”

All are perfectly good words for referring to the knowledge products which might record actions and arguments for a specific local project. Each possesses shades of difference which are important; for, example: “design” often connotes a plan for a physical artifact; a “method” connotes the existence of a multi-step systematic set of actions, etc. Meanwhile, all have a specificity to them which is undesirable for the present project: and that is, again, to name a general category of scholarly knowledge product for practitioners and designers regarding what to do in instruction or its design. It is worth searching for a more general word to refer to whatever it is that is held in common by them all.

Standards, Guidelines, and Recommendations

Perhaps the chief virtue of “recommendation” is its previous establishment in other applied fields – such as psychology and medicine – to point to their rigorously-argued, practitioner-facing knowledge products. Organizations from the American College of Physicians to the American Academy of Pediatrics to the American Psychological Association to the World Health Organization make frequent use of the term when describing such scholarly output. Its pre-existing employment in such fields means “recommendations” has a familiar use in fields with scientifically-informed professional practitioners.

At the same time, two other contenders besides “recommendations” do present themselves from the same fields. These are: “standards” and “guidelines.” Both “recommendations” and “guidelines” are together preferred over “standards,” for reasons similar to the ones for dismissing “prescription.” That is: in the medical field, “standards” are considered compulsory for all practitioners, with little room for practitioner adaptation (APA Office of General Counsel, cited in APA, 2002; American Academy of Pediatrics, 2019).

This leaves “guidelines” and “recommendations.” The decision to select “recommendations” over “guidelines,” here, is colored by Polish philosopher of action Tadeusz Kotarbiński (1965, 1966). As a philosopher of action, Kotarbinski was interested in the distinctions between practical directives of all kinds: from plans to methods to designs -- but also, in what we all sense they have in common. When writing in or being translated into English, he made extensive and very effective use of one particular word to apply to all of these, and that word was: recommendations. I will here follow suit.

It is further favored by a nuance regarding the respective granularities of these terms. While they are often used interchangeably in the medical field (CDC, 2012; Qaseem et al, 2010), “guidelines” is sometimes formally used to refer holistically to the set of granular “recommendations” mentioned in the length of a full, formal, institutionally-backed document [CDC, 2012; WHO, 2010]). “Recommendations,” meanwhile, may more easily be either simple and single or elaborate and highly multi-step than “guidelines.” It is arguably the term with a more flexible granularity; and this is desirable for our purposes.

Recommendations as the best alternative

In short, “recommendations" in medicine serve a remarkably similar function to what Bruner, Snelbecker, and Reigeluth sought to achieve with “prescriptive theories”: they rigorously synthesize research findings on various points of contextual interest into focused practitioner guidance. “Recommendations,” as conceived in medicine and psychology, better serve the practical functions these scholars valued than does "theory,” because “recommendations” are clearly distinct from the more theoretical offerings of a discipline – and are explicitly designed for practitioner implementation. A more thorough discussion of the “recommendatory” tradition in medicine and psychology is to be found at the conclusion this paper.

Addressing a Key Disadvantage of Recommendations. There is still at least one serious confusion available to readers from ID, if instructional design researchers use the word “recommendations” to refer to generalizable scholarly knowledge products. The tradition of evaluation research consistently uses “recommendations,” in a narrower sense, to refer to actions which might be recommended for local implementation in an evaluated program. And beyond that well-established tradition: in design practices from needs assessment to analysis, the term “recommendations” may refer to the practitioner-generated deliverables that guide an individual client about what to do in their local situation.

However, it might be hoped that the difference in what is meant by “recommendations,” in the above situations should be clear from audience and publication context. In short: one is local and specific, and the other is more generalizable. The American Pediatric Association’s “recommendations” are understood to represent a scholarly consensus; your doctor’s “recommendation” for your treatment is understood to be a local and specialized one for your situation as a client. The same distinction might be easily maintained in ID.

Back to the Inadequacy of “Theory”: Further Exploring the Risks of Misunderstanding it Poses

At this point, the discussion will return to the point about “theory” being an especially poor choice to refer to ID scholarship’s most practical knowledge products, on account of its already being “taken” to mean too many other things – both to practitioners, and in the academy.

What Theory Already Means To The Educated Practitioner Or Designer

Practitioners might agree that the word “theory” was always an interesting choice to name the knowledge product by which ID scholars intended to specially reach them. Despite its authoritative sound, “theory” is not a word with a pristine reputation among practitioners and designers. Indeed, it is sometimes used disparagingly, to imply the comical distance of scholars from practical concerns. As Snelbecker himself yielded: "[T]here is a rather distinct skepticism expressed by practitioners about theory. Theory is frequently used to refer to ideal but impractical principles” (1974, p. 116).

But these negative connotations (and the question of their fairness) aside, there’s an even more serious issue afoot. That is: that the denotations of “theory” among practitioners are already highly diverse, raising serious communications challenges. In common usage among practitioners, “theories” might be anything from the “isms” of introductory teaching courses (e.g., “humanism,” “developmentalism,” “behaviorism,” “constructivism,” etc. [Kliebard, 1992; Ertmer and Newby, 1993]) to more specific scientific theories influential in education, like “cognitive load theory” or “attribution theory.”

Accordingly: anything instructional design scholars call “theory” must compete for attention in a crowded ring with many other ideas going by the same name. Scholars would, among other things, be giving the field’s special “bridging knowledge product” the same name as the more basic scientific knowledge they are trying to build a bridge to practice from!

What Theory Already Means To Scholars, And The Risks Incurred By Stretching This Meaning Further

Scholars, too, are familiar with multiple meanings of “theory” as they exist in the academy. Beyond the “design theory” or “technological theory” proposed as aims for the newer applied fields in the university (e.g., Reigeluth and Carr-Chellman, 2009; Gibbons, 2014; Jones and Gregor, 2007), ID scholars are likely at least as familiar with “theory” in the older academic traditions on which ID draws.

In particular, scholars in ID are likely familiar with: (a) the use of the word “theory” in the traditional humanities to refer to large orienting schools of thought and perspectives (for examples, see: Leitch, 2001; Grishakova and Salupere, 2015); as well as (b) the more constrained use of “theory” in scientific fields (for examples and discussion, see the papers in: Suppe, 1977) to refer to broadly influential accounts of regularities in the measurable world.

And it is the pre-existing connotations of the latter – traditional “scientific theory” – which should most strongly deter us from re-using the word “theory” to refer to recommendations to instructors and designers for what to do.

The field of ID has an important working relationship with the more basic social sciences. Its collaboration with academic psychology is especially notable; understanding of scientific findings and theories from psychology is considered vital for the informed instructional designer (Winn, 1997; Driscoll, 1994). It is also certainly the case that most researchers in ID engage in traditional scientific inquiry – and that many of those inquiries generate precise, rigorous findings which can increase our scientific knowledge of education.

Arguably, then, a chief risk of confusion to researchers in ID, in calling “recommendations for what to do” “theories,” is that they will begin to confuse them with the standard scientific “theories” which they must already deeply interact, within our regular work. Or even, that they will confuse them with standard scientific knowledge –which species of knowledge they are uncontroversially capable of producing, and probably also ought to be producing.

The problem with confusing “recommendations for what to do” with “scientific knowledge of regularities of the world” – whether that knowledge is “fully” theoretical or sub-theoretical – is, quite simply, that these diverse species of knowledge products are built very differently.

Conflating the two would obscure substantial differences in how they are properly developed, justified, updated and challenged. Not only are they built fundamentally differently, but, to complicate things further, in a field dedicated to maintaining an empirical basis, there is a notable and complicated interdependence between the two.

Given their essentially different constitutions combined with the frequent necessity to nevertheless discussion them in relation with one another, it is of paramount importance that we use all the tools at our disposal, including vocabulary, to keep these two kinds of knowledge products distinct.

On the Differences in Building Generalized Recommendations vs. Scientific Knowledge of Regularities in the World

Much of the rest of this paper will deal with this crucial difference in “how they’re built” – for recommendations vs. knowledge of regularities in the world – and its implications for ID scholarship and, ultimately, for research-informed practice.

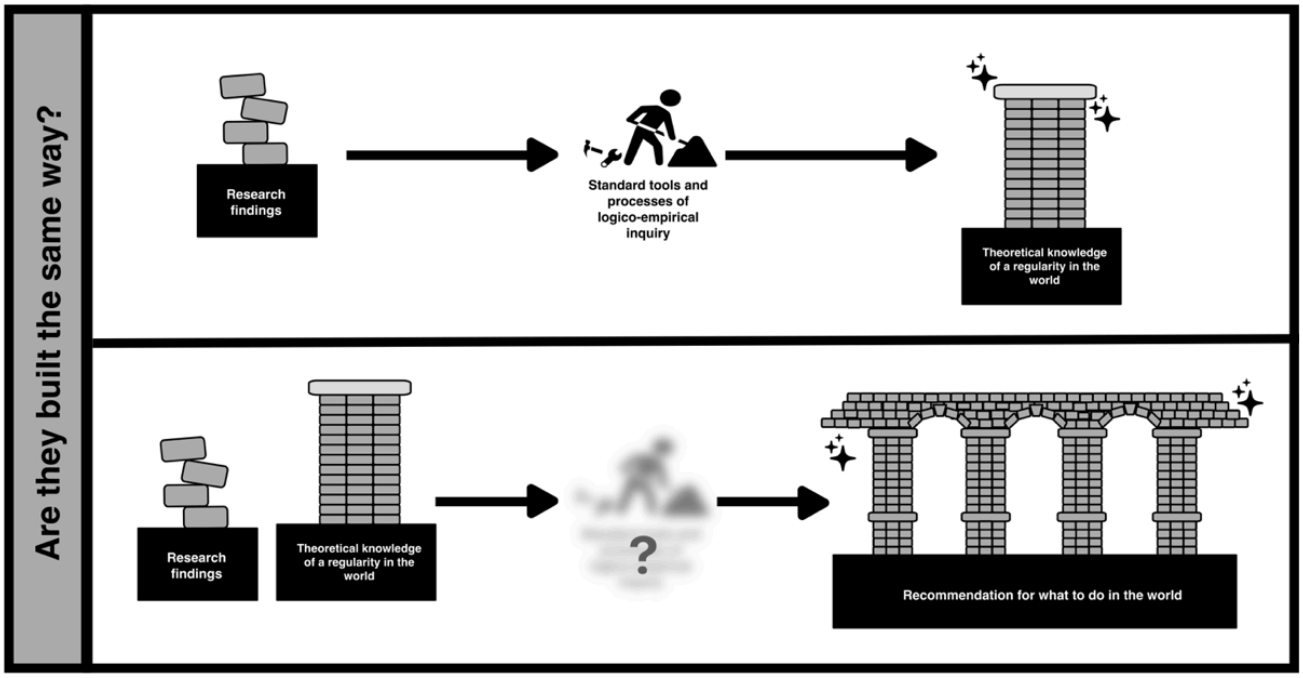
First: how is scientific knowledge of a regularity in the world built? The discussion will leave aside for the moment the difference between “theoretical” and “sub-theoretical” knowledge of regularities in the world. For our purposes here, we might as well take the pragmatic view of theoretical vs. sub-theoretical knowledge in science. That is: that they both build up through the same norms of logico-empirical inquiry. Meanwhile, some pieces of knowledge about regularities the world eventually becomes so firmly established, so broadly applicable (and thus useful to remember [Duhem, 1906]), and so exemplary for further work in the field (Kuhn, 1977) –that scientists deem it “theory” to mark it as such.

What matters for the purposes of the present argument is that in both fully “theoretical” and sub-theoretical cases, traditional scientific knowledge of regularities in the world builds up roughly in this way: through the systematic gathering and analysis of empirical data, often in the context of an explanation-laden hypothesis. This knowledge strengthens as further independent studies find evidence of the regularity.

The question is, then: is this also the course that must be taken for the development of rigorous instructional design recommendations –or, “prescriptive ID theories”? (Fig. 7).

Figure 7

Can we build recommendations using the same approach we use for building knowledge of regularities in the world?



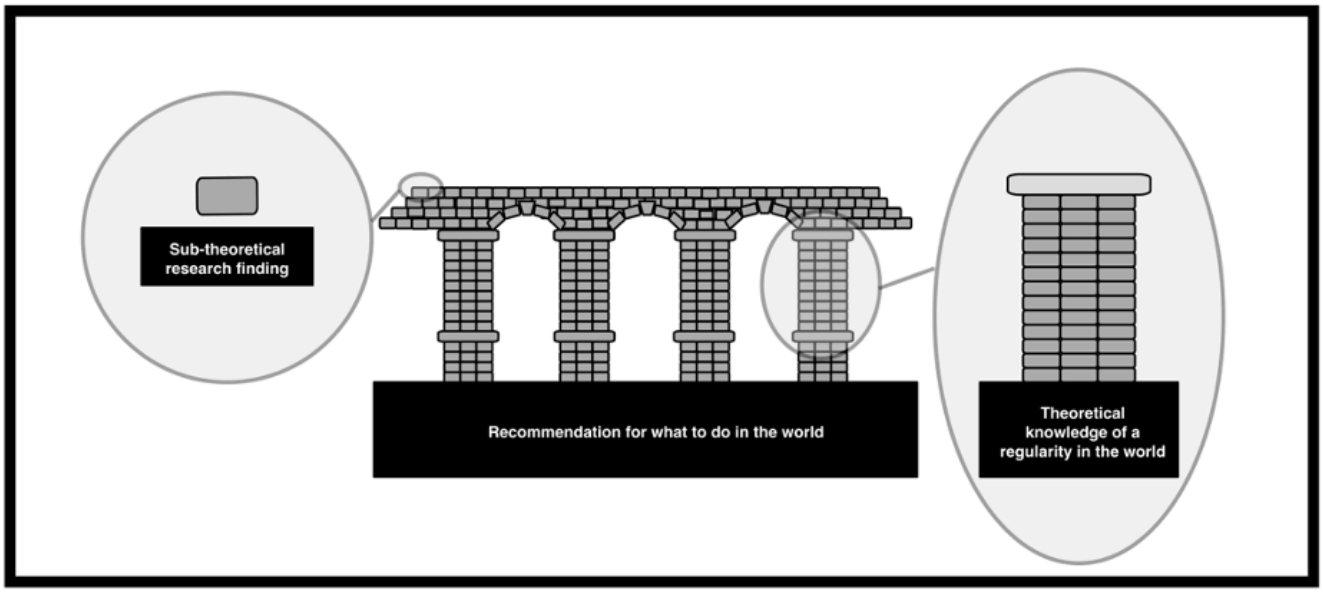
The Insufficiency of Any Fact or Theory to Recommend Action, Alone

The answer is no. These two knowledge products cannot follow the same course of development. The generation of relevant knowledge about regularities in the world, both theoretical and sub-theoretical, is in fact part of the process of developing rigorous instructional recommendations; but it is only a part. Standard scientific "theory" can at most have a partial, informing relationship to a recommendation – a claim that will be further defended below.

As illustrated in Figure 8: while a well-warranted recommendation for what to do is certainly reliant on facts or theories with empirical pedigrees; no single such empirically-pedigreed point of knowledge about a circumscribed regularity in the world – whether it rises to the "theoretical" level or not –is sufficient, by itself, to make a recommendation for action.

Figure 8

Knowledge of a regularity in the world can have, at most, a partial informing relationship to a recommendation



This is why robust empirical findings that “If you offer students a million dollars for memorizing the periodic table, they are 1000x more likely to successfully memorize the periodic table;” and “If you hurl verbal abuse at a student every time they say the word ‘ain’t’ in the classroom, they will say the word less often” –even if found true, through repeated high-quality experiments hinting at an almost law-like regularity –would not themselves translate into recommendations to pay students a million dollars to memorize the periodic table, or to hurl abuse at students to mitigate their use of the word “ain’t.”

Why is there not a translation, here? In the original “green book” edited by Reigeluth, contributor Lev Landa (1983) attempted to tackle this same vital question. Landa perceived that critics might accuse the method for deriving a scientific "prescriptive ID theory" of being a trivial one: a mere matter of rewording a “descriptive” finding about instruction (e.g. "If you do x, you're likely to get y") into a new exhortative form, (e.g., "If you want y, do x.")

Landa worried this criticism would in turn jeopardize Reigeluth et al’s attempt to establish the legitimacy of “prescriptive ID theorizing” as its own separate project, distinct from traditional empirical inquiry and theorizing in education. He therefore sought, in his own fashion, to demonstrate that the statement of an instructional fact could not be converted directly into a prescription for what to do in instruction. Landa hoped the deep distinction he established between (a) knowledge of regularities in instruction vs. (b) rigorous instructional “prescriptions” would preserve the legitimacy of the latter as, potentially, its own non- “descriptive” species of scientific “theory.”

Landa’s precise reasoning and his motivation to validate the legitimacy of a peculiar “prescriptive” form of scientific theory is obviously under critique here. However, from the perspective of the present paper, Landa was well-justified in one vital aspect of his project. That is, he was justified insofar as he aimed to demonstrate that there is more to establishing recommendations for what to do, than simply rewording a single finding of instructional effectiveness into an exhortation. This point remains correct and important in its implications.

The Greater Diversity of the Informational Substrate Required to Build a Recommendation

To recommend an intervention, scholars need to know, informally or otherwise, a few other things besides just that it has been well-established to work. For instance, with relevance to the examples used above, they should know such things as: whether it is ethically acceptable in means and worthwhile in ends; and, of course, whether it would quickly bankrupt the average school.

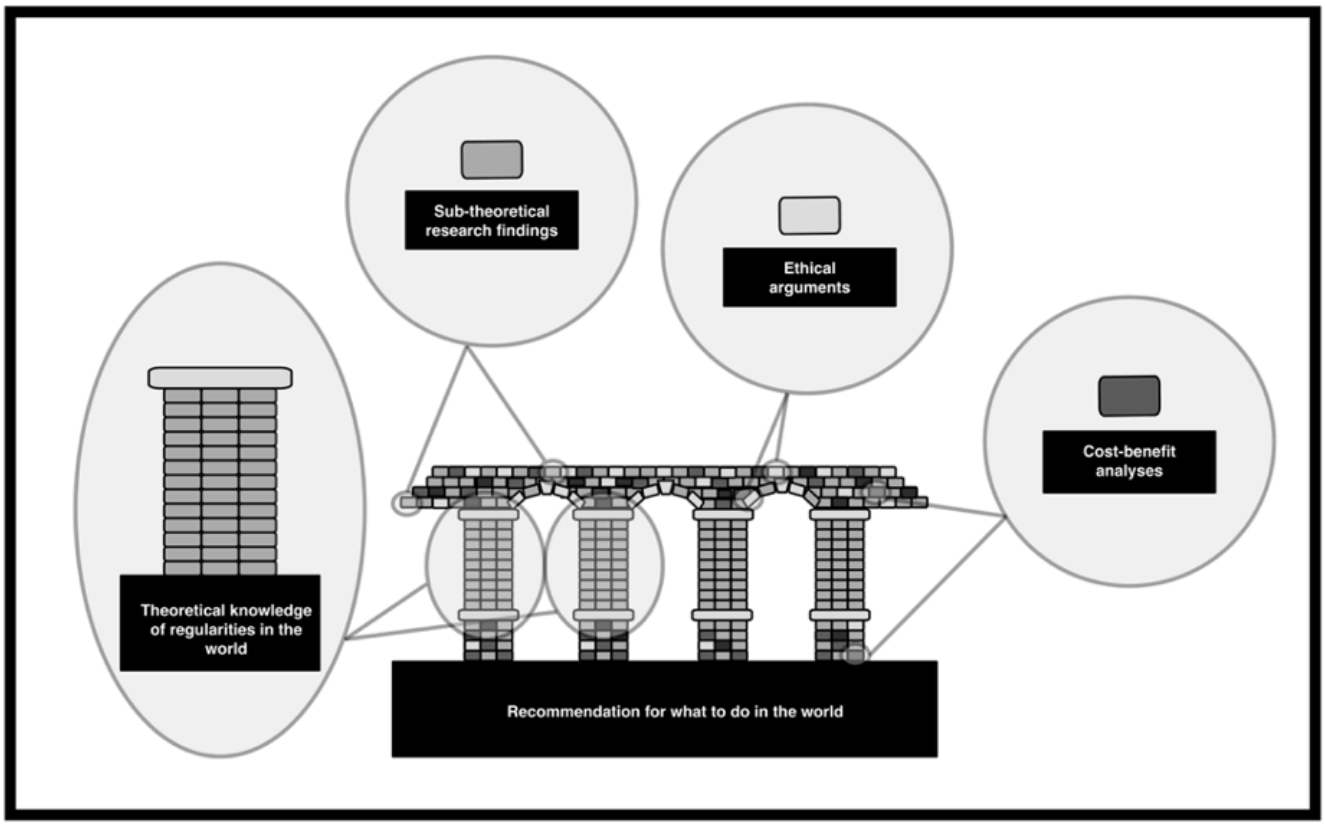
In fact, before a course of instructional action is recommended, the recommenders need to know many additional things about it, from many diverse corners of knowledge. As philosopher of science Carl Hempel (1961) wrote:

“If we are to choose a rational course of action in pursuit of given ends, we will have to take into account all available information concerning such matters as: the particular circumstances in which action is to be taken; the different means by which, in these circumstances, the given ends might be attained; and the side-effects that may be expected to result from the use of different available means” (p. 6, emphasis added).

Even the most arguably close-to-practice empirical findings –such as findings about the effectiveness of an intervention –are not themselves sufficient to make for recommendations for practice. Recommendations simply depend on more diverse reasons –indeed, more diverse kinds of reasons, in more complex argumentative interrelation to one another –for their proper justification, than do beliefs about regularities in the world. It follows that the construction of a rigorous recommendation is simply more involved than the construction of rigorous knowledge about a regularity of the world, as it depends on the prior justification of a highly diverse substrate of supporting information (Fig 9).

Figure 9

Constructing a rigorous recommendation relies on a diverse substrate of information



The Necessary Inclusion of Ethical Argumentation. As readers will likely have been anticipating: when I say that recommendations depend on “more diverse kinds” of reasons than just beliefs about regularities in the world, I am partially referring to their famous dependence on ethical norms about what kinds of things are good or morally permissible for people to do. This is a famous and well-understood difference between knowledge of the world and plans for what to do in the world, and it is well-discussed by philosophers of education as well (Biesta, 2007; Brighouse et al, 2018).

It is not for no reason that philosophers (Hume, 1979; Moore, 1903; Blackburn, 1993) have spent centuries arguing that you cannot get an ought from an is in the same way you can infer plain facts from each other. There is probably at least a special form of reasoning involved when one gets into questions of ethics and values.

Recommendations are already more complex knowledge products just because they need to engage in this extra species of argumentation. However, the additional complexity does not end with the extra ethical layer required for recommendation-building. The difference goes beyond that.

The Further Diversity of Even the Prosaic Scientific Information Basis of a Recommendation

Beyond its oft-noted, distinguishing ethical component, relative to standard scientific knowledge: a recommendation also relies for its justification on a broader and more eclectic information basis of even prosaic facts and theories about the world. That is: in the practical world, it is almost never one finding or theory which establishes the basis of a recommendation for action, but many. There are generally a large host of facts and theories, concerning separate aspects of the rich real-world environment in which we plan to intervene -- as well as interactions of those environmental aspects among themselves, and their interactions with given techniques -- which are relevant to the synthesis of any recommendation for action in that environment.

Many scholars have weighed in, from their various disciplines and traditions, suggesting the additional information bases desirable for making solid recommendation in educational contexts. According to them, to establish a recommendation, stakeholders do not just want to know that something regularly works –or even how well, on average, it works. Important as that often-privileged information is, they would also ideally like to know: (1) whether there are any meaningful differences in for whom it works (Cronbach and Snow, 1977), and if possible, (2) why, causally, it is thought to work at all (Joyce and Cartwright, 2019).

Furthermore, in a democratic society, participants would like to know (3) how generally its aims are endorsed by the concerned public (Biesta, 2007). They would like to know (4) how to weight the importance of those aims, given the resource tradeoffs it has with other priorities (Brighouse et al, 2018).

Indeed, critics have often suggested that an entire layer of ethically-inflected economic questions – the “cost-benefit” layer -- is all-to-frequently frequently missing, between theory and practice in education. For example: we would like to know (5) how much its recommended actions might cost to implement on average (Levin et al, 2018), and, beyond monetary cost, (6) how likely it is to have unpleasant externalities like burning out our teachers, or undermining our students’ motivation. And of course, we want to know: (7) how its effectiveness stacks up against such costs; and how its cost-benefit ratio compares to the ratios of its alternatives (Levin et al, 2018).

In summary: it requires far more work, from far more diverse traditions, as well as a far more complex synthesis of that work, to develop a rigorous scholarly recommendation than it does to develop “just” a theory about a regularity in instruction or its design.

Hints of The Multiply-Informed Structure for Recommendations in the Extant “Prescriptive Theory” Literature

Readers familiar with these topics will recognize that hints of this structure – i.e., wherein “recommendations” are informed by a diverse substrate of information, from diverse sources – have long been present in the program for developing “prescriptive design theory.”

Looking closely, Reigeluth's account of the relationship between what he calls "prescriptive theory" and "descriptive theory" implies a dependent, one-to-many relationship between the former and the latter. If "prescriptive ID theory" is that which anoints an "optimal" instructional approach[8] in a given situation; and, if "descriptive theories" characterize individual approaches on various criteria for optimization; then it follows that researchers would need to know many relevant "descriptive theories," for each prescriptive approach in any set of similarly-targeted approaches, in order to anoint one "optimal" "prescriptive theory" for that situation.[9]

Reigeluth does not fully develop this implicit idea of a one-to-many, partially dependent relationship between what he terms "descriptive" and "prescriptive" theories. However, the essence of such relationship is there for the observation, directly in his original definitions. It is worth noticing this thread of continuity between Reigeluth's original formulation and the amended one urged here.

Furthermore, in the idea of a one-to-many, contributory (yet not sufficient) relationship of standard scientific theory to recommendation, there are recognizable echoes of Gibbons's (2014) work in An Architectural Approach to Instructional Design. Gibbons's work has well-established the nestedness of traditional scientific theories within the larger argument for establishing "prescriptive theories" about what to do in instruction or its design.

In short, there has long been acknowledgment of this multiply-informed, "nested" structure of prescriptive theory, in the ID literature. This paper simply proposes a new and simpler conceptual structure for our research agenda, by replacing highly complex, nested prescriptive theories with … recommendations.

In information systems scholarship, too, Simon's call for "design theory" has been widely interpreted as a call for a new kind of discrete, competitive knowledge product in design-oriented fields (see Gregor, 2006). To clarify the relationship between their own dual species of "theoretical" knowledge products that have resulted from this understanding, information systems scholars have proposed ornately nested structures for "information systems design theories." In one formulation, "kernel" "explanatory" theories about information systems are nested within the justification for larger "prescriptive" "design theories" (Walls et al, 1992; Jones and Gregor, 2007). Internal critics from information systems science have expressed concern about the unnecessary complexity of this picture:

"It is not clear that layering such complexity into design theories serves the best interests of advancing design science research as a discipline on the level of other sciences. It violates one of the oldest principles of scholarship, the fourteenth century Ockham's Razor … It also seems problematic to create such distinct and specialized forms of theory, especially when these theories must entail other theories (such as kernel or justificatory theory). Besides failing to satisfy our expectations for other forms of scientific theory, it creates complicated rationalizations (Baskerville and Pries-Heje, 2010, p. 271)."

Baskerville and Pries-Heje's further concern is that this nested structure of theory-within-another-kind-of-theory will confuse researchers, who might too easily forget about the distinct natures and uses of such "theories," and draw on the wrong kind at the wrong time.

I agree that the distinction between recommendations for what to do (on the one hand) and scientific theories and findings regarding regularities in the world (on the other) is far too important – too central to our entire reason for being – to risk it getting lax or blurred. To that end, the following section will elaborate further on the concrete risks to our research program of confusing one for the other.

What Will Happen if We Forget the Difference in How to Build Theories vs. Recommendations?

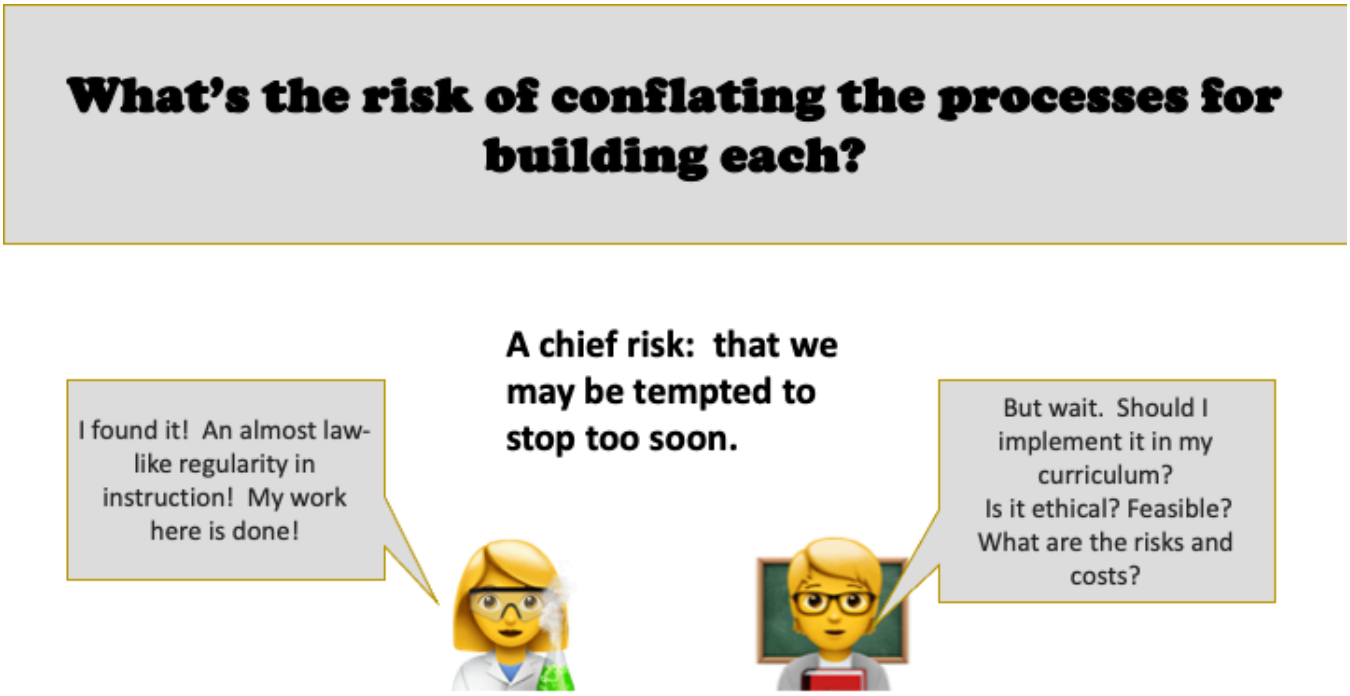
This paper has warned of danger to the academic ID research program (and, by extension, directly to research-informed ID practice) if the different constitution of theory-building and recommendation-building is not honored by researchers. But, more concretely: what would these "dangers" caused by working from false analogy between recommendation and theory actually look like? I propose three major risks for consideration here.

Risk One: That Scholars Will Chronically Stop Short of Synthesizing Full-Fledged Recommendations

A first risk is that as instructional design scholars might chronically trick themselves into falling short of synthesizing full-fledged recommendations. Scholars might be tempted to prematurely stop the line of inquiry every time a compelling regularity about instruction is discovered – especially if it is particularly robust or lawlike, and thus reminiscent of a "normal" "scientific theory" – and simply not complete the further work sufficient to establish recommendations related to it (Figure 10).

Figure 10

A risk that scholars will stop too soon



It is not unlikely that scholars will be tempted stop even beforehand: that is, at the level of the encouraging "finding" -- particularly if the discovered regularity is a favorable one, regarding a novel instructional approach (e.g, "novel intervention x was found to work better than control intervention y to achieve w according to z outcome measurement!"). Complacent with uncovering such a promising empirical fact, scholars might simply neglect the further work needed to establish a full instructional recommendation for the approach -- by inquiring on such further issues as its risks, benefits, limitations, tradeoffs, cost-effectiveness, and cost-benefit ratio relative to other interventions. Arguably, this reflects the present state of affairs, in academic ID.

Risk Two: Scholars Will Be Too Shy to Recommend

The second risk to ID's research agenda of confusing "recommending" with "theorizing" lies at another extreme. Rather than simply forget out of complacency to ever build basic empirical knowledge towards full recommendations, instructional design scholars might become too shy to make recommendations, overawed by the high bar set by the misleading name of "theory." Scholars may be inappropriately reticent to recommend to practitioners and designers at all, where they do not have full scientific "theory-like" understanding –that is, with lawlike predictability or extremely repeated findings, etc. –on every relevant supporting point, Asimovian "psycho-history" style.

Bringing inflated standards to recommendation-building via a false analogy to standard scientific knowledge development, where the goal is to establish "mere" regularities in the world, puts ID scholarship and research-informed practice at an unnecessary standstill.

Risk Three: That Scholars Will Forget the Differences In How to Properly Challenge and Update Each Kind of Knowledge Product

Finally, there is this serious risk: instructional design scholars may forget what it looks like to properly challenge and update the knowledge base of regularities in education, versus to properly challenge and update recommendations for education. Because, as discussed, they are built so differently –with recommendations often partially dependent on individual findings and theories, which are themselves dependent on further sub theoretical scientific findings –they must of course be treated differently, upon our discovery of challenging new knowledge. Books could and probably should be written on this difference and its implications; but I will simply provide a couple of examples, here.

A scientific discovery that changes our explanation for why something works may be devastating for some theoretical position in education, knocking that theory from its place in the literature. At the same time, such a discovery may have remarkably little effect on the dominance of an effective recommendation which cited the toppled theory in its rationale –because its recommended activities continue to work as well as they ever have.

On the other hand: repeated findings that a given validated technique regularly burns out the teachers asked to enact it do absolutely nothing to our separately established knowledge of its efficacy, which may remain as solidly enshrined in the literature as ever. But such a finding may completely devastate the formulation of recommendations advising use of the same technique.

Concluding Discussion of Risks: The Risks are Not Just Semantic

Through the above examples of concrete potential harms to our research program, I hope to establish the threat that scholars will confuse theory-building with recommending, if they make them share a name, as not a trivial semantic one. I propose that some of these hazards are already at work in the field of ID. Instructional design scholars do not build full, robust recommendations together on questions of general import, in instruction. Rather, they seem content to seek ever more discrete, localized regularities – almost exclusively about the effectiveness, alone, of highly specific interventions. There is, to date, no robust tradition in instructional design scholarship for systematically challenging or updating any of the vague, informal recommendations to practitioners that are created.

"Recommendation-Building" as an Organizing Principle in an Applied Field

The greater complexity of recommendatory knowledge products – and the distinctiveness of their proper development – is recognized in other fields, and we may look to them for guidance and inspiration, towards establishing a tradition of recommendation in ID.

Professional organizations with a strong commitment to evidence-based consensus – from the American Psychological Association (APA, 2002) to the American College of Physicians (Qaseem et al, 2010) to the American Academy of Pediatrics (2019) – support the publication of nuanced, multiply-evidenced policy and practice recommendations, by drawing on a range of relevant scholarly activity, evidence of efficacy to ethical analysis to cost-benefit analysis. In the past thirty years, medicine has seen the rise of a formal niche for "clinical practice guidelines" (CPG's) (Field and Lohr; 1990; Chen et al, 2017; Brouwers et al, 2018; Morgan et al, 2018) as a scholarly knowledge product, distinct – according to the influential Equator Network (equator-network.org) – from classical study types such as observational studies, randomized trials, economic evaluations, meta-analyses, etc.

In 2016, Brouwers et al synthesized a checklist for other scholars compiling such knowledge products, called the AGREE checklist. The AGREE checklist encourages synthesizers of CPG recommendations for the medical field to separately treat, in their reports, such items as (1) an empirical understanding of the target population's preferences and views, (2) an evaluation of the strengths and limitations of the available evidence regarding the treatment(s) under question, (3) the explicit links between recommendations and the evidence, at all relevant points of the recommendation (4) consideration of benefits and harms, and more.

In doing so, it neatly illustrates the previously discussed diversity of information and reasoning strategies which must work together in the synthesis of a recommendation for what to do. The AGREE checklist institutionalizes the varieties of information on which groups of scholars writing clinical recommendations should be drawing (e.g., diverse empirical knowledge, on multiple aspects of a given intervention, from diverse sources), as well as emphasizes the fact that they should be engaging in complex, ethically inflected cost-benefit thinking upon those diverse sources of information.

The fact that the field of medicine has honored a scholarly knowledge product dedicated to synthesizing recommendations for practitioners is a useful example to us, in our own applied field. The possibility of analogous standard scholarly knowledge products for ID may be worthwhile to discuss.

It bears a reminder, in closing, that "recommendation" need not refer just to a single, formal (and, yet-to-be-specified) type of publication out of ID. In a more abstract sense, "recommendation" also provides an alternative way to conceptualize our shared research agenda; that is, the way in which individual scholarly studies in ID build together with others towards something larger.

Under a recommendation-building metaphor versus a theory-building metaphor, individual knowledge contributions in ID need not be imagined as adding over time to an increasingly elaborate scientific "theory" of local regularities in instruction and its design. Instead, the distinctiveness of ID scholarship can lie in its aspiration to contribute to the development of high-level "recommendations" for instruction and its design, through the gradual accretion of arguments and evidence from multiple methods and traditions (e.g., from the psychological to the economic to the ethical and beyond), synthesized together at strategic points of need for a professional audience.

Conclusion

Sometimes, it seems that to call an idea a theory is just to give it a compliment. When speaking informally, we often call things theories when we think they are particularly profound, important, or wide in their influence. And so, when scholars have tried to define "theory" in ID in the past, perhaps they have really been trying to establish what kind of knowledge they want to hold up as exemplary, to pass on to the next generation of ID scholars, and to work together in larger pursuit of.

With that in mind: insofar as they chose the word "theory" to emphasize the crucial importance of the kind of scholarly recommendatory knowledge product which has been the subject of this paper, I am in hearty accord with the impulses of Bruner, Reigeluth, and Snelbecker. It is easy to cheer their original push towards something more in educational scholarship towards better serving practitioners. They were right: if the gap is to be narrowed between scholarship and practice, there is certainly much more to do, in educational research, than simply testing what works, as such, or even explaining why it works, as in traditional scientific research agendas.

The argument put forth in this paper is simply that the tradition through Bruner of conceptualizing recommendatory scholarly knowledge products as “theories” was mistaken. Calling them theories will not help their audience find them, nor will it help scholars to build them. In fact, it is likely to do nontrivial harm on both counts. It was proposed that if ID scholars can call their scholarly knowledge products that recommend what-to-do in instruction or its design something different – and in so doing, also draw on a better metaphor for their construction and refinement – then they should.

As an alternative, I have suggested for the benefit of both themselves and their practitioner audience, that ID scholars think of such scholarly products as recommendations. “Recommendation” is a word with a robust history in the scientific professions – and a concept which should be accorded, in application-oriented scholarship and research-informed practice, no less enthusiastic attention than “theory.”

Footnotes

[1] Like Dunne (1997) and Biesta (2007), in the philosophy of education, and like McDonald (2022) in instructional design, these readers might be skeptical of any scholarly agenda which, in their judgment, draws overmuch focus to the creation of disembodied formulas for action, and so comes at the expense of conversations about the uniqueness of educational environments and the uniquely important personal qualities of practitioners themselves – which conversations they deem to be of greater priority for educational scholarship.

[2] In this paper, the term “scholarly knowledge product” will be used to refer to the rigorous argument-and-evidence-backed *propositions* that scholarly inquiry is uniquely structured to deliver. When I refer in this paper to different species of “scholarly knowledge products,” I do not intend to refer to the individual *publications* or types of publications which convey such propositions; but actually to the species of propositions which are therein conveyed. In this account: different traditions of scholarship have diverse ideas of what constitutes a valid scholarly knowledge product, specialized means of producing such products, and (it is also true) specialized publication styles for conveying them.

[3] As will be elaborated in later sections, I would still question on philosophical grounds any claims that these scholarly knowledge products are both fully scientific and “prescriptive” at the same time. Nevertheless: these early frameworks seem intuitively to have a better claim to use of the word “theory” than many constructs later anointed as such in Reigeluth’s arguably more influential “green books.” Exploring why this is so deserves more space than available here; but it is perhaps due to their ambitiously fundamental nature, their broad applicability across instructional cases, as well as the unusual clarity and falsifiability of some of their claims. As mentioned in the introduction: there may very well be something worth calling “theory” out of ID. It is the narrower concept of “prescriptive ID theory” which is the target of this paper’s critique.

[4] This is a contradiction which has long plagued popular science communicators (National Academy of Sciences, 1998), as noted in Kelly’s (2004) critique of the use of “theory” from design research.

[5] As a striking example: if any artifact and/or its methods ever deserved – by virtue of generality, novelty, and impactfulness – to be called “prescriptive design theory,” the “General Problem Solver” created by Newell, Shaw, and Simon (1959) might be it. However, they referred to the path-breaking GPS as a “program,” and its systematic activities as “methods.”

[6] Indeed, none of the authors of the painstaking proposals from the 1962 Conference on Design Methods – which included a laboriously modeled optimal design for an Indian village (Alexander, 1962) – referred to their creations as "theories."

[7] It is worth noting that, unlike the present author, the above critics (e.g., Venable, Yanchar, and Faulconer), would nevertheless retain for ID a goal of creating action-oriented and practitioner-facing "theory," even while distancing the goals of such "design theory" from its historic aim of "prescription

[8] Where "optimality" is to be determined on the criteria of "efficacy, efficiency, and appeal" [Reigeluth, 1999, p. 9-10]).

[9] Furthermore, if a robust search for "optimality" is the aim in the search for "prescriptive ID theory," then it is implied that a mathematical decision-analytic logic would be needed to put these various "theories" into comparative discussion with one another, towards anointing one "prescriptive theory" as "best." But perhaps because the task as originally framed is still so monumental as to be uncertainly achievable, neither Reigeluth nor his successors have explored any systematic comparative techniques for determining the "optimality" of any "prescriptive theory" (such as mathematical optimization in the operations research tradition, or multi-criteria decision analysis [MCDA]). The agenda for developing "prescriptive ID theory" has evolved into a less systematic one than might have been predicted, from Reigeluth's earlier writings. The modern program centers iterative practical design and re-design driven by empirically informed critique, over anything more broadly systematic. (Reigeluth and An, 2009).

References

American Academy of Pediatrics. (2019). *Caring for our children: National health and safety performance standards guidelines for early care and education programs*. Alpha Press.

American Psychological Association. (2002). Criteria for practice guideline development and evaluation. *American Psychologist, 57*(12), 1048–1051.

Andrews, D. H., & Goodson, L. A. (1980). A comparative analysis of models of instructional design. *Journal of Instructional Development, 3* (4), 2–16.

ASCD Commission on Instructional Theory (1968). *Criteria for theories of instruction*. (I. Gordon et al, eds.). Association for Supervision and Curriculum Development.

Ausubel, D. P. (1966). Review of "Toward a theory of instruction" by Jerome S. Bruner. *Harvard Educational Review, 36*(3), 337–340.

Baskerville, R., & Pries-Heje, J. (2010). Explanatory design theory. Busi*ness & Information Systems Engineering, 2*(5), 271–282.

Biesta, G. (2007). Why 'what works' won't work: Evidence-based practice and the democratic deficit in educational research. *Educational Theory, 57*(1), 1–22.

Blackburn, S. (1993). *Essays in quasi-realism*. Oxford University Press.

Bostwick, J., Wade, I. W., Francis, J., Mawkley, M., Henrie, C.R., Hyatt, F.R., Juncker, J., & Gibbons, A.S. (2014). A process for the critical analysis of instructional theory. *Educational Technology Research and Development, 62*, 571-582.

Brighouse, H., Ladd, H. F., Loeb, S., & Swift, A. (2018). *Educational goods: Values, evidence, and decision making*. University of Chicago Press.

Brouwers, M. C., Florez, I. D., McNair, S. A., Vella, E. T., & Yao, X. (2018). Clinical Practice Guidelines: Tools to support high-quality patient care. *Seminars in Nuclear Medicine, 49*(2), 145–152.

Brouwers, M. C., Kerkvliet, K., & Spithof, K. (2016). The AGREE reporting checklist: A tool to improve reporting of clinical practice guidelines. *BMJ (Online), 352*(i1152).

Branch, R. M., & Kopcha, T. J. (2014). Instructional design models. In J. M. Spector, M. D. Merrill, J. Elen, & M. J. Bishop (Eds.), *Handbook of Research on Educational Communications and Technology* (pp. 77–89). Springer Science and Business Media.

Bruner, J. (1963). Needed: A theory of instruction. *Educational Leadership, 20*(8), 523–532.

Bruner, J. (1966). "Notes on a theory of instruction." *In Toward a theory of instruction* (pp. 39–72).

CDC Guidelines and Recommendations Work Group. (2012). *Guidelines and recommendations: A CDC primer*. Office of the Associate Director for Science Centers for Disease Control and Prevention. Retrieved from https://stacks.cdc.gov/view/cdc/81408/cdc_81408_DS1.pdf.

Chen, Y., Yang, K., Marušić, A., Qaseem, A., Meerpohl, J. J., Flottorp, S., ... & Ahmed, F. (2017). A reporting tool for practice guidelines in health care: The RIGHT statement. *Annals of Internal Medicine, 166* (2), 128-132.

Craver, C. F. (2002). Structures of scientific theories. In P. Machamer & M. Silberstein (Eds.), *The Blackwell guide to the philosophy of science* (pp. 55–79).

Cronbach, L., & Snow, R. (1977). *Aptitudes and instructional methods: A handbook for research on interactions*. Irvington Publishers.

Cross, N. (2001). Designerly ways of knowing: Design discipline versus design science. *Design Issues, 17(*3), 49–55.

Driscoll, M. P. (1994). *Psychology of learning for instruction*. Allyn and Bacon.

Duhem, P. (1906/1991). *The aim and structure of physical theory* (P. Wiener, Trans.) Princeton University Press.

Dunne, J. (1997). *Back to the rough ground: Practical judgment and the lure of technique*. University of Notre Dame Press.

Edelson, D. (2002). Design research: What we learn when we engage in design. *The Journal of the Learning Sciences, 11*(1), 105–121.

Ertmer, P. A., & Newby, T. J. (1993). Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. *Performance Improvement Quarterly, 6*(4), 50–72.

Field, M. J., & Lohr, K. N. (Eds.). (1990). *Clinical practice guidelines: Directions for a new program*. National Academy Press.

Gibbons, A. S. (2014). *An architectural approach to instructional design*. Routledge.

Gibbons, A., & Rogers, P. C. (2009). The architecture of instructional theory. In C. M. Reigeluth & A. A. Carr-Chellman (Eds.), *Instructional-design theories and models: Building a common knowledge base, Vol. III* (pp. 305–326). Taylor and Francis.

Gregor, S. (2006). The nature of theory in information systems. *Management Information Systems Research, 30*(3), 611-642.

Grishakova, M., & Salupere, S. (2015). *Theoretical schools and circles in the twentieth-century humanities: Literary theory, history, philosophy*. Routledge.

Gustafson, K. & Branch, R.M. (1997). S*urvey of instructional development models: Third edition*. ERIC Clearinghouse on Information & Technology.

Hempel, C. G. (1961). Rational action. *Proceedings and Addresses of the American Philosophical Association, 35*, 5–23.

Hesse, M. (1966). *Models and analogies in science*. University of Notre Dame Press.

Hume, D. (1739). *A treatise of human nature*. Oxford.

Huppatz, D. (2015). Revisiting Herbert Simon's "Science of design." *Design Issues, 31*(2), 29-40.

Jones, D., & Gregor, S. (2007). The anatomy of a design theory. *Journal of the Association for Information Systems, 8*(5), 312–335.

Joyce, K. E. (2019). The key role of representativeness in evidence-based education. *Educational Research and Evaluation, 25*(1–2), 43–62.

Kelly, A. (2004). Design research in education: Yes, but is it methodological? *Journal of the Learning Sciences, 13*(1), 115–128.

Kliebard, H. M. (1986). *The struggle for the American curriculum: 1893-1958*. Routledge.

Kotarbiński, T. (1965). *Praxiology: An introduction to the sciences of efficient action*. Pergamon.

Kotarbiński, T. (1966). Praxiological sentences and how they are proved. *Studies in Logic and the Foundations of Mathematics, 44*(C), 211–223.

Kuhn, T. (1977). Second thoughts on paradigms. In F. Suppe (Ed.), *The structure of scientific theories*. University of Illinois Press.

Landa, L. (1983). Descriptive and prescriptive theories. In C. M. Reigeluth (Ed.), *Instructional-design theories and models, Volume I: An overview of their current status*. Lawrence Erlbaum Associates.

Leitch, V. B. (2001). *The Norton anthology of theory and criticism*. Norton.

Levin, H. M., McEwan, P. J., Belfield, C. R., Bowden, A. B., & Shand, R. (2018). *Economic evaluation in education: Cost-effectiveness and benefit-cost analysis*. SAGE.

McDonald, J. (2022). "A framework for phronetic LDT theory." In Leary, H., Greenhalgh, S. P., Staudt Willet, K. B., & Cho, M-H. (Eds.), *Theories to influence the future of learning design and technology.* Ed Tech Books.

McDonald, J. and Yanchar, S. (2020). "Towards a view of originary theory in instructional design." *Educational Technology Research and Development, 68*(2), 633-651.

Merrill, M.D. (1983). Component display theory. In C. M. Reigeluth (Ed.), *Instructional-design theories and models, Volume I: An overview of their current status.* Lawrence Erlbaum Associates.

Moore, G. E. (1903). *Principia ethica.* Cambridge University Press.

Morgan, R. L., Florez, I., Falavigna, M., Kowalski, S., Akl, E. A., Thayer, K. A., … Schünemann, H. J. (2018). Development of rapid guidelines: 3. GIN-McMaster Guideline Development Checklist extension for rapid recommendations. *Health Research Policy and Systems, 16*(63), 1–12.

Morgan, M. & Morrison, M. (1999). *Models as mediators: Perspectives on natural and social sciences.* Cambridge University Press.

National Academy of Sciences. (1998). *Teaching about evolution and the nature of science.* National Academy Press.

Newell, A.; Shaw, J.C.; Simon, H.A. (1959). *Report on a general problem-solving program.* The Rand Corporation.

Qaseem, A., Snow, V., Owens, D. K., & Shekelle, P. (2010). The development of clinical practice guidelines and guidance statements of the American College of Physicians: Summary of methods. *Annals of Internal Medicine, 153*(3), 194–199.

Reigeluth, C.M, Merrill, M.D., Wilson, B.G., & Spiller, R.T. (1980). The elaboration theory of instruction: A model for sequencing and synthesizing instruction. *Instructional Science, 9*, 195-219.

Reigeluth, C. M. (1983). Instructional design: What is it and why is it? In C. M. Reigeluth (Ed.), *Instructional-design theories and models, Volume I: An overview of their current status.* (pp. 3–36). Lawrence Erlbaum Associates.

Reigeluth, C.M. (Ed.). (1999). *Instructional-design theories and models, Vol II: A new paradigm of instructional theory.* Routledge.

Reigeluth, C. M., & Carr-Chellman, A. A. (2009). Understanding instructional theory. In C. M. Reigeluth & A. A. Carr-Chellman (Eds.), *Instructional-design theories and models, Vol III: Building a common knowledge base* (pp. 3–26). Routledge.

Reigeluth, C. M., & An, Y. (2009). Theory building. In C. M. Reigeluth & A. A. Carr-Chellman (Eds.), *Instructional-design theories and models, Vol III: Building a common knowledge base* (pp. 365–385). Routledge.

Richey, R. (1986). *The theoretical and conceptual bases of instructional design*. Kogan Page.

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

Seel, N. (1997). Models of instructional design: Introduction and overview. In Dijkstra, S., Schott, F. Seel, N., and Tennyson, R.D. (Eds.), *Instructional Design: International Perspectives, Vol I (pp. 355-359)*. Routledge.

Seels, B. (1997). Taxonomic issues and the development of theory in instructional technology. *Educational Technology, 37*(1), 12–21.

Simon, H. A. (1969). *The sciences of the artificial.* MIT Press.

Snelbecker, G. E. (1974). *Learning theory, instructional theory, and psychoeducational design*. McGraw-Hill.

Suppe, F. (Ed.) (1977). *The structure of scientific theories*. University of Illinois Press.

Travers, R. M. W. (1966). Towards taking the fun out of building a theory of instruction. *Teachers College Record, (68)*, 49–59.

Van Fraassen, B.C. (1989). *Laws and symmetry*. Oxford University Press.

Venable, J. R. (2013). Rethinking design theory in information systems. In J. vom Brocke, R. Hekkala, S. Ram, & M. Rossi (Eds.), *Design science at the intersection of physical and virtual design: 8th international conference, DESRIST 2013, Helsinki, Finland, June 2013* (Vol. 7939 LNCS, pp. 136–149). Springer.

Walls, J. G., Widmeyer, G. R., & El Sawy, O. A. (1992). Building an information systems design theory for vigilant EIS. *Information Systems Research, 3*(1), 36–59.

West, R., Ertmer, P., & McKenney, S. (2020). The crucial role of theoretical scholarship for learning design and technology. *Educational Technology Research and Development, 68*(1), 593–600.

Winn, W. E. (1997). Advantages of a theory-based curriculum in instructional technology. *Educational Technology, 37*(1), 34–41.

World Health Organization. (2010). *WHO Handbook for guideline development.* World Health Organization. Retrieved from https://www.who.int/hiv/topics/mtct/grc_handbook_mar2010_1.pdf

Yanchar, S. C., & Faulconer, J. E. (2011). Toward a concept of facilitative theorizing: An alternative to prescriptive and descriptive theory in educational technology. *Educational Technology, 51*(3), 26–31.