THE JOURNAL OF EXPERIMENTAL EDUCATION
2018, VOL. 86, NO. 1, 124–135
https://doi.org/10.1080/00220973.2017.1380592

Routledge
Taylor & Francis Group

COMMENTARY ON THE SPECIAL ISSUE

The Relevance of Relevance for Learning and Performance

Patricia A. Alexander

University of Maryland, College Park, MD

ABSTRACT

In this commentary, an attempt was made to uncover common ground about relevance found among the contributions to this special issue, which reflect diverse theoretical orientations and empirical traditions. Those commonalities characterize relevance as person-centered, complex or multifaceted, significant, and modifiable. With these commonalities identified and discussed, several tacit assumptions about relevance and mechanisms for its enhancement are critiqued. Among those assumptions are: the seeming acceptance of school content and tasks as having relevance; an expectation that changes in relevance judgments should ultimately result in improved learning and performance; and, the assignment of primary responsibility for discerning relevance to learners. This commentary concludes with a recommendation to approach the study of relevance more systemically by considering the broader academic context and forces that can facilitate or frustrate students' abilities to find the value, utility, and meaningfulness in what is taught and what is tasked in school.

AS SOMEONE LONG concerned with learning and students' academic development, I see great value in trying to bring clarity and enhanced understanding to the construct of relevance as was the aim of this special issue (Albrecht & Karabenick, this issue). Unquestionably, relevance is a word familiar to the general populace and a notion that has populated the philosophical and psychological literatures for more than a century, as the editors of this special issue rightly observed (Albrecht & Karabenick, this issue). As occasionally happens within communities of practice, relevance has become the construct *du jour*, enjoying great celebrity status among educational and social psychologists.

In effect, the construct of relevance has risen to the surface as a powerful explanatory factor for some students becoming disenchanted with school or detached from their studies. It provides a rationale as to why certain students fail to be intrinsically motivated by or to self-identify with the content they are taught or the tasks they are assigned. Hence, it is timely and worthwhile to submit the construct of relevance to careful scrutiny and to do so from diverse theoretical perspectives. Clearly, the editors of this special issue have done well assembling a collection of scholars representing different theoretical orientations who can speak to the nature and importance of relevance for learning and performance. These contributors are also well equipped to suggest ways to help learners find relevance in the content they are taught and the tasks they are assigned.

Specifically, those contributing to this issue provide its readership with a wealth of theoretical, empirical, and statistical information regarding the conceptualization and operationalization of relevance from their unique vantage points. As such, these contributors have clearly taken up the gauntlet thrown down by the editors to "describe their perspectives on individual and social processes involved in relevance-based motivation and achievement interventions and outcomes" (Albrecht & Karabenick, this issue). Consequently, consumers of this issue will encounter multiple definitions of

CONTACT Patricia A. Alexander palexand@umd.edu Department of Human Development and Quantitative Methodology, University of Maryland, College Park, MD 20742-1131.

relevance, be introduced to many of its forms and manifestations, recognize how it is linked to diverse literatures and where it is situated within varying theoretical orientations. Readers of this issue will also be informed about novel and alternative procedures for the statistical analysis of relevance data.

However, does this wealth of psychological content achieve the dual goals of greater clarity and enhanced understanding sought by the editors? Or—as often happens when an idea that has long populated educational, psychological, and philosophical literatures, as well as everyday discourse, is cast into the limelight—does the effort create even more ambiguity or give rise to even more questions? As someone privileged to critically reflect on the thought-provoking articles included in this issue, I experienced both reactions. On the one hand, there were undoubtedly moments of clarity about relevance, especially in terms of its place within motivation theory and social psychology research. I garnered deeper and richer understandings about how respected motivation and social psychology researchers defined and modeled relevance and how they set out to change or measure it. On the other hand, I came away with the sense that certain assumptions upon which this work was predicated merited reconsideration and that critical pieces to the relevance puzzle still needed to be put in place. Thus, I will use this commentary as an opportunity for critical reflection on areas of agreement about relevance that emerge across the diverse perspectives represented in this issue. I will then share certain confusions that remained for me about the nature and nurturing of relevance and the role it plays in educational practice. In effect, I will use the platform of this commentary to consider the relevance of relevance for the learning and performance.

Consilience

In devising this special issue, Albrecht and Karabenick (this issue) were intentional in their efforts to assemble researchers who hold to varied theoretical orientations toward learning and motivation in general and, consequently, toward relevance in particular. Thus, Acee, Weinstein, Hoang, and Flaggs (this issue) draw on a history of research in learning strategies and self-regulation to frame their article on value reappraisal that entails prompting learners to rethink their perspectives on tasks with the end goal of improved academic outcomes. Priniski, Hecht, and Harackiewicz (this issue), whose research is nested within social and personality psychology, craft a model of personal relevance that progresses on a continuum from personal association to personal usefulness and, ultimately, to identification. As researchers who embrace self-determination theory (STD), Vansteenkiste et al. (this issue) understandably view relevance through the lens of autonomously motivated learning and consider self-relevance from the viewpoint of learners' volition. For Walkington and Bernacki (this issue), with combined expertise in mathematics and intelligent tutoring systems, the focus is on context personalization or the use of adaptive systems that allow for curricular modifications meant to forge connections between a student and mathematics problem solving.

In the last two contributions, the emphasis turns to methodology. In particular, Nagengast et al. (this issue) offer a procedure for considering students' compliance or noncompliance with a given intervention as a mechanism for judging the effects of that intervention. The compliers average causal effects (CACE) and noncompliers average causal effects (NCACE) procedures afford a metric for considering fidelity of treatment at the individual level and for assessing the effects of that treatment when participants' compliance or noncompliance is taken into account. For this issue, this technique was applied to data from a large-scale relevance intervention (Gaspard, Dicke, et al., 2015).

As with Nagengast and colleagues (this issue), Hartwell and Kaplan (this issue) apply a more novel data-analytic technique to relevance-specific data. Also, in a rather unique way, Hartwell and Kaplan started from a more phenomenological orientation. Specifically, these authors first sought to unearth students' perceptions of relevance, as revealed in the ninth-graders' responses to prompts about any associations they could envision between a given task and their life experiences. The resulting data were then submitted to multidimensional scaling analysis (MDS). The MDS resulted in a two-dimensional mapping with the first dimension, relevance degree, being interpreted as the extent of perceived self-relevance, and the second dimension, cognitive-value, distinguishing between value-related and cognitive aspects of relevance conceptions.

Given this conceptual range and the contrasting perspectives, is consilience possible for these contributing authors when it comes to relevance? *Consilience* is a term introduced by Whewell (1840) and used by Wilson (1998) to describe unity of knowledge across varied disciplines. I began this commentary by asking whether there was any unity of knowledge surrounding relevance that could be extracted from these six contributions. In reflecting on these articles, I found that there was indeed common ground to be mapped. In several cases, that common ground was expressly identified by authors, whereas in other cases that common ground came in the form of tacit assumptions guiding the collective work. Specifically, the explicit common ground shared by these authors' views the construct of relevance as person centered, complex or multifaceted, significant, and modifiable. I address each of those dimensions within the ensuing discussion.

Perhaps even more intriguing to me, as someone engaged in critical analysis of this special issue, were the largely unvoiced assumptions about relevance as it is presumed to function within the context of learning and performance. I refer to these assumptions as largely unvoiced because they were often located "between the cracks" of the discourse, marked as much by what was not mentioned by authors as what they explicitly stated. It was this tacit area of consilience that fueled certain puzzlements about the nature and nurturing of relevance and its place within educational practice. I focus on those puzzlements later in this commentary. For now, let me return to the common ground shared by contributors to this issue.

Relevance as person centered

In their introductory article, Albrecht and Karabenick (this issue) use the enticing claim posed by philosopher Israel Scheffler (1969) to capture a central theme of this special issue: "Nothing is either relevant or irrelevant in and of itself. Relevant to what, how, and why?—that is the question" (p. 764). To Scheffler's three interrogatives, I would add another of importance to the ensuing treatises, "Who?" For the contributors to this issue of the *Journal of Experimental Education*, there appears to be an unwavering emphasis on the individual and on relevance as seen through the eyes of the "one." Although there is mention of others within the pages of this issue, including teachers, the common ground among these works is that they remain fixed on the individual student—the self—in the perspectives they hold and the models they propose.

For example, Acee et al. (this issue) cast value reappraisal as a general strategy that could be applied broadly to academic content or tasks to stimulate reassessments of domain or task value or utility. These reappraisals seek relevance adjustments that are specific to individual students. Similarly, the relevance continuum posed by Priniski et al. (this volume) conceptualizes the movement from personal association to identification as a uniquely individual experience. In articulating their identity-based model of relevance, Hartwell and Kaplan (this issue) are very evidently focused on the one in that they "intentionally foreground the role of the self and self-related exploration in relevance construction."

Relatedly, the plethora of terms that populate this collection of articles have a distinctively person-specific focus. *Self-relevance*, for example, is discussed both by Hartwell and Kaplan (this issue) and by Vansteenkiste et al. (this issue), albeit from distinct theoretical orientations. Specifically, Hartwell and Kaplan (this issue) conceptualize self-relevance in terms of "meaningful personal connections" that a student may seek to forge with academic content. Viewing relevance through the lens of SDT, Vansteenkiste et al. (this issue) likewise speak of self-relevance as the personal meaning a student brings to a learning task. While their focal term is *personal relevance*, Priniski et al.'s (this issue) conceptualization carries the same connotation of a "personally meaningful connection" (p. xx) to the individual. Despite the absence of "self" or "personal" as an identifier, Walkington and Bernacki (this issue) offer an explicit definition of relevance pertinent to personalized learning or PL that also connotes a student-centered emphasis. What varies is that these authors move away from the idea of meaningfulness to "objects, events, goals, and ideas that a learner finds familiar, likes, or values, combining cognitive, affective, and motivational components" (p. xx).

Relevance as complex and multifaceted

Yet another area of agreement that emerges from the authors' varied treatises is the implication that simplistic or unidimensional perspectives of relevance that might suffice as folk constructs are wholly

inadequate when the construct moves from everyday discourse to formal theories and models. In every instance, these researchers have conveyed a conceptualization of relevance that is complex and multifaceted or multidimensional in nature. In some ways, the Hartwell and Kaplan article (this issue) bridges folk and formal conceptions of relevance in that it starts with the language of students and builds to a more formal depiction of self-relevance. That is, the multidimensional portrayal of self-relevance begins with the responses of ninth graders to open questions that asked them to discuss how certain biology topics were personally meaningful to them. By engaging in detailed analysis of those responses via multidimensional scaling (MDS) analysis, the authors provide support for their contention that students' conceptions of self-relevance encompass three key dimensions: the academic content, the student's identity, and the connection students build between those two.

In their examination of relevance via SDT, Vansteenkiste et al. (this issue) offer a model of rationales that should "foster perceived self-relevance and promote the process of internalization" for students (this issue). From their analysis, the authors conclude that contextual, task-related, and learner-related factors must be simultaneously considered when trying to formulate a rationale that will be seen as self-referential and that is apt to foster internalization. In these components, there is a noticeable relation to the three dimensions described by Hartwell and Kaplan (this issue), who also acknowledge the role of context, a dimension central to Vansteenkiste et al.'s (this issue) model.

Although Acee et al. do not specifically write in terms of the multidimensionality of relevance, they provide sufficient evidence that it is not easy to alter the negative perceptions that students come to hold about specific academic domains or tasks. In effect, the process model they have described to evoke reappraisals of task value judgments entails activities to elicit immediate cognitive-affective responses regarding coursework that are regarded as critical to changes in perceptions about the relevance of what is being taught and what is being tasked in academic courses. Such reappraisals are seen as catalysts for positive academic outcomes.

Relevance as important

Motivation has been broadly defined as the physiological processes involved in the direction, vigor, and persistence of behavior (Bergin, Ford, & Hess, 1993, p. 437). For many educational psychologists, concern for motivation revolves around academic achievement or the direction, vigor, and persistence of behaviors that contribute to students' success relative to whatever internal or external standards have been set for educational performance (Alexander & Murphy, 1998; Alexander & Riconscente, 2005). Relevance for these researchers is perceived as a mechanism to elicit the vigor or persistence seen as necessary to achieve those standards. For social psychologists, the importance of relevance rests in the degree to which it moves individuals away from a strong extrinsic motivation for performance in academic contexts to one that is increasingly more intrinsic in nature. In this way, relevance enhances the likelihood that students' actions will be driven by their will or volition (Ryan & Deci, 2000). Still for others, relevance carries a personal identification with the content or tasks that are far more likely to invigorate students' engagement or promote persistence (Rosenzweig & Wigfield, 2016). When students identify in some positive manner with a domain of study or regard themselves as "good" at some academic task, then there is a degree of relevance that that domain or task holds for them.

For all these perspectives, however, relevance serves as a means to a valued end. Its importance comes from what it instigates rather than what it inherently represents. Moreover, what the attention to relevance often affords in the studies cited by contributors are documented changes in attitudes toward target content or tasks, more evidence of regulatory behaviors, or higher reports of interest in the domain. For instance, if a science teacher in high school or a professor of statistics utilizes a value-reappraisal strategy, it may increase student engagement in the academic experiences presented to the students. Or if students are given some choice in the problems they solve or find the events depicted in a problem to reflect their lives, they may well attend more to the content, identify some solution path suggested by their prior experiences, or simply persist longer.

Of course, whether any of these steps ultimately translate into significant gains in learning or achievement or endure for any period following the intervention is less well established. On the positive

side, Walkington and Bernacki (this issue) discuss how attempts to ground arithmetic or algebra problems in students' everyday experiences and language have resulted in better problem solving in certain investigations (e.g., Koedinger, Alibali, & Nathan, 2008). However, as they acknowledge, a clear direct causal path between relevance interventions like their personalized learning environments and student learning outcomes has yet to be forged in the empirical literature. In fact, as the work of Harackiewicz and colleagues (Canning & Harackiewicz, 2015) and others (Rosenzweig & Wigfield, 2016) suggests, relevance interventions are not often globally effective and may even prove detrimental to some students. Thus, what becomes important is to understand better when such interventions are warranted, for whom, and under what conditions.

Relevance as modifiable

One of the strongest points of consilience for the contributors to this issue, even if it was not expressly stated by some, is the shared belief that relevance is not fixed for any learner. Instead, what content or tasks individuals perceive as personally meaningful, of interest, valuable, useful, or that to which they can identify is expected to shift as conditions internal and external to that individual change. For example, in articulating the process of personalization, Walkington and Bernacki (this issue) describe contextual grounding and funds of knowledge as two critical features in designing systems for personalized instruction. Contextual grounding, an external dimension, pertains to everyday situations relevant to students to which instruction and assessment ends should be linked. In contrast, funds of knowledge, which describes the various resources that students have derived from being members of various social/cultural communities, is an internal dimension that must be addressed when orchestrating personalized learning environments.

It is also apparent from the number of interventions described or referenced within these articles, that these researchers hold that it is not only possible but also desirable to orchestrate conditions that promote positive judgments of meaningfulness, interest, value, or utility of academic content and tasks. In fact, outside the critical analysis by Priniski et al. (this issue) there was little explicit discussion by these researchers that their specific orchestrated experiences may prove nonoptimal for particular learners, particular content, or particular contexts. Indeed, this lack of detail pertaining to *which* interventions should be expected to translate into *what* cognitive or affective outcomes for *whom* is what led Priniski et al. (this issue) to identify this concern as a direction for future research. As these researchers write: "Thus the same UV intervention could increase perceptions of personal association, usefulness, or identification for different students. This type of treatment heterogeneity can be a great asset for an intervention that needs to reach a diverse group of students with different levels of initial interest or success expectancies" (p. xxx).

Puzzlements

For all the points of clarification and new insights about relevance that these special issue authors have contributed, there were nonetheless puzzlements that arose for me. As mentioned, those puzzlements resulted from assumptions about relevance that were more or less taken as givens by the contributors. Yet, from my theoretical perspective as a cognitive contextualist concerned with the nature and process of learning unfolding in schools and in the world outside of school, those "givens" demand critical examination (Alexander, Schallert, & Reynolds, 2009). It is my sense that delving into those tacit assumptions will bring greater clarity to the construct of relevance and inform future efforts to craft interventions that lead not only to desired attitudinal or regulatory changes but also to improved learning and performance.

Specifically, what I extracted from these six contributions are five shared assumptions about the nature and promotion of relevance. Those assumptions that call for critical analysis are:

- What is taught or what is tasked in schools has relevance that simply awaits identification.
- When relevance with content and tasks is forged, improved learning or performance will eventually be realized.

- The identification of relevance requires the learner (the who) to forge a personal association with what is being taught or tasked (the what).
- There are ways to increase the possibility that learners will recognize the meaningfulness, value, or utility of what is being taught and what is being tasked.
- Relevance is a construct of significance for all learners and all academic content and tasks.

Inherent relevance

What struck me about these treatises in general was that the contributors seemed to accept the idea that there is, in fact, relevance to be found in the "whats" of schooling—the content and assignments that students in elementary, secondary, or tertiary education encounter. Thus, the task for students is merely to unearth that meaningfulness, to recognize the utility of that content, or to become intrinsically motivated by the assignments given. But is that a valid assumption? Is every topic, every lesson, and every task that students encounter valuable, significant, or personally interesting? Sadly, I think not. Having spent a good many years as a public school teacher and then as a university professor, I have perused numerous curricula, observed countless lessons, scanned many a school textbook, and evaluated an array of assignments and assessments. Throughout those experiences, I often felt uncertain of the merits of what was being taught, tasked, or tested. It was unclear to me why topic X was chosen as the focus of a lesson or assignment rather than Y, and I rarely heard teachers describe or illustrate the importance of what was being taught, tasked, or tested.

It has long been my mantra that educators at all levels are teaching less and less about more and more (Alexander, 2017; Alexander, Murphy, & Woods, 1996). Further, it is sometimes a struggle to identify the principled knowledge that educators are seeking to promote in their students not only at the lesson or task level but also in terms of the academic domain or discipline of concern. I use the term *principled knowledge* to denote those concepts or procedures that are core to a domain and that are foundational to subsequent learning in that field (Alexander et al., 1996; Gelman & Greeno, 1989). When students and teachers grasp those principles, they can see them reflected in the content and are more likely to recognize the value or utility of a specific lesson or task meant to build on those principles. Moreover, teachers are better prepared to illuminate that value or utility to their students during the flow of instruction.

In reality, however, the mile-wide-and-inch-deep curriculum is well established in the educational system (Schmidt, Houang, & Cogan, 2011). Lessons are crammed with questionable information, the significance of which is rarely reflected upon. My purpose in raising this depressing thought is that efforts to interject relevance into learning and instruction should consider a more systemic approach. Even as educators and educational researchers labor to help students find some personal value or utility in what is being taught, tasked, or tested, there should be concomitant efforts to reframe and reform what is being taught, tasked, and tested. These reforms efforts will undoubtedly require supports for teachers as they work to identify the principled domain and topic knowledge that warrants instructional time and as they consider ways to communicate the significance and relevance of that content to their students.

That is to say, even as researchers devise student-level interventions intended to instigate relevance judgments, it would seem imperative that educators and curriculum developers at all levels of schools take a long and hard look at *what* they are teaching. There should be a concerted effort to define the principled knowledge that warrants time and attention in academic domains and to ensure that students both understand the significance of that content and have ample opportunity to learn it. Thus, the practice of teaching less and less about more and more should be abandoned. Instead, the practice should be to teach more about less, with the less comprising concepts and procedures of significance—a significance that can be communicated meaningfully to students.

Improved learning/performance

Yet another assumption that appears to guide the work of the contributing authors is that students' recognition of relevance will ultimately result in improved learning or enhanced performance. I take no issue with the assumption that learners who perceive the value or importance of academic content and

tasks or who find themselves personally interested in what is taught or tasked should generally outperform those who regard such content or tasks as meaningless, trivial, or mundane. The problem is that the path from relevance to improved learning or enhanced performance is by no means direct, as suggested by the models described in this issue (e.g., Acee et al., this issue; Vansteenkiste et al., this issue). Rather, the contributors seem to envision relevance as instigating changes in students' attitudes toward the content or tasks, which in turn evokes changes in their behaviors, which should ultimately contribute to positive academic outcomes.

For example, that indirect path to learning or performance outcomes is seen in the process model offered by Vansteenkiste et al. (this issue). In their model, rationale-related features contribute to perceptions of self-relevance on the learner's part and to the process of internalization central to SDT. Subsequently, when these changes of perception and internalization are realized, learners are expected to manifest not only increased engagement and a greater sense of well-being but also improved learning and performance. Similarly, the value-reappraisal intervention devised by Acee and Weinstein (2010) and referenced in several of the articles in this issue was found to prompt shifts in the values students placed on the learning of statistics and on their views of the utility of statistics for accomplishing future goals. However, even as they reported on the benefits of this intervention, Acee and Weinstein acknowledged that there was only "tentative evidence" that the intervention "could increase students' performance on course exams but these benefits seemed to depend on unknown instructor and course factors" (p. 508).

Indeed, tentative evidence of the effects of relevance on learning and performance was what generally characterized the articles populating this issue or referenced by the contributing authors. What was more evident was that efforts to help students see the value or utility of what is being taught or tasked is more likely to translate into self-reported changes in attitudes or an expressed willingness to be more strategically engaged. The lingering question that must then be asked is whether such self-reported changes in attitudes or perceptions in the short term translate into documented changes in students' learning behaviors over the long term? Even more importantly, it is important to ask what the true value or utility of efforts to transform students' perceptions of personal relevance amounts to if there is no empirical evidence that their learning and performance is positively impacted? Thus, as the theoretical and empirical work on relevance progresses, I would expect to see more attention paid to the immediate and long-term effects on students' learning or academic performance.

Learner responsibility

Given the contributors' orientations toward relevance as a motivational construct, their emphases on individual learners and the personal or intrinsic association they perceive between themselves and the objects or "whats" of instruction seem justifiably placed. Within the context of school-based learning and instruction, however, there is yet another dimension to relevance that warrants consideration—rooted relevance (Alexander et al., 1996). Before I define this term, let me provide a bit of context for its generation. For some time, I had been wrestling with the question of why so many educational innovations fail and why there is the tendency among educators and policymakers to revisit some iteration of failed techniques over and over (Alexander & Knight, 1993).

Moreover, through our research, my colleagues and I (Alexander, Murphy, & Woods, 1997) became aware of a lack of foundational domain and disciplinary knowledge among educators responsible for teaching others. Thus, we came to see that lack of domain or disciplinary knowledge as one of the barriers to effective school reform (Alexander et al., 1996). We concluded that particular treatise by forwarding several recommendations we felt would help to break this unhealthy cycle and contribute to more effective instruction. I have already introduced you to two of those recommendations: Seek principled knowledge and teach more about less. Still another of those recommendations speaks directly to this special issue on relevance—rooted relevance.

In generating the term *rooted relevance*, my co-authors and I sought to convey that educators hold a dual responsibility in what they teach, task, or test (Alexander et al., 1996). On the one hand, they should be sufficiently rooted in (i.e., knowledgeable about) the domains and disciplines they teach so

they can represent those domains and disciplines substantively, accurately, and meaningfully to their students. On the other hand, educators must know their students well enough to understand how those domains and disciplines naturally relate to learners' individual goals, interests, and experiences. What we wanted to make evident was that, neither rootedness nor relevancy alone will break the unending cycle of innovation/condemnation/innovation that has been established in educational research and practice. What seems requisite is a relevance to real-world, contemporary problems that is also well rooted in the histories and theories upon which they are based. (p. 39)

Consequently, just as there needs to be a more systematic approach to relevance within the educational system, teachers have a significant and mediating role to play. Educators at all levels need to consider how what they teach, task, or test is meaningful to the domain under study, while simultaneously communicating the personal value or meaning that content holds for the students.

Augmented relevance

As a devotee of John Dewey, it is always pleasing to see his writings acknowledged when someone is trying to unravel the complexities of psychological constructs like relevance. Yet, there was a bit of irony for me in the contributors' referencing of Dewey when I consider the specific approaches to forging relevance they overview and the populations that were of primary concern to them. Let me clarify this point. As with the editors of this special issue, I see the shadow of Dewey looming large when the idea of relevance is framed as that which is personally meaningful or interesting. One insight I drew from Dewey (1913) pertained to misguided efforts of some educators to make what is taught "interesting" to students. As he wrote:

> Here, and here only, have we the reality of the idea of "making things interesting." I know of no more demoralizing doctrine—when taken literally—than the assertion of some of the opponents of interest that *after* subject-matter has been selected, *then* the teacher should make it interesting. This combines in itself two thorough going errors. On one side, it makes the selection of subject-matter a matter quite independent of the question of interest—that is to say of the child's native urgencies and needs; and, further, it reduces method in instruction to more or less external and artificial devices for dressing up the unrelated materials, so that they will get some hold upon attention. (p. 23)

Dewey goes on to explain how meaningfulness or personal interest is better manifest within schooling—an explanation that echoes what my co-authors and I (Alexander et al., 1996) tried to capture in our notion of rooted relevance.

> In reality, the principle of "making things interesting " means that subjects be selected in relation to the child's present experience, powers, and needs and that (in case he does not perceive or appreciate this relevancy) the new material be presented in such a way as to enable the child to appreciate its bearings, its relationships, its value in connection with what already has significance for him. (pp. 23–24)

I invoke Dewey (1913) here due to concerns that arose from how contributors to this issue described interventions meant to help learners recognize the value, utility, or meaningfulness within what is being taught and tasked. My concerns rest not so much on what these experts say, but rather what was not said about enhancing perceptions of relevance. From my vantage point, the interventions were wholly aimed at learners and their efforts to find something of value, utility, or meaningfulness in the content and assignments given them. There was little said about the responsibilities of teachers in this endeavor. For Dewey, the role of the teacher in illuminating relevance is made apparent, and the onus for finding personal meaningfulness is no longer conveyed as the sole or primary responsibility of the students.

I appreciate that several contributors mentioned educators' explication of the value or utility of what they were teaching or assigning to students (Vansteenkiste et al., this issue). That is certainly a starting point. However, I would caution that merely "mentioning" the value or utility of what is taught or tasked may have limited effect. As with Walkington and Bernacki (this issue), I would be leery of rather shallow attempts to personalize academic content. If there are benefits to be accrued from more superficial or "seductive" approaches to personalization, those benefits would likely be short lived. Rather, to echo Dewey's (1913) words, the content should be presented in such a way that students can "appreciate its bearings, its relationships, its value" (p. 24) to them and their lives.

I must admit that as I was writing the section, I could hear the voice of my late friend, Claire Ellen Weinstein, echoing in my head. She would remind me that students must find a way to help themselves in those situations where teachers are not even mentioning the value, utility, or meaningfulness of the content, much less illuminating that relevance for students. I could not agree more. Nonetheless, as motivation and strategy researchers attempt to inform the education communities about the power of relevance, they should aim for interventions that get to the heart of relevance rather than those that might rest on tenuous grounds. There should be attempts to create comprehensive interventions that make teachers, students, and the educational system partners in this enterprise. Such interventions would not place the responsibility of discovering relevance solely on the back of students who, as novices, may be poorly positioned to see the value, utility, or meaningfulness of what is taught or tasked in the way more knowledgeable others can and should.

Learner and domain characteristics

I would assume that those contributing to this issue would agree that relevance is a construct of significance to all learners and all fields of study. Relevance is not the dominion of any specific age group or academic domain. Even if these authors do not expressly state this fact, their conceptions, models, and interventions are not explicitly confined to particular ages or domains. That being said, I was aware that there was a strong emphasis within these articles on students in middle school through college. There was also more attention paid to the areas of science and mathematics over other content domains.

For example, in their methodological piece, Hartwell and Kaplan (this issue) use the written responses of ninth-grade students to questions about the relevance of particular biology topics to their lives as the source for their MDS analysis of relevance. Nagengast et al. (this issue) conduct a secondary analysis of data gathered from an intervention project by Gaspard, Dicke, et al. (2015) that targeted ninth-grade students' perceptions of mathematics. In their development of personalized learning technologies, Walkington and Bernacki (this issue) also targeted mathematics and used students at the sixth- to eighth-grade levels to support their claims. Although Priniski et al. (this issue) mention pertinent research at the middle school level, much of what they detail involves high school and college students. They likewise build their case for utility-value (UV) interventions around science and mathematics content. Further, the value-reappraisal intervention that Acee et al. (this issue) describe grew out of the challenges that college students faced in finding relevance in their statistics courses.

With this clear pattern identified, I was left to reflect on why those promoting the relevance of relevance had bounded their articles in this manner. Were there compelling reasons to situate relevance in middle school, high school, or college or to concentrate on the domains of science and mathematics? Upon reflection, I was able to formulate several plausible reasons for this pattern: research facility, empirical traditions, and academic needs.

Research facility

In much of what Dewey (1897, 1913) writes on interest, he focuses on young children and the organic nature of the interests they manifest. There is often little need to help the young find interest in educational experiences. For all intents and purposes, the young are wellsprings of interest. Nonetheless, studying relevance in the young can be very challenging methodologically. They may know what interests them, but they may have little understanding as to why. They also have limited capacity to share their thinking orally or in writing. Because of such challenges in studying relevance in the young, it makes sense that researchers more often focus on older children, adolescents, and adults who are better able to reflect on and articulate their views about the value, utility, or meaningfulness of what they are being taught or what they are tasked with.

Moreover, because relevance as described in this special issue involves an association between a learner and some domain of study or associated task, it helps that older children through adults have a more-developed sense of academic domains. In effect, their notions of science and mathematics, biology or statistics have sufficient maturity to allow them to reflect upon and respond to questions about the

relevance of these academic domains and their relation to them. From the standpoint of facility, therefore, there is justification for the contributing authors' emphasis on older rather than younger students.

Empirical traditions

There is another plausible reason for the learner and domain emphases observed in this issue. Motivation and development researchers, who are well represented among contributing authors, have a long tradition of studying that point in students' academic development where there is a noticeable decline in their personal investment in schooling (e.g., Anderman & Maehr, 1994, Eccles et al., 1993). Further, those declines in mathematics and science have been especially salient. In justifying their focus on mathematics, for example, Walkington and Bernacki (this issue) argued that: "Mathematics is a natural area to apply ideas of relevance, as students' interest in learning mathematics tends to decline over adolescence" (p. xx). Consequently, it makes sense that these researchers would carry forward those research traditions, as they explore more novel constructs such as relevance.

Academic needs

Finally, it is conceivable that the contributions in this special issue converge on the domains on mathematics and science because these are perceived as areas of particular need now and in the years to come (Ellis, 2008). It is difficult to pick up any educational publication that does not reference STEM fields and students' declining pursuit or competence in those fields as a cause for concern (Wang, 2013). That concern is greater for underrepresented populations who may regard the content of science and mathematics as abstract in form and removed from their everyday existences (Harackiewicz, Canning, Tibbetts, Priniski, & Hyde, 2016). That is why the search for personal meaning or relevance when it comes to science and mathematics may compel the contributing authors investment in these domains.

Regardless of the justifications for centering on older students and on science and mathematics, it is imperative that those who see relevance as a relevant motivation construct expand their investigation to match the theoretical and philosophical foundations from which that construct arises. While it is sensible to start with those grades and domains wherein the ability to empirically investigate relevance is perhaps easier and the demonstrated need is stronger, there is much more to be uncovered about this construct. For instance, there is little understanding of how the seeds of interest that Dewey describes among the young take root over the course of the educational experience. What configuration of internal and external factors stimulates the development of certain realms of meaningfulness while others remain stunted or wither away? How do certain students manage to identify with certain academic domains or find personal meaning in the tasks set before them, while others seem to resist attempts to forge any such association? Such questions deserve to be more fully investigated.

Concluding thought

In this commentary, I set out to find common ground among the diverse contributions constituting this special issue on relevance. Although the articles were penned by experts representing varied theoretical frameworks, there were areas of consilience to be discerned. Specifically, this collection of articles shared a view of relevance as person-centered, complex and multifaceted, important, and modifiable. Despite the insights I garnered from these writings, I was left with several nagging concerns that remained unresolved. Overall, what those puzzlements led me to was the realization, echoed at several points in this commentary, that relevance or personal meaning (or the lack thereof) has no singular root but emerges (or fails to emerge) from a convergence of internal and external factors. Thus, educators or educational researchers' efforts to illuminate relevance or to help students find it for themselves cannot be dealt with in any singular way. Rather, efforts to forge meaningful associations between learners and what is taught or tasked must be systemic. Without such a systematic approach that involves not only students but also teachers, school leaderships, and policy makers, well-intentioned interventions that rest on students' ability to discern meaningfulness in academic content or

assignments may have only limited or short-term effects on what students learn or how they perform in the immediate context or in the years to come.

References

Acee, T. W., & Weinstein, C. E. (2010). Effects of value-reappraisal intervention on statistics students' motivation and performance. *Journal of Experimental Education*, *78*, 487–512.

Acee, T., Weinstein, C. E., Hoang, T., & Flaggs, D. (this issue). Value reappraisal as a conceptual model for task-value interventions. *Journal of Experimental Education*.

Albrecht, J., & Karabenick, S. (this issue). Introduction to the special issue on relevance for learning and motivation in education. *Journal of Experimental Education*.

Alexander, P. A. (2017, September 9). *Ed Talk: Re-educating the mind*. Retrieved from https://www.youtube.com/watch?v=ozIapr_MmU8&t=40s

Alexander, P. A., & Knight, S. L. (1993). Dimensions of the interplay between learning and teaching. *Educational Forum*, *57*, 232–245. doi:10.1080/00131729309335422

Alexander, P. A., & Murphy, P. K. (1998). The research base for APA's learner-centered principles. In N. M. Lambert & B. L. McCombs (Eds.), *Issues in school reform: A sampler of psychological perspectives on learner-centered schools* (pp. 25–60). Washington, DC: American Psychological Association.

Alexander, P. A., Murphy, P. K., & Woods, B. S. (1996). Of squalls and fathoms: Navigating the seas of educational innovation. *Educational Researcher*, *25*(3), 31–36, 39.

Alexander, P. A., Murphy, P. K., & Woods, B. S. (1997). Unearthing academic roots: Educators' perceptions of the interrelationship of philosophy, psychology, and education. *Educational Forum*, *61*, 172–186. doi:10.1080/00131729709335248

Alexander, P. A., & Riconscente, M. M. (2005). A matter of proof: Why achievement ≠ learning. In J. S. Carlson & J. R. Levin (Eds.), *The No Child Left Behind legislation: Educational research and federal funding* (pp. 27–36). Greenwich, CT: Information Age.

Alexander, P. A., Schallert, D. L., & Reynolds, R. E. (2009). What is learning anyway? A topographical perspective considered. *Educational Psychologist*, *44*, 209–214. doi:10.1080/00461520903029006

Anderman, E. M., & Maehr, M. L. (1994). Motivation and schooling in the middle grades. *Review of Educational Research*, *64*, 287–309. doi:10.3102/00346543064002287

Bergin, D. A., Ford, M. E., & Hess, R. D. (1993). Patterns of motivation and social behavior associated with microcomputer use of young children. *Journal of Educational Psychology*, *85*, 437–445. doi:10.1037/0022-0663.85.3.437

Canning, E. A., & Harackiewicz, J. M. (2015). Teach it, don't preach it: The differential effects of directly communicated and self-generated utility-value information. *Motivation Science*, *1*, 47–71. doi:10.1037/mot0000015

Dewey, J. (1897). My pedagogic creed. *School Journal*, *54*, 77–80.

Dewey, J. (1913). *Interest and effort in education*. Cambridge, MA: Riverside Press.

Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Mac Iver, D. (1993). Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist*, *48*, 90–101. doi:10.1037/0003-066X.48.2.90

Ellis, G. (2008). Grand challenges for engineering. *IEEE Engineering Management Review*, *37*(1), 3–3. Washington, DC: National Academy Press. Retrieved from www.engineeringchallenges.org/cms/8996/9127.aspx

Gaspard, H., Dicke, A.-L., Flunger, B., Schreier, B., HaÅNfner, I., Trautwein, U., & Nagengast, B. (2015). More value through greater differentiation: Gender differences in value beliefs about math. *Journal of Educational Psychology 107*(3), 663–677. doi:10.1037/edu0000003

Gelman, R., & Greeno, J. G. (1989). On the nature of competence: Principles for understanding in a domain. In L. B. Resnick (Ed.), *Knowing, learning, and instruction: Essays in honor of Robert Glaser* (pp. 125–186). Hillsdale, NJ: Erlbaum.

Harackiewicz, J. M., Canning, E. A., Tibbetts, Y., Priniski, S. J., & Hyde, J. S. (2016). Closing achievement gaps with a utility-value intervention: Disentangling race and social class. *Journal of Personality and Social Psychology*, *111*, 745–765. doi:10.1037/pspp0000075

Hartwell, M., & Kaplan, A. (this issue). Students' personal connection with science: Investigating the multidimensional phenomenological structure of relevance. *Journal of Experimental Education*.

Koedinger, K., Alibali, M., & Nathan, M. (2008). Trade-offs between grounded and abstract representations: Evidence from algebra problem solving. *Cognitive Science*, *32*, 366–397. doi:10.1080/03640210701863933

Nagengast, B., Brisson, B., Hulleman, C., Gaspard, H., Häfner, I., & Trautwein, U. (this issue). Learning more from educational intervention studies: Estimating complier-average-causal-effects in a relevance intervention. *Journal of Experimental Education*.

Priniski, S., Hecht, C., & Harackiewicz, J. (this issue). Making learning personally meaningful: A new framework for relevance research. *Journal of Experimental Education*.

Rosenzweig, E. Q., & Wigfield, A. (2016). STEM motivation interventions for adolescents: A promising start, but further to go. *Educational Psychologist*, *51*(2), 146–163. doi:10.1080/00461520.2016.1154792

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, *25*, 54–67. doi:10.1006/ceps.1999.1020

Scheffler, I. (1969). Reflections on educational relevance. *Journal of Philosophy*, *66*, 764–773. doi:10.2307/2023779

Schmidt, W. H., Houang, R., & Cogan, L. S. (2011). Preparing future math teachers. *Science*, *332*(603), 1266–1267. doi:10.1126/science.1193855

Vansteenkiste, M., Aelterman, N., De Muynck, G., Haerens, L., Patall, E., & Reeve, J. (this issue). Fostering personal meaning and self-relevance: A self-determination theory perspective on internalization. *Journal of Experimental Education*.

Walkington, C., Bernacki, M., & Alexander, P. A. Personalization of instruction: Design principles and implications for cognition. *Journal of Experimental Education*.

Wang, X. (2013). Why students choose STEM majors: Motivation, high school learning, and postsecondary context of support. *American Educational Research Journal*, *50*(5), 1081–1121. doi:10.3102/0002831213488622

Whewell, W. (1840). *The philosophy of inductive sciences*. London, UK: Parker.

Wilson, E. O. (1998). *Consilience: The unity of knowledge*. New York: Knopf.