# Is Direct Instruction an Answer to the Right Question?

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# Is Direct Instruction an Answer to the Right Question?

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Kirschner, Sweller, and Clark (2006) make a general case for the effectiveness of a teaching method—direct instruction—without reference to any context of what it is that is being taught by whom and to whom. In so doing, they bypass what is arguably the most pressing concern facing educators—not how to teach students but what to teach them. An argument is made for the need to contemplate instructional methods within the broader context of instructional goals.

Kirschner, Sweller, and Clark (2006) make a strong case for the efficacy, and hence desirability, of what is currently referred to as "direct instruction," over its alternatives, at all age levels. If we want students to learn something, they claim, we will be most successful if we convey it to them in as explicit, direct, and highly scaffolded manner as possible.

Kirschner et al.'s position comprises two separable claims—that direct instruction is effective and that other methods are ineffective. Each of these claims, I would maintain, is debatable, and solid experimental evidence exists that fails to support them. In my own research, we have shown that direct instruction does not fare so well when one takes the "long view," over time and transfer to new contexts (Dean & Kuhn, in press). On the other hand, well-controlled experimental studies have shown that students' learning is enhanced when they have identified a question or a problem to address (Capon & Kuhn, 2004; Kuhn & Dean, 2005).

Rather than pursue a detailed discussion of this evidence or contrasting evidence supporting Kirschner et al.'s claims, here, instead, I would like to pursue a theme based on what I found most striking about Kirschner et al.'s treatment of their topic—the fact that nowhere in the article do they make any reference to what it is that a teacher might be seeking to teach and students undertaking to learn. Implicit in their presentation is the assumption that their claims about how best to teach and learn are universally applicable, irrespective of what is being taught to whom.

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## COGNITION AND MOTIVATION

This universalist stance of Kirschner et al.'s article is especially striking as it stands in contrast to the contextualist perspective of the other articles that appear in the very same or an adjacent issue (Issues 1 and 2 of the 2006 volume) of this journal. The articles in issue 1 by Vansteenkiste, Lens, and Deci (2006); by Winne (2006); and by Boekaerts, DeKoning, and Vedder (2006); and the articles in issue 2 by Flum and Kaplan (2006) and by Hidi and Renninger (2006) all are devoted, explicitly or implicitly, to the topic of academic motivation.

In contrast to an earlier time in which motivation was regarded strictly as an attribute of the learner, motivation theorists now focus directly on what the subject matter is that students may (or may not) have the motivation to learn and more specifically what the relation may be between a particular student's dispositions and the particular subject matter we would like that student to master. In other words, motivation resides not within the individual but in the interaction between individual and subject matter. As Winne captures nicely in a few words in his article in issue 1 ". . . learners see themselves as agents who make choices about how to construct knowledge" (p. 9).

The implications of this newer perspective on motivation extend broadly to children and adolescents' development of self-regulation and identity formation, as well as to what they do in school. In their article, Flum and Kaplan underscore the need for the young child's natural curiosity to evolve into an active search for information and its examination and evaluation in a self-reflective manner. In their words, "the focus of exploration is simultaneously on engaging in the academic

material as well as on the self: What does engagement in the content suggest with regard to who one is, what are one's values, and who does one want to become" (2006, p. 106). They approvingly cite Nicholls (1989, 1992), who advocates the need for students to engage in "spirited discussion of the nature and point of what they learn in school" (1992, p. 280), an activity that requires explicit reflection and higher order thinking. Hidi and Renninger speak simply of the need for students to identify "a reason to be interested," a crucial step in their coming to regulate their own interest. In a similar vein, Vansteenkiste et al. (2006) see coming to identify with the value of an activity as a crucial step in "accepting regulation of the activity as one's own" (p. 21).

In addition to bringing subject matter into the equation, all of this points to the "cognitivization" of the construct of motivation from its historical origins as a dynamic, strictly affective construct (Bempechat & Drago-Severson, 1999; Kaplan & Maehr, 2002). Motivation theorists like Kaplan and Maehr now highlight the need to identify ". . . pathways by which students can construct the meaning of achievement situations and the purposes that they can adopt for engagement and success in achievement tasks" (2002, p. 138). The broad conclusion is that we need to focus our attention on what sense students are making of things if we hope to influence their behavior. In the school context, this means that key to predicting students' performance is examining what it is that they are undertaking to learn in school, what they think it means, how they construe the meaning of this material in relation to themselves, and whether they can see it as worth learning—none of which are easily accomplished tasks.

How, then, can we reconcile this contemporary perspective with the stance taken by Kirschner et al. that the most pressing issue facing educators is identifying and implementing the most effective mode of instruction, irrespective of what the content to be learned may be? This is the anomaly that inspired the present article, and in what follows I seek to resolve it. To anticipate in a word, my argument is that the concerns of Kirschner et al., and a number of others who take a position similar to theirs, are misplaced and that the most pressing concern facing educators and challenge to educational reformers is not in fact how to teach students but rather what to teach them. In other words, whether or not they have a correct answer, Kirschner et al. do not address the most pressing question.

## WHAT DO WE WANT CHILDREN TO LEARN?

The foundation for my argument is well laid by the motivation theorists cited above. David Olson (2003) in a recent book lays this foundation in even broader terms. It is students themselves, in the end, not teachers, he says, who decide what students will learn. A teacher cannot change a student's belief system or way of thinking unless the student wishes it to be changed. Hence, it is essential that we attend to what students think they are doing at school—what sense the endeavor makes to them (Kuhn, 2005, in press). As the authors quoted above stress, for there to be any chance of long-term success, students must come to identify with the value of the activity and then "accept[ing] regulation of the activity as one's own" (Vansteenkiste et al., 2006, p. 21). They must embrace the activity to the extent of incorporating it as part of their present and future identity.

If so, the crucial question becomes one of what kinds of activities can fulfill these demands. Kirschner et al. ignore the question. The assumption implicit in their article is that others will make the decision of what is to be learned and as educators their task is to identify the most efficient way in which this learning can be accomplished. The motivational theorists cited above recognize the importance of the question, but they assume that the answer is highly individualized. Every student must seek and find their own academic and personal interests and construct an identity around them, which will sustain engagement and aid in their pursuit. Educators can do no more than offer opportunities for exploration.

In recent writing (Kuhn, 2005), I have proposed a broader, less individualistic answer to the question of what it is that children might learn, what kinds of activities would accomplish these learning goals, and why these educational goals are superior to others. Traditional answers to the question of what schools should teach children have become increasingly hard to justify. Beyond basic literacy and numeracy, it has become next to impossible to predict what kinds of knowledge people will need to thrive in the mid-21st century. Like knowledge acquisition, another traditional goal—education for citizenship—is far from straightforward to characterize or implement. Examples across the world illustrate the dangers of ideological teaching that narrows students' perspectives to the point of accepting only their own "right" way of understanding human affairs.

A resolution has been in the direction of undertaking to teach not simply knowledge itself but the skills of knowledge acquisition,—skills that will equip a new generation to learn what they need to know to adapt flexibly to continually changing and unpredictable circumstances (Anderson, Greeno, Reder, & Simon, 2000; Bereiter, 2002; Botstein, 1997; Kuhn, 2005; Noddings, 2006; Olson, 2003). A shift in focus from knowledge to skills by no means resolves the question of educational goals. But it does bring the challenge of defining goals to the forefront as one that is by no means resolved and demands our primary attention. Prescriptions like those of Kirschner et al., regarding how best to inculcate knowledge will not suffice, nor even get us very far, if questions remain unresolved regarding what knowledge to teach or even whether to teach knowledge at all.

After examining possible alternatives, I make the case that the only defensible answer to the question of what we want schools to accomplish is that they should teach students to use their minds well, in school and beyond (Kuhn, 2005). The two broad sets of skills I identify as best serving

this purpose are the skills of inquiry and the skills of argument. These skills are education for life, not simply for more school (Andersen et al., 2000). They are essential preparation to equip a new generation to address the problems of the day.

We have only a brief window of opportunity in children's lives to gain (or lose) their trust that the things we ask them to do in school are worth doing. Activities centered on inquiry and argument enable students to appreciate the power and utility of these skills as they practice them. They learn for themselves what they are good for, without having to be told, and become committed to them as tools for lifelong thinking and learning.

## IS THERE AN ALTERNATIVE TO LEARNING BY DOING?

My purpose here is not to make a comprehensive case for inquiry and argument as goals of education. Space does not allow developing all the strands of the argument and I have done that elsewhere. Rather, my objective is to make explicit the implications of these claims with respect to a position like the one that has been advanced by Kirschner et al. and a number of others (Klahr & Nigam, 2004; Mayer, 2004).

In addition to describing the positive attributes of direct instruction as the preferred instructional method, Kirschner et al. explain what's wrong with methods they regard under the broad umbrella of "minimally guided instruction." Most well-known of these is the method that has come to be known as "inquiry learning," and is now widely endorsed as a highly desirable, even essential, aspect of science curriculum. Engaging in scientific inquiry activities is mandated in US curriculum standards as an instructional goal beginning in the early grades and at every grade level thereafter through secondary school (National Research Council, 1996). Inquiry practices vary widely but are generally agreed to entail identifying a question, generating and analyzing evidence, interpreting the evidence vis-à-vis the question, and drawing conclusions.

Kirschner et al. criticize such methods on two major grounds. The first is that they produce cognitive overload and unproductive search in problem-solving settings. In their place they advocate worked examples as the epitome of strongly guided instruction. These, they claim, make it explicit to the learner precisely what it is that needs to be learned and performed.

But note the anomaly that confronts us at this point. If we agree that development of inquiry skills is a worthwhile educational goal, as I have argued and a majority of science educators agree, and we also accept Kirschner et al.'s claims regarding the desirability of direct over inquiry methods of instruction, the following conclusion is unavoidable: Students should learn inquiry skills but they should not be involved in inquiry as an instructional method for mastering these skills. Engaging in inquiry, in other words, is not the most effective means of acquiring inquiry skills.

In making their second criticism of minimally guided instruction, Kirschner et al. make it clear that they see no anomaly here. Advocates of inquiry methods, they claim, confuse practicing a discipline and teaching or learning that discipline (science, in this case). It is a mistake, they say, "to assume that the pedagogic content of the learning experience is identical to the methods and processes (i.e., the epistemology) of the discipline being studied. . . " (p. 84). There is no basis, they claim, for advocating ". . . learning a discipline by experiencing the processes and procedures of the discipline" (p. 78). It is notable that this extended discussion of science education methods by Kirschner et al. takes place without their ever once making a reference to what it is that students might or ought to be learning about science, a question that in the field of science education both theorists and practitioners have been grappling with for decades.

Meanwhile, science educators have moved increasingly to the view that the most important thing children have to learn about science is to recognize science as a way of knowing the world, one that distinguishes it from other kinds of knowing and serves as a powerful tool for understanding (see Lehrer & Schauble, 2006, for review). Here the latest views of motivation theorists, which we visited earlier, come into play. It is students' understanding of the use and purpose of what they are learning that is vital to their willingness to engage in learning it. Of course we want children to acquire some rudimentary understanding of the physical and biological world around them, but it is by now obvious that we can hope to impart only an arbitrary smattering of what there is to know in these complex and rapidly expanding scientific disciplines. And what is most likely to stay with students over the ensuing years is not the specifics but the overall nature of the enterprise and what sense it makes. Are scientific topics worth learning about, knowing about, or inquiring about any more deeply? And, as the motivation theorists highlight, another critical question: Am I someone who is competent to engage in such learning?

How do such questions get answered? In the words of White and Frederiksen (2005), ". . . students need to develop explicit cognitive models of capabilities needed for inquiry. Such models help students learn how to do inquiry, as well as to understand its nature and purpose" (p. 212). In a word, students need to learn what it is scientists do and why they bother to do it. Students can develop that understanding only by engaging, in however rudimentary a way, in the practice of science. As for the claim that engaging in problem-solving produces cognitive overload, isn't problem-solving, often unstructured, exactly what students need to become equipped to do? Surely a steady diet of "worked examples" cannot possibly prepare today's students for what they will face in the 21st-century world.

## INTELLECTUAL GOALS AND THE MEANS TO ACHIEVE THEM

This article might be interpreted as perpetuating the "either/or" perspective of Kirschner et al.'s article. I should therefore make a point of disclaiming it. I am not making a case against the opposition—direct instruction—and in favor of inquiry or problem-based or discovery learning – the headings under which various constructivist methods get classified. Schwartz and Bransford and colleagues (Schwartz & Bransford, 1998; Schwartz & Martin, 2004) have for some time had it right in claiming that there is a place for both direct instruction and student-directed inquiry. The challenge is to get the balance and sequence right. And certainly the "worked examples" that Kirschner et al. emphasize have their place as well. As the other commentators (this issue) on Kirschner et al.'s article highlight, good instruction is never without structure. Indeed, designing the structure of problem-based instructional activities may require the most complex and demanding instructional design of all.

My argument here, then, is not for or against any instructional method. Rather, it is an argument for the need to contemplate instructional methods within the broader context of instructional goals. It is only in this context that it can be meaningful to do so. I have proposed here and elsewhere that the most defensible educational goals are those that pertain to mental self-management—taking charge of one's own learning—and coming to value learning and knowing and one's self as learner and knower (Kuhn, 2005; Kuhn & Park, 2005). If one accepts these as worthy educational goals, the instructional methods for best achieving them must be debated in the context of and in relation to these goals.

These goals and methods must also be debated in the context of learners' developing cognitive skills and understanding, broadly conceived. Particularly germane here is developing epistemological understanding (Hofer & Pintrich, 1997; 2002; Kuhn, Cheney, & Weinstock, 2000; Kuhn & Park, 2005). Consistent with all that has been said here regarding the importance of students' meaning-making, students base their intellectual efforts on a foundation of understanding of what it means to know. Research on epistemological understanding has now grown to the extent that we know in broad terms the nature of a developmental progression that occurs from childhood to adolescence and into adulthood. This evolution in levels of understanding of the nature of knowing provides a foundation, indeed the rational base, that is needed for sustained intellectual engagement and the formation of personal intellectual goals (Kuhn & Park, 2005).

Educators have long been concerned about whether students are motivated to learn and whether teachers know how to teach. Perhaps we are now at a point at which we should focus attention on what it is that students may be motivated to learn and why they wish to do so. What do they see as the value of this learning? Only then are we in a position to contemplate how best to help them achieve their goals.

As for direct instruction, of course it has a place. Each young student does not need to reinvent knowledge from the ground up. The challenge is to formulate what we want direct instruction to be. In doing so, it is well to keep in mind that it is students who construct meaning from such instruction and decide what it is that they will learn.

## REFERENCES

Anderson, J., Greeno, J., Reder, L., & Simon, H. (2000). Perspectives on learning, thinking, and activity. *Educational Researcher, 29*(4), 11–13.

Bempechat, J., & Drago-Severson, E. (1999). Cross-national differences in academic achievement: Beyond etic conceptions of children's understandings. *Review of Educational Research, 69,* 287–314.

Bereiter, C. (2002). *Education and mind in the knowledge age.* Mahwah, NJ: Erlbaum.

Boekaerts, M., de Koning, E., & Vedder, P. (2006). Goal-directed behavior and contextual factors in the classroom: An innovative approach to the study of multiple goals, *Educational Psychologist, 41,* 33–51.

Botstein, L. (1997). *Jefferson's children: Education and the promise of American culture.* New York: Doubleday.

Capon, N., & Kuhn, D. (2004). What's so good about problem-based learning?*Cognition and Instruction, 22,* 61–79.

Dean, D., & Kuhn, D. (in press). Direct instruction vs. discovery: The long view. *Science Education*. **Q4**

Flum, H., & Kaplan, A. (2006). Exploratory orientation as an educational goal. *Educational Psychologist, 41*, 99–110.

Hidi, S., & Renninger, K. A. (2006). The four-phase model of interest development, *Educational Psychologist, 41*, 111–127.

Hofer, B., & Pintrich, P. (1997). The development of epistemological theories: Beliefs about knowledge and knowing and their relation to learning. *Review of Educational Research, 67,* 88–140.

Hofer, B., & Pintrich, P. (Eds.). (2002). *Epistemology: The psychology of beliefs about knowledge and knowing.* Mahwah, NJ: Erlbaum.

Kaplan, A., & Maehr, M. (2002). Adolescents' achievement goals: Situating motivation in socio-cultural contexts. In F. Pajares & T. Urdan (Eds.), *Adolescence and education: Vol. 2. Academic motivation of adolescents* (pp. 125–167). Greenwich CT: Information Age.

Kirschner, P., Sweller, J., & Clark, R. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist discovery, problem-based, experiential, and inquiry-based teaching. *Educational Psychologist, 41*, 75–86.

Klahr, D., & Nigam, M. (2004). The equivalence of learning paths in early science instruction: effects of direct instruction and discovery learning. *Psychological Science, 15*, 661–667.

Kuhn, D. (2005). *Education for thinking.* Cambridge, MA: Harvard University Press.

Kuhn, D. (in press). How to produce a high-achieving child. *Phi Delta Kappan.* **Q5**

Kuhn, D., Cheney, R., & Weinstock, M. (2000). The development of epistemological understanding. *Cognitive Development, 15,* 309–328.

Kuhn, D., & Dean, D. (2005). Is developing scientific thinking all about learning to control variables? *Psychological Science, 16,* 866–870.

Kuhn, D. & Park, S. (2005). Epistemological understanding and intellectual values. *International Journal of Educational Research, 43*, 111–124.

Lehrer, R., & Schauble, L. (2006). Scientific thinking and scientific literacy: Supporting development in learning contexts. In K. A. Renninger & I. Sigel (Vol. eds.), W. Damon & R. Lerner (Series eds.), *Handbook of child psychology. Vol. IV* (6th ed.). Hoboken, NJ: Wiley. **Q6**

Mayer, R. E. (2004). Should there be a three-strikes rule against pure discovery learning? *American Psychologist*, *59*, 14–19.

National Research Council (1996). *The National Science Education Standards*. Washington, DC: National Academy Press.

Nicholls, J. (1989). *The competitive ethos and democratic education.* Cambridge, MA: Harvard University Press.

Nicholls, J. (1992). Students as educational theorists. In D. Schunk & J. Meece (Eds.), *Student perceptions in the classroom* (pp. 267–286). Hillsdale, NJ: Erlbaum.

Noddings, N. (2006). *Critical lessons: What our schools should teach.* New York: Cambridge University Press.

Olson, D. (2003). *Psychological theory and educational reform: How school remakes mind and society.* New York: Cambridge University Press.

Schwartz, D., & Bransford, J. (1998). A time for telling. *Cognition and Instruction, 16,* 475–522.

Schwartz, D., & Martin, T. (2004). Inventing to prepare for future learning: The hidden efficiency of encouraging original student production in statistics instruction. *Cognition and Instruction, 22,* 129–184.

Vansteenkiste, M., Lens, W., & Deci, E. (2006). Intrinsic versus extrinsic goal contents in self-determination theory: Another look at the quality of academic motivation. *Educational Psychologist, 41,* 19–31.

Winne, P. (2006). How software technologies can improve research on learning and bolster school reform . *Educational Psychologist, 41*, 5–17.

White, B., & Frederiksen, J. (2005). A theoretical framework and approach for fostering metacognitive development. *Educational Psychologist, 40,* 211–233.