

Dewey's Yardstick: Contextualization as a Crosscutting Measure of Experience in Education and Learning

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Abstract

Although experience and context are omnibus terms, the relationship between them provides some guidance on how each can be used to inform an understanding of the other. This article presents contextualization, or the degree to which content and context are connected through experience, as a measurable outcome of learning, education, or situated cognition. Contextualization is proposed here as a construct that (a) indicates curricular intention, cognitive process, and learning outcomes; (b) is a measurable variable that can be correlated to measures of learning; (c) is broadly applicable and thus represents a comparison variable across diverse scenarios; and (d) represents an important link between existing theory and practice. A contextualization spectrum framework is proposed to align curricular intentions for student experience to the resulting disposition of knowledge, as connected through contextualization.

Keywords

contextualization, experiential learning, situated cognition, learning environments, education theory and practice, education, social sciences

For more than 100 years, educators and educational researchers have been discussing the role of experience in education. That discussion remains in part a theoretical expansion of John Dewey's work of the early 20th century (summarized in Dewey, 1938). This work remains important as even the nature of experience remains inadequately theorized (Bell, 2010; Fox, 2008; Roberts, 2008; Roth & Jornet, 2014) rendering it difficult to measure, manipulate, or grapple with in a purposeful way. Because the messiness of measuring experience has hindered empirical investigation into its role in learning outcomes (Ewert & Sibthorp, 2009), researchers and practitioners must continue to press toward understanding not just *if* but *how* lived experiences impact learning if we are to optimize approaches to education that intentionally manipulate experience (Mackenzie, Son, & Hollenhorst, 2014) or theorize education from a situated perspective (Roth & Jornet, 2013).

Both Dewey and Vygotsky proposed the use of lived experiences, rather than researcher-defined events, as lenses to look at the complexities of what can be broadly classified as situated learning (Roth & Jornet, 2014), but the unit and method of analysis remain unclear. Can the interactional complexities of an experience in which inseparable actors and environments co-construct each other be captured empirically? Roth and Jornet (2014) suggest "a need to develop analytical accounts that retain the inherent uncertainty that is an integral part of human experience" (p. 3), and yet, any such account must be bounded enough to compare across

events or interventions. In this article, *contextualization* is proposed as a measurable component of experience that has promise for advancing an empirical understanding of how experience impacts learning. The theoretical evolution of using *an experience* as a unit of measure in educational research is presented. I then argue for the utility of a mechanism to determine the impact of experience within an educational event and to compare experiences as measurable input variables in educational settings. Contextualization is then further developed as a variable to be measured and used to determine a contribution of experience to learning.

Contextualization as Input, Process, and Outcome of Learning Through Experience

Every one has experienced how learning an appropriate name for what was dim and vague cleared up and crystallized the whole matter. Some meaning seems distinct almost within reach,

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but is elusive; it refuses to condense into definite form; the attaching of a word somehow (just how, it is almost impossible to say) puts limits around the meaning, draws it out from the void, makes it stand out as an entity on its own account. (Dewey, 1910, p. 173)

Many self-labeled “experiential” approaches to education use the immersion of learners into learning environments that are either representative of environments where the target knowledge could be applied, or otherwise closely approximate to the world beyond the classroom. The labels *authentic*, *in situ*, and *immersive* contribute important descriptors to this type of curriculum. *Contextualized curriculum* is a term that is more broadly applicable and descriptive of the learning that is intended by these programs, and the term implies intentionality behind the content–context connection. While every learning environment is imbued with context, the term *contextualization* is used here to indicate the degree to which the subject knowledge being developed by the learners is connected to the world beyond the abstractions of the classroom (King & Ritchie, 2012; Rivet & Krajcik, 2008). The context provides additional information to the learner such that she may find personal relevance and understand how a phenomenon or concept could be applied or observed within an environment where it has meaning beyond academic achievement, what Pugh (2011) refers to as *motivated use*.

Through contextualized curriculum, the context is intended to provide additional cognitive and affective information to the learner beyond the targeted content knowledge (Dewey, 1938; Giamellaro, 2014). This intention is manifested when the process of contextualizing knowledge occurs through experience (Rivet & Krajcik, 2008; Roth & Jornet, 2013). *Realized contextualization, then, is a process of learning as situated in a setting in which the social and material environment can contribute meaningfully to the development of knowledge.* As a process, knowledge is given meaning through connections between the learner’s conceptual understanding of an idea and the environment in which it was learned, recalled, used, or collectively situated (Giamellaro, 2014; Rivet & Krajcik, 2008; Zimmerman & Bell, 2012). Ideally, an educator could contextualize the curriculum, supporting the learner to contextualize her learning, resulting in contextualized knowledge (realized contextualization) in a function that could be modeled [intention → process → outcome]. Contextualized knowledge, as process and outcome, could also be described as explicitly situated such that the learner can recognize the situatedness or connections between the content and context, albeit with varying qualities of articulation. If this content–context connection (contextualization) is explicitly recognizable then it can also be conceptualized as an outcome measure of educational experiences and serve as an indicator of the degree to which the experience explicitly situated the knowledge for the learner.

Contextualized curricula can be juxtaposed against *decontextualized* curricula, wherein there is no explicit intent for

the learner to detect a clear connection between the events that he is experiencing and the content knowledge as it is typically used in authentic practice (Aubusson, Griffin, & Kearney, 2012). Whitehead (1929) labels the knowledge gained through decontextualized curriculum as “inert” because the learner would not be able to make use of this knowledge beyond the immediate setting. While decontextualized, rote memorization tasks do occur in schools, most classroom curricula probably represent some degree of intended contextualization. In the typical secondary classroom, for example, the knowledge that students are intended to learn may be presented in conjunction with a description of contexts in which the knowledge is applicable but all of the actual contexts the students are operating within may not be related to the content knowledge. The material, cultural, social, and temporal surround is the context of school. When the class ends in 45 min, the context switches to other parts of the school and distinct academic discourses. The sociocultural surround, the physical space, and the peripheral context cues the student is exposed to no longer have meaningful associations with the target knowledge. One could argue that curriculum cannot truly be decontextualized as the context of school is real and relevant. However, curriculum can have an entirely academic context as it approaches a decontextualized state. Curriculum can be, and often is, academically contextualized.

At the other end of the spectrum, consider a language immersion program in which the student travels to and immerses herself in a culture with a different language. She receives formal instruction on vocabulary and the proper ways to apply it. In addition, everything else outside of class provides contextual cues to support her learning. She can practice, test, question, and apply the new knowledge throughout the environment, and she is presented with countless opportunities to extend her knowledge in directions that mesh with her own interests. Her learning is situated within the facilitated formal curriculum and the peripheral elements of the context. Through such an immersion program, the student is learning *in* context rather than *with* context as she would with a text-based narrative supporting the content. The context becomes an instructive force in her learning and situates her knowledge in an applicable environment.

As a process embedded within a situated view of cognition, contextualization is an iterative process where content knowledge and learner experience each inform the other (Brown, Collins, & Duguid, 1989; Hildreth & Kimble, 2002). It cannot be parsed down to a simple or singular cause-and-effect event and should be conceptualized as a holistic aesthetic experience (Girod, Rau, & Schepige, 2003). Contextualization is the degree to which this process happens in conjunction with a real-world setting, the process that tracks the situatedness of knowledge. While this article considers all levels of learning within the contextualization process, Pugh (2011) suggests that “transformative experiences occur when students actively use curricular concepts in

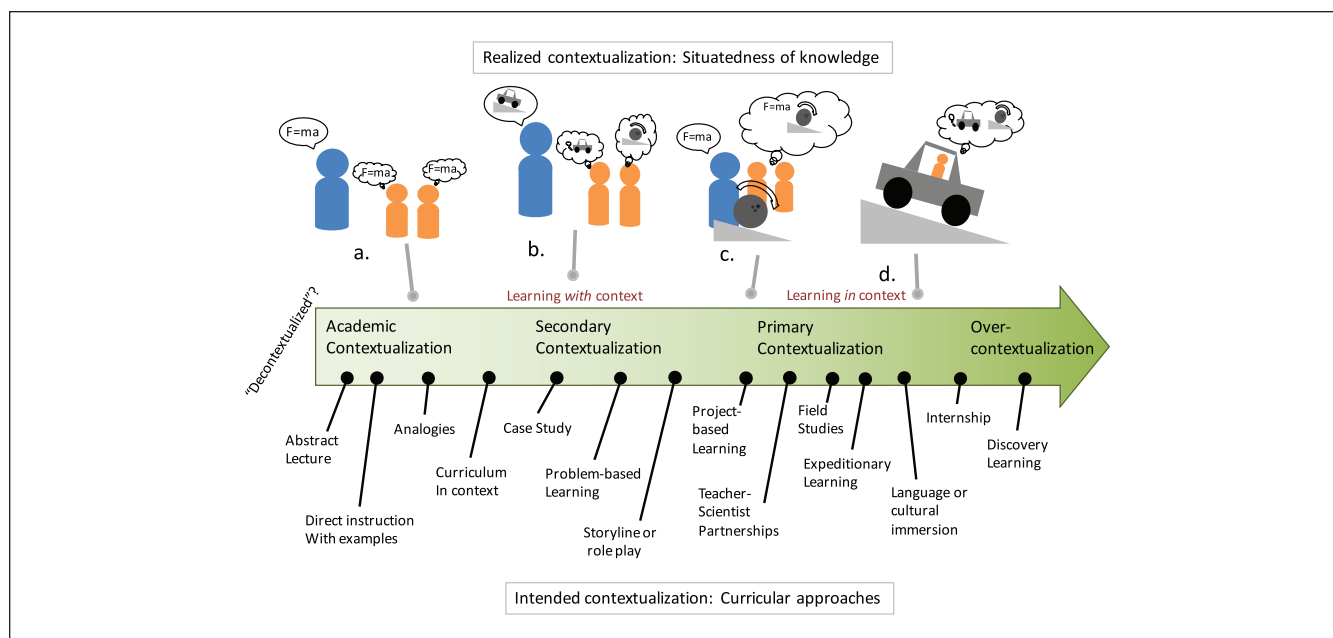


Figure 1. The contextualization spectrum: Alignment of knowledge and curriculum.

Note. The central arrow in the figure indicates a learner's degree of transaction between subject knowledge and environment (contextualization). Curricular approaches, as inputs, are plotted across the bottom of the diagram to indicate likely degrees of intended contextualization. The area above the arrow illustrates the learners' processes and the situatedness of resulting knowledge. (a) The teacher shares an abstract formula and learners maintain it in a cognitive form that is dissociated from the environment. (b) The teacher makes a narrative connection between the idea of the formula and a hypothetical example (secondary contextualization). Learners associate the example and concept with a best fit of their past experience. (c) The teacher connects the abstract formula to a common experience with learners in real time (primary contextualization). (d) The learner experiences the phenomenon and may associate surface features with past experiences but does not transfer the underlying concept.

everyday life to see and experience the world in a new, meaningful way" (p. 107). That is, contextualization can lead to transformative experiences when learners reach a point where contextualized knowledge is applied to the environment as much as it is supplied to the learner by the environment. To do so, the learner must have an experience through which to connect content knowledge to context. Thus, contextualization represents a bridge between experience and content knowledge that provides researchers with a mechanism to measure the impact of experience on learning, particularly in naturalistic settings.

Contextualization as a Spectrum of Processes and Outcomes

Education in order to accomplish its ends both for the individual learner and for society must be based upon experience—which is always the actual life-experience of some individual. (Dewey, 1938, p. 89)

Contextualization as a learning process can be dichotomized as *primary* or *secondary contextualization* (Giamellaro, 2014) or conceptualized as a spectrum of curriculum approaches (intended contextualization) aligned to learning processes and outcomes (realized contextualization) as shown in Figure 1. Primary contextualization, or learning *in*

context, is the process of connecting context and content through direct personal experience, further to the right on the spectrum in Figure 1. Secondary contextualization, learning *with* context, refers to making context–content connections through second-hand communication of others' experiences, observations, or other data (Giamellaro, 2014). In the classroom, secondary contextualization can be achieved by *anchoring* the curriculum within a semantically rich narrative or *macro-context* to connect abstract ideas with what both students and domain experts could experience in the real world (The Cognition and Technology Group at Vanderbilt, 1990; Oliveira & Brown, 2016). Secondary contextualization can also be seen with "problem-based learning" (e.g., Rivet & Krajcik, 2008), case study approaches (e.g., Clyde, 2007), and virtual environments (e.g., Metcalf, Kamarainen, Tutwiler, Grotzer, & Dede, 2011), all of which could be plotted left of center on the contextualization spectrum in Figure 1.

When practitioners or scholars refer to experiential learning and experiential education, they tend to describe primary rather than secondary contextualization. These experiences might include field studies (Rickinson et al., 2004), expeditionary learning (e.g., Riordan & Klein, 2010), or internships (e.g., Narayanan, Olk, & Fukami, 2010). The student experience involves direct interaction with the environment, not for the sake of the experience itself but because that

direct experience is assumed to lead to some outcome that is different than an indirect experience would provide. Although the same topic could be taught with the intention of secondary or primary contextualization, the experiences would look very different, and there is an implicit assumption that the learning outcomes would also be different. For example, medical students could be taught to diagnose and treat various manifestations of angina through narrative case studies or through rounding with an experienced cardiologist. While each of those approaches would have inherent advantages and disadvantages, how the resultant knowledge (rather than the curriculum) is contextualized is perhaps the most important difference.

In addition to primary and secondary contextualization, the spectrum (Figure 1) also accounts for decontextualized, academically contextualized, and overcontextualized curriculum. As shown in Figure 1, academically contextualized curriculum would be largely abstract for the learner, such as the memorization of the formula representing the relationship between force, mass, and acceleration. Students might commit the formula to memory, may associate it with the label “Newton’s Second Law of Motion,” and may know it is useful in school, but would not be able to describe the relevance or apply the idea to a problem. The context in which the knowledge is situated does not contribute useful information to the subject knowledge itself. As discussed above, it is unlikely that knowledge can be truly decontextualized, but the effect can be similar with academic contextualization if the knowledge is situated entirely in a school setting. On the opposite end of the spectrum, if the curriculum is too embedded in a particular context, the learner may overly contextualize the subject knowledge to a point where he is unable to transfer the knowledge to other contexts (Day, Motz, & Goldstone, 2015). As illustrated in Figure 1, the learner may intuitively recognize that his car accelerates when coasting down a hill and he may have a sense that an accident would result in greater damage at higher speed, but he would not be able to recognize these variables as existing in a transferable relationship, and he would be unlikely to represent that relationship as $F = ma$ when the knowledge is overcontextualized.

The arrow in Figure 1 represents the spectrum of purely abstract knowledge to purely applied knowledge or skills. While most learning experiences include a mix of abstract and applied knowledge, traditional classroom learning tends to place a premium on abstract knowledge while learning labeled as experiential tends to include a greater degree of applied knowledge. In treating these as a dichotomy, the vast middle ground is excluded from the conversation. In this middle ground, the learning process includes abstract knowledge that is situated within authentic contexts through experience—the abstractions become contextualized. Consider ecological fieldwork, internships, cultural immersion courses, and service learning; the goal is neither abstraction nor application but a blend of the two.

To consider education on the spectrum shown in Figure 1, it is context and contextualization rather than the having of an experience that distinguishes where on the spectrum a given learning event is positioned. Students have an experience in the most didactic of classrooms, but the interactions with the social, cultural, and/or material context add the value and information that lead to a learning event being labeled “experiential” versus “traditional,” for example. To compare a “traditional” educational approach with an “experiential” approach, we should not be looking at whether students had an experience but at the degree to which that experience afforded students opportunities to contextualize their learning process or the degree to which the resulting knowledge is situated in an authentic setting (contextualized). Despite this, we know little about how the contextual surround of complex environments affects student learning, resulting in a sense of a “black box” (Baldwin, Persing, & Magnuson, 2004), in that there are known inputs, as well as some empirical evidence that experiential education can output significant learning, but little indication of how it does so (Henderson, 2004). It has been repeatedly shown that the context within which each student lives on a daily basis is a significant contributor to or detractor from learning (e.g., Hanscombe, Haworth, Davis, Jaffee, & Plomin, 2011; Vermunt, 2005) and there is a wide field of research into the classroom as a learning environment (see Fraser, 2007, for review), but more empirical evidence is needed to describe learning as interactions between learner and context in real-world settings. As will be described below, contextualization is a construct that can be used to provide an empirical lens into the role of experience in learning.

Defining and Measuring Experience

Experience and experiment are not self-explanatory ideas. Rather, their meaning is part of the problem to be explored. To know the meaning of empiricism we need to understand what experience is. (Dewey, 1938, p. 25)

Experience as Frame

Every experience is a moving force. Its value can be judged only on the ground of what it moves toward and into. (Dewey, 1938, p. 38)

To position the use of contextualization as a measurable learning outcome of experience, the unit of analysis must be bounded. In this section, *an* experience is supported as an appropriately bounded unit to examine learning in real settings and with a situated cognition lens. Just as contextualization must be parsed out as an identifiable process from the infinite nature of context, *an* experience must also be parsed out as an identifiable phenomenon from the infinity of events in time if it is to move from the philosophical to the empirical. Dewey acknowledged the broad vision of experience, writing,

when a name is wanted to emphasize the interconnectedness of all concerns, affairs, pursuits, etc., and it is made clear that experience is used in that way, it may serve the purpose better than any word that is yet available. (Dewey & Bentley, 1949, p. 187)

This broad arc of experience over time and in real time aligns well with a situated view of cognition. All contextual elements are players in the learning process as meaning continually evolves and shifts through co-construction (Brown et al., 1989; Gee, 2008; Lave, 1988; Lave & Wenger, 1991; Roth & Jornet, 2013; Sadler, 2009). Within situated learning and cognition theories, there is a recognition that the learner and environment are interacting in a system that cannot be understood when atomized down to the learner alone nor attributed to the external factors of the experience alone (Brymer & Davids, 2014). While it is important to keep this infinite sense of experience as the situated framework to understand the role of experience in learning and education, it becomes intractable to understand in any capturable, empirical way (Nardi, 1996).

Dewey made a distinction between the broad, continuous nature of experience and the having of a more compartmentalized experience (Dewey, 1938; Pugh, 2011). Furthermore, Dewey argued that experience writ large was not as important to learning as the punctuation by specific, aesthetically identifiable events that could be later identified as *an* experience (Dewey, 1938; Girod et al., 2003; Roth & Jornet, 2014; Simpson, 2011). These identifiable experiences are what allow us to maintain a cognitive connection between the actual world and our evolving understanding of it (Dewey, 1910, 1938). We imbue experiences with affective associations after the fact (Girod et al., 2003; Roth & Jornet, 2014). For Dewey (1910), whose work has informed modern situated perspectives on cognition (Roth & Jornet, 2013), experience occurs in the material world as well as in the reflective and cognitive constructions of the mind. According to Dewey (1938), these two levels of experience are continually at work, cognitively integrating past experiences and preparing the individual for future experiences, a concept he referred to as *continuity of experience*. Situated cognition theories have built on this idea of interplay between internal/external and system evolution over time but move the locus of cognition away from the head and distribute it throughout the learning environment (Brown et al., 1989). Experience is transactional as seen through a situated lens.

Dewey's interplay between external and internal is also paralleled and expanded in Vygotsky's conceptualization of experience as integrating the material, practical, intellectual, and affective (Roth & Jornet, 2014; Vygotsky, 1978). From a situated cognition perspective, it could be argued that recalling a memory is a manifestation of this continuity as the recall is a reactualization of a prior experience through joint action between the learner and the new context (Roth & Jornet, 2014). While these material and cognitive aspects of experience are useful constructs in understanding the role of

experience in learning and cognition, *contextualization can be seen as the transactional bridge between external and internal experience, the mechanism that connects the material and temporal world to the world of ideas through an experience or through a series of identifiable experiences.*

Because contextualization is a specific process within experience, it can also be seen as leaving a cognitive residue, detectable as manifestations of individual or group outcomes responding to the inputs of the learning and recall experiences. This outcome residue of experience can be conceptualized as capturing "how the continuing, open-ended flow of a happening is reflected in the consciousness and affect of the participants" (Roth & Jornet, 2014, p. 10) or as snapshots of an evolving system at a specific point in time. The distinction between experience writ large and what is cognitively situated as a residue of the experience is what then becomes *an* experience (Dewey, 1938; Roth & Jornet, 2014; Simpson, 2011). While we cannot recite every aspect of past events, we can recall significant contextual details of *meaningful* past experiences (Girod et al., 2003; Schacter, 1996) and we retain these events as *an* experience accompanied by semantic detail, and a contextual frame of place, time, and social setting (Miglino & Ponticorvo, 2009; Pugh, 2011), albeit as resituated in the recall environment. Furthermore, the having of *an* experience changes the learner's future interactions with their internal and external environments (Dewey, 1938; Pugh, 2011; Vygotsky, 1978).

As Dewey (1938) described this process, academic subject matter can be used to facilitate this higher level or more meaningful interaction with the world to transform experience into *an* experience. Pugh (2011) argues that when one begins to experience academic content by using it in the real world (motivated use), when one can see the world through the lens of that content (expansion of perception), and when one learns to value the role of that content for enhancing everyday experience (experiential value), transformative experience is often the result. In other words, the presence or absence of content knowledge contextualization contributes to transforming an experience into meaningful learning.

By understanding contextualization, experience can also be better understood. Although the nature of experience and the resultant learning is not universally agreed upon and likely never will be, it does seem likely that contextualization of that learning would be an outcome across the many manifestations. As such, contextualization provides a lens to examine and measure outcomes of experiences in education that are comparable across different approaches.

An Experience as Unit of Analysis

We have *an* experience when the material experienced runs its course to fulfillment. Then and then only is it integrated within and demarcated in the general stream of experience from other experiences. (Dewey, 1934/1980, p. 35, emphasis original)

What is the proper grain size if experience is to be measured and correlated to educational outcomes? Leont'ev (1978) suggests that activity is the most reduced level at which learning and development can be analyzed while still capturing the situatedness of learning, but defining activity can be inherently difficult, subjective, and broad. Pugh (2011) argues that transformative experience is an appropriate unit because it is at once possible to develop a measure of it while also having it be representative of a composite. While transformative experience, as Pugh (2011) defines it, is very likely to capture the interaction of learner, subject matter, and environment, the requirements of motivated use, expansion of perception, and experiential value might set the bar too high, thereby excluding most educational experiences that may or may not lead to transformational experience. It does not allow for the examination of lower level but more common learning experiences.

Dewey provides a middle ground. Examining learning or education through the lens of *an* experience allows for a bounded unit of analysis that can be examined by the learner, the educator, or a researcher once that experience has become reified as a memorable event (Dewey, 1934/1980, 1938) while still allowing the learner to self-define what could be counted as a whole and memorable experience. Allowing the learner to self-define experiences is admittedly problematic for empirical research, particularly for comparison studies, but it is a methodological hurdle that must be overcome as only the learner can judge significance within the continuity of experience (Dewey, 1938). An additional methodological hurdle is created by the reliance of post hoc reflection on an event as it becomes reified into an experience. These reflections, situated simultaneously in the past and present, may not reflect the same events as perceived by an outside observer. The events become a history with potentially different interpretations.

Despite the necessity of post hoc identification of *an* experience (Dewey, 1938), it is possible to predict and manipulate what is likely to be later defined as an experience for a group of learners, through the novelty of time, place, social setting, and narrative. For example, it is more likely that students will identify as a defined experience, a field-based data collection lesson in which the time and place were novel than they are to identify a classroom lecture on the same topic (Giamellaro, unpublished data). By creating more distinct learning events, the educator or researcher can increase the commonality of what is considered an experience across a group of learners, allowing for a closer comparison of those experiences. In contextualizing curriculum by designing educational events that are intended to help learners bind events into an experience, one can also examine these intended experiences in real time. While a researcher could not assume that the events will become a defined experience for a given learner, the researcher could conduct real-time observations within reasonable bounds and later correlate the in situ data collection with the learner's post hoc

reflection. One could capture elements of both the actualized and reactualized experience (Roth & Jornet, 2014). While this process would also present its own methodological hurdles, using *an* experience as the unit of analysis would allow for a deeper examination of the situatedness of experience in education and learning. By using the contextualization spectrum (Figure 1), a researcher could more intentionally manipulate the degree to which the experience would situate the learner and her learning in authentic contexts.

Measuring Outcomes of Experience in Educational Settings

The only ground for anticipating failure in taking this path [progressive education] resides to my mind in the danger that experience and the experimental method will not be adequately conceived. (Dewey, 1938, pp. 89-90)

There remains an inherent tension in the measurement of learning, cognition, or education through a situated lens as one tries to consider the full context but atomize variables down to manageable constructs. As Nardi (1996) reflects, "How can we confront the blooming, buzzing confusion that is 'context' and still produce generalizable research results?" (p. 35). This is difficult to answer but it is likely that the whole of learning is greater than the sum of the parts and it is also likely that there are substantial differences between what happens in a naturally complex environment and what happens under controlled conditions (Salomon, 1993), driving the need for this empirical work. Rickinson et al. (2004) offer a word of caution: "The difficulty of identifying, measuring and evaluating the benefits of fieldwork and field trips should not be underestimated by researchers, practitioners or policy makers. There are far too many poorly conceptualised, badly designed and inadequately carried out studies" (p. 24). In considering the measurement of experience in learning or cognition, there is a danger not only in blurring the focus of the research to capture the "blooming and buzzing" complexity of what is occurring but also in overly atomizing the process to the point where we are measuring factors that may have little to do with the most important aspects of student learning.

While conceptualizing the role of experience in educational settings becomes overwhelming and impractical to manipulate in a meaningful way, the notion of event-distinguished, semantic experiences is a useful tool as the educator has some control over the conceptual, affective, material, and social elements of a distinct learning event as well as the capacity to intentionally link otherwise distinct events through manipulation of the continuity of experience. Educational researchers can similarly identify contextual and semantic bounds of *an* experience, particularly when it is largely shared by a group of learners. Thus, while this article restricts the discussion to experiences that were planned as educational interventions or to educational events identified

by the learner post hoc, there remains a recognition that these events are situated within the larger frame of individual and group experience and that this broader sense of experience continuously impacts the more definable experiences (Tseng & Seidman, 2007; Vygotsky, 1978).

The large breadth of educational approaches described as “experiential education” highlights the need for a measure of the nature of or the degree to which experience contributes to that education, cognition, or learning. Because the term “experiential education” is used so widely, it is difficult to discuss it as a singular thing and there is a danger in broad, unsubstantiated generalization in support of or denigrating experiential approaches to education (e.g., Clark & Mayer, 2008; Kirschner, Sweller, & Clark, 2006; Kuhn, 2007; Mackenzie et al., 2014). If there is to be meaningful discussion of experience in education, researchers and practitioners must identify some common inputs and outputs that can be detected. Certainly, the having of an experience with an educational goal is a common input, but the diversity of learning outcomes has defied meaningful and measurable outputs that are common across the spectrum (Ewert & Sibthorp, 2009).

When scholars have conducted meta-analyses on educational outcomes within the subfields of adventure education (Cason & Gillis, 1994; Hattie, Marsh, Neill, & Richards, 1997) and field studies (Rickinson et al., 2004), they report struggling with both highly variable effects across programs and difficulty in comparing studies due to drastically different outcome measures used across studies. One study might report school grades and another might rely on self-report of knowledge gains. In two meta-analyses on adventure education (Cason & Gillis, 1994; Hattie et al., 1997), larger effect sizes were found for experiential learning than for more traditional interventions. However, as Hattie and colleagues (1997) point out, that was not true for all of the cases, but the lack of formative, process-oriented studies leaves us with little understanding as to why one program is effective and another is not. While these studies are dated, there is little indication that this status has changed significantly since those analyses were conducted. Similarly Rickinson et al. (2004) conclude, in part, “substantial evidence exists to indicate that fieldwork, properly conceived, adequately planned, well-taught and effectively followed up, offers learners opportunities to develop their knowledge and skills in ways that add value to their everyday experiences in the classroom” (p. 24). This statement is loaded with difficult-to-measure assumptions about the educative inputs and the learning outputs.

While there is much value in measuring learning outcomes that are closely aligned to a given learning experience, this does not provide an opportunity to judge the contribution of experience to learning across studies. Contextualization within *an* experience can be measured and can provide meaningful data about learning through experience.

Contextualization as Measurable Variable

If *an experience* is the unit of analysis and one is trying to capture the contribution of that experience to learning, what is to be measured to indicate what or how that holistic experience contributed to the learning process or outcomes? Where is experience detectable during the process or as cognitive residue? Contextualization describes the connection between experience and subject knowledge as it is actualized (situated) as well as when it is reactualized (resituated). It is important to know both the long-term outcomes of contextualization and how those outcomes and processes developed in real time. All aspects of the [intention → process → outcome] function need to be better understood as well as the interaction between these manifestations of contextualization.

A substantial amount of work has been done to examine the impact of the intention in the [intention → process → outcome] function via evaluation studies of contextualized curricula (see Gilbert, 2006; King & Ritchie, 2012, for reviews as well as the 2016 collection edited by Taconis, den Brok, & Pilot, 2016). However, there is a wide variety of ways in which the intended contextualization of curricula are measured, making comparability across studies difficult. The spectrum presented here (Figure 1) provides a mechanism to compare studies, even retroactively. The contextualization spectrum (Figure 1) could also be used as a framework for a meta-analysis. The framework would allow for the positioning of existing studies that have not specifically identified contextualization as a goal but have clearly identified the degree of contextualization within the methodology. The framework would allow for a common metric to position these studies on the spectrum post hoc and compare effect sizes of learning outcomes as a result, albeit with some caution as to the conclusions that could be drawn. For example, case studies and field studies have clear relative positions on the spectrum and, given sufficient sample sizes, could be compared in a meta-analysis. However, the curricular approaches shown on the spectrum (Figure 1) are not absolute as the specifics of any actual curriculum or implementation would alter the degree of contextualization.

To pursue use of the spectrum in this way would require more tightly defined regions of the spectrum or scalar variables that indicate the relationship between the learner and the authentic environment as afforded by a curriculum. Time in context, authenticity of materials and the physical environment, realism of presented problems, degree of interaction with real-world actors from the germane field, and other variables could conceivably constitute a metric or rubric to more precisely position various curricula on the spectrum. Treating the intended experience in the curriculum as a continuous rather than dichotomous variable (traditional classroom vs. experiential) allows for a more meaningful mechanism of comparison. Measuring the degree of contextualization is more tractable than the degree of experience.

The processes of contextualization that fall between the intention and outcomes of the [intention → process → outcome] function remain somewhat of a black box. These processes are crucial to understand if outcomes are to be improved through intended contextualization of curriculum. Realized contextualization as a measurable variable is a relatively new idea and as such it needs further theoretical development as well as testing in a wide variety of settings. Rivet and Krajcik (2004, 2008) present a scale and scheme to judge students' realized contextualization of students' knowledge during middle school project-based learning units in science. They used a 0 to 5 scale to rate contextualization as indicated by student contributions to classroom discourse during the learning experience. A "0" on their scale represents no evidence that the student had contextualized their knowledge while a "5" indicates that the student had made direct connections between content and context in multiple scenarios as suggested by how they verbally connected those ideas in class discussions (Rivet & Krajcik, 2008). This approach prioritized the contextualization process in the moment as students situated within a problem-based learning environment verbalized the cognitive connections they experienced in the moment and as a function of their continuity of experience. The authors found a correlation between the degree to which students contextualized their knowledge and subsequent content knowledge assessment results (Rivet & Krajcik, 2008).

Realized contextualization as process or outcome can also be treated as categorical with two levels: secondary or primary contextualization (Giamellaro, 2014). The learning events studied in Giamellaro (2014) examined immersive field studies in high school science classes as students traveled, lived, and learned in wilderness settings for extended periods of time. Students' content knowledge was tested before and after their experience and students were interviewed during and after the experience to examine the degree to which their subject knowledge had become contextualized. This approach prioritized the residue of contextualization as knowledge was resituated in a recall event. Contextualization was judged on a scale representing the degree to which students discussed contextual elements in their self-described content knowledge and acquisition of that knowledge. The study positively correlated degree of contextualization with student learning and identified the role of specific contextual aspects on that learning. Contextualization was effectively used as a measure of the experiences' impact on learning outcomes in a way that allowed for the determination of which aspects of the experience were most influential in student outcomes.

The Rivet and Krajcik (2004, 2008) and Giamellaro (2014) approaches to quantifying realized contextualization represent an important theoretical difference that returns to the question of whether experience should be measured during the event or as a cognitive residue after the event, actualized or reactualized experience (Dewey, 1934/1980; Roth &

Jornet, 2014). In other words, should contextualization be measured *in situ* as lived experience or post hoc as *an* experience. Both approaches contribute to a deeper understanding of experience in education and offer theoretical and methodological advantages and hurdles.

The contextualization spectrum presented here (Figure 1) may provide some guidance and structure to future studies that seek to use contextualization as a measure of the contribution of experience to learning or the situatedness of learning through education. For example, experimental designs could intentionally manipulate the degree of contextualization in the presentation of content by altering the personal interaction of the learner with the authentic context. Such a study could monitor the way and degree to which the learners interact with the content knowledge in response to the level of contextualization. Alternatively, or in addition, such a study could assess the nature, complexity, transferability, or other qualities of the resultant knowledge in response to the varying levels of contextualization.

To advance either the experimental or the meta-analytic approach, the field would benefit from a more defined and universally applicable metric to reliably gauge contextualization across the spectrum. In other words, how can one reliably determine where on the spectrum a curriculum or an experience lands? Giamellaro (2014) and Rivet and Krajcik (2004, 2008) provide some guidance. A more comprehensive scale may benefit from an approach that considers intended and realized contextualization together, or it may be more effective to consider them in isolation.

Relatedly, the transactional process between learner and environment must also be explored over time to determine the role of reactualization of past experiences as well as the role of those experiences in anticipating future learning (Dewey, 1938; Pugh, 2011). Ideally, all these lines of inquiry should be advanced and perhaps combined to develop a richer understanding of how these processes work together.

Conclusion

The belief that all genuine education comes about through experience does not mean that all experiences are genuinely or equally educative. Experience and education cannot be directly equated to each other. (Dewey, 1938, p. 25)

This article proposes the use of contextualization as a construct that may allow for a common empirical measure of the contribution of experience to situated cognition, a construct that has the potential for use across the spectrum of education. Certainly, some may bristle at the notion of trying to over-quantify a deeply complex process. However, without a way to measure processes and outcomes, educators are left without a reliable mechanism to determine why one approach, program, or educator is successful while another is not. This is particularly true for programs explicitly characterized as experiential education as well as for others that

provide student experiences as central educative mechanisms. Without a measure, administrators are left without a reliable manner to show results with funders or decision-making bodies weighing the launch or continuance of contextualized programs. Educators new to contextualized approaches may see examples of successful experts but may struggle to identify exactly why they are successful without a comparison tool. Current practitioners are left with gut instinct to guide them, at times in the wrong directions. If practitioners do not understand how authentic learning environments contribute to learning, there is a real danger that programs will not be designed to utilize the potential benefits and student learning will suffer.

The construct of contextualization offers an avenue between theory and practice that can begin to address this need for clarity. Contextualization establishes a mechanism for Dewey's (1938) "continuity of experience" by describing the learners' cognitive and affective connections to the environment, or their situatedness within it. Approaching education from a perspective of facilitating scenarios in which contextualization is primed and scaffolded rather than from an approach of providing an experience to learners helps avoid the theoretical and practical pitfalls of the discrepancy of experiences from person to person, particularly between teacher and student.

Rather than asking whether students had a good experience, one can ask to what degree did the experience change the way the content was learned, remembered, applied, or situated? As described here, contextualization is measurable through observations, student work, and student interviews. Further work is needed to better understand how contextualization can be captured and to examine contextualization through other means. Doing so opens up a window not just to a correlation between two variables (experience and learning) but to the center of the relationship between the learner and the environment. For researchers, contextualization offers a measure that provides a meaningful comparison across a relatively wide array of approaches, programs, and experiences. The construct can be used to move beyond measuring learning as a number of facts and toward a more nuanced understanding of the nature of students' knowledge. While beyond the scope of this article, contextualization should include affective inputs and outcomes. Further work is needed to better understand the relationship between affective variables and contextualization.

Further work also needs to be done to inform practitioners on how to use contextualization for planning, instruction, and assessment within educational settings. Conceptually, a shift in focus away from the having of an experience to the facilitation of contextualization could have a profound impact on teachers and students. Rather than either building an experience and then finding the teachable moments or delivering content and then adding a tangentially related experience, teachers can plan with the specific intention of scaffolding student experiences to specifically connect the

learner to the environment by intentionally choosing and highlighting contexts with the power to support the intended content. In this way, teachers can utilize contextualization to support learning. By making intentional choices of where a learning event should fall on the contextualization spectrum (Figure 1), educators can vary their teaching to better match a given learning outcome with a context and the needs of their individual students.

The concept of experience in education remains useful as a broad ethic and clearinghouse for discussions around innovative and engaging approaches to education, just as it was when Dewey wrote about it 100 years ago. However, rather than struggling to define such an omnibus idea, practitioners and researchers should accept experience as a broad container and move toward the use of more targeted constructs that can be measured, compared, evaluated, and revised if the field is to be meaningfully advanced. Conceptualizing and measuring contextualization is one such mechanism to crack the black box of experience in education.

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