

On the Concept of Context

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Abstract: This article aims to clarify the concept of context. Our motivation is the lack of consensus on what context is, despite common accept of the claim that learning is context-dependent to some degree, and despite a widespread interest in researching learning in specific contexts such as museums, classrooms, or workplace settings. We provide a minimal concept which is applicable to all references to context, properly construed. We point out that more general considerations of contextuality and compositionality must be reconciled and balanced out if the role of context in relation to learning is to be understood. We then flesh out the minimal concept with a typology of context categories relevant for understanding the significance of context for learning. The categories are *location*, understood both in a physical-geographical and an institutional sense, *knowledge domain*, *sequence of occurrences*, *activity*, *historical period*, *social relationship*, and *horizon of significance*. We illustrate the usefulness of the typology through pointing out how it could help clarify discussions about transfer of knowledge and skills.

Keywords: context; transfer; learning; typology

1. Introduction

For the past century, educational thinkers have stressed the significance of context for learning. Thus, Dewey claimed that context is the taken-for-granted spatial and temporal background and selective interest of the agent, upon which the content of thought stands out [1]. Piaget and Vygotsky both, albeit in different ways, explored the significance of social context for children's cognitive development [2,3]. Bateson argued that “without context, there is no communication” and that to understand communicational aspects of a phenomenon, one must look to ever larger context units in a “hierarchy of contexts within contexts” [4] (p. 408). As learning for him inherently is a communicational phenomenon, this point applies especially to learning. Context-dependency of learning, and, more specifically, the roles context plays in shaping cognition, is still a recurrent theme within contemporary educational research, both theoretical [5–11] and empirical [12–20]. Several research fields build on the significance of context for learning, e.g., domain-specificity of skills and informal learning in museums or in the workplace. Many of today's important educational questions similarly draw implicitly on this significance, e.g., the question of how to integrate (or not) students' informal social media practices in formal educational settings [21]; how to improve students' interest in science and technology by heightening their awareness of close connections between curricular content and their daily life [22]; and how to validly compare—and possibly reproduce—educational practices and outcomes across countries, cultures, and traditions [23–25].

The concept of context is, however, far from clear. Often, it is left unanalyzed and taken for granted. Sometimes, it is prefixed with an adjective such as “historical”, “cultural”, “social” or

“national” [23,24,26]. This points the reader to the kind of influence on learning that is implied, but still does not explicate what “context” is. It thus remains vague what the relationship between context and learning is, including how the influence of context more specifically plays out. Theorists, who do analyze the concept, tend to do so from a particular educational- or learning-theoretical point of view, which makes their analyses less useful for other educational research approaches. This is the case for the analyses provided by Dewey and Bateson, respectively (cf. above). The aim of this article is to provide a philosophical analysis of the concept of “context” in relation to learning which does not presuppose a particular view of learning, cognition, and knowledge and thus can be useful across different educational research approaches and questions. We set out by demonstrating the need for a clarification by pointing out the widespread acknowledgment of the significance of context on the one hand, and the lack of clarity as to what context is on the other. We argue that several discussions within educational theory are muddled because of this lack of clarity. We then point out that though the concept of context is unclear, enough of a common core may be found in otherwise diverse uses to warrant treating it as a single, broad concept: Regardless of how the concept is exemplified, a context is usually meant to play a determinate role. This leads us to explicate a minimal concept. We identify two functional roles that the concept exhibits across different usages and offer some general observations concerning the limits of appeals to context within the educational field. On this background, we provide an analytical typology of categories important to understanding the significance of context for learning. Our claim is that the identified senses are relevant to consider irrespective of the more specific approach to learning one adheres to, though how these senses will be considered will likely differ between approaches.

2. Prevalence of Appeals to Context—Absence of Clarity on What That Is

The prevalence of appeals to context within the educational field may be illustrated by the range of research fields drawing directly or indirectly on the significance of context for learning:

- Discussions of the domain-specificity versus the generic nature of skills [8,26–29] involve pointing out how e.g., abstraction, reflection, planning, and forming judgements take form and content (or not) from the contexts in which they are learned and carried out.
- Research into informal learning in museums [30], in hobby practices [31], or in the workplace [9,32–34] investigates how non-school contexts provide different conditions for e.g., defining subject domains, for judgement formation and development of understanding, as well as for motivation and self-direction.
- Curriculum and competence development studies regularly focus on the question of how learners may be supported in bridging between their various learning contexts through different pedagogical designs, such as portfolio [35,36] or problem-based learning [37,38].
- Discussions of whether transfer of knowledge between contexts is possible—and of what “transfer” actually means—draw directly on the purported context-dependency of learning [6,7,10,12,39,40].
- Debates about the validity of large-scale international student assessments such as PISA, PIRLS, and TIMSS [25,41,42], about the possibility of sustainably “exporting” educational policies between countries [23,24], and about the risk of standardization [43], need for “recontextualization” [24] or local, democratic re-interpretation [23] all build on the idea that countries’ different educational traditions provide different contexts for learning which may not be commensurable and which may accommodate educational policies differently.

This list implicitly displays the diversity of senses in which the concept of context is understood. and the diversity comes out clearly when one juxtaposes examples of contexts provided in different texts (or indeed within them) which make unanalyzed use of the term. Restricting ourselves to examples from educational philosophy for the sake of brevity (similar examples are found within other educational research fields, as indicated in the references above): Winch mentions “architecture”, “cooking” [26] (p. 288), “bricklaying” [29] (p. 10), and “social context” (in which activities such as

“conversation” are carried out) [26] (p. 291) as examples of context. Likewise, he speaks more generally of “professional contexts” and “instructional contexts” [29] (pp. 6 and 13, respectively). Lewis speaks of “work contexts”, “practical everyday contexts”, e.g., “everyday contexts of verbal communication”, “practical or real-world contexts”, and of “workplace, family, community” as the “fundamental contexts” of people’s lives [6] (pp. 425, 431, and 432, respectively). Davies discusses “school teaching” as only one kind of “teaching context”, and also uses the term in a broad sense when speaking of “liv[ing] out a *particular* fulfilling life in the context of . . . a *particular* community of people with a *particular* history and *particular* ways of doing things” [44] (pp. 477 and 486, respectively, emphasis in original). Lang points at the significance of “location within social and linguistic contexts” and of the experiences we have “within our own historical and social contexts” and argues for “Re-visioning educational contexts—institution, classroom, teachers, and students—by means of epistemologies of situated knowledges” [11] (pp. 88, 89, and 92, respectively). Guile names the “contexts of education and work” [5] (p. 252). Hinchliffe’s only specific example is “context of a job”; apart from this he hints at an understanding of context by saying e.g., that “low-level skills” such as cycling or swimming may be learnable in “a context that is very thin” and that many IT-skills “by definition [are] transferable across contexts”. These examples seemingly range from specific activities (“verbal communication”) over an extended task (“job”) to professions (“architecture”) and societal institutions (“education”) [7] (pp. 190 and 195).

Attempts have certainly been made, also within contemporary research, to clarify the meaning (or set of meanings) of the term. Still the non-compatibility of these clarifications along with their diverging learning-theoretical presuppositions arguably only heightens the confusion. Thus, Beckett and Hager e.g., characterize context as “surroundings” and explicate four dimensions of contextuality. These are *specific combination of features in the situation here and now, changeability over time, social forces, and the individual’s integration of personal characteristics* [9] (pp. 116 and 177, respectively). Together with Halliday, Hager on the other hand denounces this list of dimensions and instead suggests “distinguishing contexts in terms of the practices that give them meaning” [10] (p. 434), and develops this further into a nested understanding of context as determined by activities, practices and traditions that are meaningful to the individual. Both texts are inspired by Dewey, who, however, as indicated, focused even more narrowly on the individual’s experience and its significance in determining thought. Context, he claimed, is that upon which “the direct material of reflection” [1] (p. 12) stands out at all—and stands out in the specific way that it does. It is thus not a “surrounding”, but rather a “background”, upon which the “foreground” of cognitive thought emerges. In contrast, sociocultural approaches to learning take social practice, not the individual, as the primary unit of analysis for context. As articulated by Säljö: “There is not first a context and then an action, instead, our actions form part of, create, and recreate contexts. Parts and wholes define each other and context can be seen as that which weaves together a social practice or activity and makes it an identifiable whole” [15] (p. 135, translation by author). He, for his part, distinguishes analytically between the *physical*, the *cognitive*, the *communicative*, and the *historical* contexts.

The differences in and lack of clarity of (implicit or explicit) understandings of context are responsible for many ambiguities and controversies within educational theory and practice. Thus, central questions within the research fields mentioned above are muddled by the lack of clarity, e.g.:

- What does it mean for a skill to be generic across domains? Discussions are muddled by unclear understandings of the contexts across which a skill, if generic, is supposed to be applicable.
- To what extent is the formality/informality of learning determined by the learning context, such as museums and workplaces?
- What is the significance of “authentic tasks” to school learning? Authenticity is frequently understood to derive from the type of context to which the task pertains [6], which again begs clarity concerning the concept of context.

- The question of learning transfer is frequently posed in the following way: How (if at all) does knowledge and skills transfer across contexts, e.g., from school tasks to “real life”? Again, this question requires a clear concept of context.
- The question of how to validly compare educational practices and outcomes across countries is confounded by diverging understandings of how to take “context” and its “influence” into account. Compare e.g., the claims made about context in OECD’s reports with the critique hereof provided by this article’s first author [25].

The question of learning transfer has been pivotal in otherwise quite varied approaches within educational research. For more than a century, it has thus been the subject of intense scrutiny in educational psychology and the learning sciences, with several special issues of, and strands in, journals still being dedicated to the topic [45–48]. After having offered an analysis of “context” in the following sections, we demonstrate the scientific utility of the analysis by applying it to the question of learning transfer.

3. Context—A Minimal Concept

Enough of a common core may be found in otherwise diverse uses to warrant treating context as a single, broad concept. Appeals to context usually is an appeal to a determinate role. Hence a first step in clarifying the notion is to provide a functional definition: We specify the *role* a context is supposed to play, while leaving open what might occupy this role. To illustrate the commonality, we supplement examples from the educational field with ones from other fields such as literature and language.

Two such functional features seem to pertain to contexts of all sorts. The first functional feature is that a context has a *supplementary* role: It is brought in, or added to, the understanding of a phenomenon—the *focal object*—that would not have been adequately understood had it been considered in isolation. A context thus *completes* the conditions for understanding the focal object. Classic examples, referred to also in literature on learning [49], are found in the study of language: Indexical expressions such as “here”, “now” or “that woman” require information about non-linguistic factors—i.e., the “context of their use”—to take on a definite meaning.

The second functional feature is that a context is *determined relative* to the *focal object*. A wide variety of focal objects can serve to determine the context, depending on the nature of the theory in question: it can be a person, a learning process, an act of understanding, an utterance, a historical event etc. The context is *centered* around the object. The context is not a neutral layout of things or properties near the focal object, nor is it a set of circumstances or an indefinite “background”. It is ordered and organized by its relations to the focal object, which co-determines what properties of the surroundings are relevant and thus part of the context. Accordingly, “here” may refer to a classroom or a larger geographical region or political or administrative entity, depending on whether the focal object is a student presentation or a cultural practice such as a particular examination system.

This second functional feature of contexts is a likely cause of much of the confusion surrounding the notion: Very different factors may be singled out as part of the context, depending on the prior understanding of the focal object which the person describing the context has and on his/her general interests. Texts which prefix an adjective such as “historical”, “cultural”, “social”, or “national” to “context” without analyzing the concept itself (cf. above) similarly remain vague precisely because they appear to overlook this second functional feature. Thus, they do not explicate how the focal object co-determines which historical/cultural/social/national aspects are relevant “completing” phenomena.

In sum, there is a mutually constitutive relationship between focal object and context. The context both determines and is determined by the object. This is so, at least *partially* and *potentially*. As we go on to argue in the following section, it is an open question how far the context determines the object in any particular case; and we argue that there must be limits to how far contexts can determine objects, since some objects at least are independently identifiable. Whereas the context is usually invoked to emphasize the significance it has for the object (cf. its supplementary function), it can of course also be

referred to in order to stress its irrelevance or lack of impact in certain cases, e.g., when speaking about something as “context-independent” or as identical or identifiable “across contexts”. This, however, presupposes that contexts in general determine focal objects.

An illustrative example of the mutually constitutive relationship between context and focal object comes from contextual theories of literature, according to which the constitutive, contextual factors should be determined “flexibly”, relative to the kind of literary work in question (though this is itself held to be determined by the context). Thus, an author’s identity and intentions may be less important for the understanding of a medieval ballad than for that of a 20th century novel [50].

Two metaphors for the relationship between context and focal object have been suggested in the literature: the container and the rope. Lave and McDermott argue that common sense uses of the term implicitly lends itself to the former—to the degree that, as Lave points out, most people talking about context will “sketch in the air a shell about the size and shape of a pumpkin” (Lave, for her part, is citing an orally reported observation by Bruno Latour) [51,52]. The gist of this metaphor is that the focal object is located *inside* the context-container which may then affect it (and vice versa). Context-dependency according to this metaphor corresponds to figuration of focal object by the container (as soup in a bowl).

In contrast, the rope metaphor highlights the interrelation of focal object and its context: A rope is made up of strands which, for their part, are held in place and get their significance from being part of the rope. The metaphor presupposes concepts of emergence and co-constitution: Context does not exist prior to its constitutive parts, taken in total, but comes into being through their combination and interaction. Each change in the parts will influence the context (a little). On the other hand, the parts become what they are through their combination and interaction. This is what context-dependency means on this metaphor. The parts do exist as threads prior to their integration, but the significance structuring of the context fundamentally gives them a new essence-in-context.

In comparison with our minimal concept of context, the metaphor of the container tends to ignore the second functional feature altogether, i.e., that context is determined relative to the focal object. The metaphor of the rope is more adequate to our analysis.

4. The Cost of Context

We now turn to the question of what one might call the cost of “contextuality”. In most, if not all cases, the appeal to context contains at least one of the two following claims: Firstly, that previous attempts at understanding or explaining a given phenomenon have taken into consideration an insufficient range of contextual content [4], or secondly, the claim that previous accounts have failed to understand the complex interactions between focal object and context [53,54]. As to the first claim, Bateson is of course right in pointing out that one can always expand the range of contextual material. However, doing this involves the risk of losing the specific focus of the focal object. Explaining a particular interaction between teacher and student with an appeal to “Western late-capitalist economic conditions” is usually less informative than reference to contextual factors at a lower level in Bateson’s hierarchy of contexts. It is infeasible to say anything with full generality about the right amount of contextual material. That depends, again, on the nature of the focal object and what one is seeking to explain or understand. This is not to deny, of course, the point made by e.g., feminist philosophical thinkers that exclusion of specific aspects of context as “irrelevant” may be a result of highly problematic gender-, race- or cultural bias [55]. At a very general level, one can only appeal to a general scientific virtue of parsimony when offering explanation and seeking understanding: adding contextual material should pay for itself in terms of added explanatory power and general ability to throw light on the topic at hand. Over-emphasizing context at the expense of parsimony is the first cost of contextuality.

We have noted the complex interaction of context and focal object, emphasized in the second claim, when we argued that they co-constitute each other. Conversely, however, one should not overlook the fact that some elements making up context and focal object may actually have

context-independent existence. The second cost of context is connected to overlooking this fact: It is the loss of explanatory potential that simpler elements have in accounting for something more complex. We shall illustrate the point by discussing the adequacy of the way appeals to context have been made within educational theory.

It is common to make this appeal by comparisons with the study of language. Bateson thus argues for his hierarchy of contexts precisely by claiming that “A phoneme exists as such only in combination with other phonemes which make up a word. The word is the *context* of the phoneme. But the word only exists as such—only has “meaning”—in the larger context of the utterance, which again has meaning only in a relationship” [4] (p. 408). Indexicals are also a typical point of reference. For example, in the widely cited paper by Brown, Collins & Duguid mentioned above, the authors relied extensively on Miller & Gildea’s empirical studies of children learning words [49,56]. Miller & Gildea confronted the view of the learning of words according to which words and sentences are self-contained pieces of knowledge and contrasted this view with indexicals. Brown, Collins & Duguid concurred with Miller & Gildea and added: “Indexicals are not merely context-sensitive; they are completely context-dependent... surprisingly, all words can be seen as at least partially indexical. All knowledge is, we believe, like language. Its constituent parts index the world and so are inextricably a product of the activity and situations in which they are produced” [49] (p. 33). Lave, in her criticism of de-contextualizing learning and knowledge, citing Rommetveit and Goffman [57,58], similarly argued against “the intuitive appeal of pervading pretheoretical notions” such as “the common sense notion ... that the word *in isolation* will have a general basic, or most down-to-earth meaning”. According to Lave, “... categorization of experience that privileges ‘decontextualization’ does not offer an adequate explanation of thought or action” [51] (p. 23).

In line with the argumentation of Bateson, Lave, and Brown et al., a prominent tradition in philosophy of language, going back at least to Frege, has emphasized that we should ask for the meaning of words only in the wider context of a proposition or even larger linguistic units. Early Wittgenstein, for instance, distinguished sharply between *sign* and *symbol* [59]. According to Wittgenstein, signs are *mere* sounds or *mere* inscriptions with no semantic or syntactic qualities at all, while symbols are signs combined to make meaningful statements. Of course, in matters of surface appearance, signs have a strong likeness with symbols, but to Wittgenstein, they are quite different things. Only in the right context—the right combination of signs—do signs become symbols, characterized by having meaning.

Such a position neglects, however, that signs rarely are *mere* signs when “out of context”, but are also potential contributors to meaningful statements, and independently identifiable as such. Words thus are, at once context-dependent, deriving meaning from the sentence, uttered in interaction, and context-independent blocks, with which we compose sentences. This dual characteristic is the reason we can distinguish an unusual use of a word (context-dependent meaning) from its ordinary use (context-independent meaning)—or in Szabó’s words: We can distinguish “occasion meaning” from “standing meaning” because of this characteristic [60]. A clarifying example of the distinction between sign and symbol: the sign “o’clock” makes sense only in a given context, namely one relative to a spatial and temporal context, as in “it is now five o’clock in London”. Now, consider the following string of signs: “It is now five o’clock on the sun”. According to a radical understanding of contextuality suggested by early Wittgenstein, the signs fail to make *any sense*—become symbols—as they have not been combined correctly *vis a vis* context, but appear “out of context”, indexed not to a *geo*-graphical location. However, this understanding does not seem reasonable: Despite the failure of the statement, it is understandable as an *attempt* at saying *something*, and in this way the signs *do* make sense as symbols, identified individually, but combined incorrectly, and in this case, combined incorrectly in a potentially instructive way. Similarly, even though “that woman” will pick out different women when uttered in different contexts, the expression contributes systematically and uniformly to those different contexts by having us scan our environment for a woman. As a corrective to the view of Bateson, Lave, and Brown et al., we therefore wish to emphasize that there is also explanatory *strength*

in acknowledging that isolable words have meaning, not considered in their context of a sentence. Isolating words allows using a principle of compositionality, i.e., that the whole proposition in some systematic way is a function of the character of its elements, when explaining the more complex sentences. This principle further helps explain the extraordinary feat that language users regularly achieve: understanding and composing novel sentences with a finite pool of words, so-called linguistic productivity [61].

Within educational theory, a similar principle of compositionality surfaces in studies of science and science education. In her study of modelling, Woody thus suggests that open boundaries and compositionality is a defining feature of models [62]. As Erduran and Dagher point out: “... while the open boundaries of the model allow its potential application to new, more complex cases, its compositional structure actually provides some instruction for how a more complex case can be treated as a function of simpler cases” [63] (p. 126).

Summing up, the problem with the literature that privileges context is twofold: It draws inadequately on arguments from the study of language by ignoring the principle of compositionality there. It therefore overlooks the explanatory potential within educational research of maintaining what Woody also calls a building block picture. This is the second risk of appeals to contextuality.

Further arguments for adherence to a principle of compositionality are found within educational theory: Lave has been criticized for disregarding the existence of general logical or arithmetical cognitive tools and principles that are applicable across contexts [64,65]. Packer has pointed out that denying independent existence of objects across contexts jeopardizes learners’ own existence as enduring entities: “If, as Lave put it, “cognition” is seamlessly distributed across persons, activity and setting’ ... does anything remain personal?” [66] (p. 500). Packer proceeds to offer a summary account of the highly contextualized understanding of learning and of the concomitant transformation of context and individual found in Lave’s situated learning approach, after which he points out that “we are still left with the question of what endures when a person makes such a move” [66] (p. 502). In this way, Packer insists on two related thoughts: That *something* is independently identifiable across (learning) contexts, and this *something* ought to play a (greater) explanatory role in the conceptualization involved in a theory of learning. Packer’s concern can therefore be seen as an emphasis on some principle of compositionality as opposed to the full-blown contextualism in Lave’s work.

As indicated, perhaps the strongest argument for compositionality in language is linguistic productivity [61] (p. 320). The learning-theoretical version of this argument would to an even greater extent than the linguistic case rely on contested empirical material, but should appeal to independently existing elements (be they persons, tools, logical structures, schemas or models) as the *best explanation* of the extraordinary amount of learning that takes place in extremely varied contexts. Mundane examples of e.g., children passing on the facts they learned on school excursions when they return to the same (or similar) physical locations with their parents certainly suggest some element of compositionality in learning.

5. A Typology of “Contexts” for Understanding the Significance of Context for Learning

Given these general considerations cautioning not to over-emphasize the significance of context, we proceed to flesh out the minimal concept provided above with a typology of categories. Key focal objects for the questions mentioned at the end of Section 2 (and for the research fields within which they arise) are “task”, “skill”, “knowledge”, “learning process”, and “learner”. Other focal objects could be analyzed such as “study group”, “teacher”, “technology”, “communicative act(s)/interaction”, “informational and material resources”, “product/outcome” and “assessment”. Extended lists of phenomena which might reasonably be taken as focal objects in discussions of learning may be found in [67–70]. For the sake of brevity, we nonetheless restrict ourselves to the former five, which suffice to develop a context typology (applicable also to such other focal objects) and to illustrate its clarifying potential. The typology is informed by existing attempts at clarification but is not based on a literature review in any strict sense of the word. As indicated above, we aim to remedy the existing confusion

surrounding the concept of context by providing a set of categories basic enough to be relevant across educational research approaches, perspectives and questions. We have therefore taken a step back from existing discussions, including existing categorizations, and performed an analysis of which context categories can be said to pertain to the focal objects. The guiding inclusion/exclusion criterion has been whether the proposed category would be relevant to both individualist approaches to learning (like Dewey's, Beckett and Hager's, and Halliday and Hager's, cf. above) and ones focused more on social practice (like Säljö's). Needless to say, the specific use which the typology may be put to will vary according to educational approach, understanding of knowledge, learning, and cognition; research question and empirical unit of investigation. In the next section, we show how the typology helps clarify the question of transfer raised at the end of Section 2.

The first category is *location*. This category applies to all five focal objects of "task", "skill", "knowledge", "learning process", and "learner". "Location" may be understood in both a *physical-geographical* and an *institutional sense*. Often these are taken as one, as in analyses of the significance of a specific classroom setting for student involvement with tasks [15,71,72]. For analytical purposes, however, it is necessary to keep them apart. The *physical-geographical sense* lends itself easily to the container metaphor mentioned above, with the presupposition that the container exists prior to and independently of the focal object. For example, the physical setting of a forest exists before a biology excursion to it, and the presence of the trees may shape the students' understanding of their tasks in different ways than would the physical setting of their school classroom. Still, the second functional feature, that context is determined relative to that for which it is a context, should not be overlooked: What is counted as "the physical surroundings"—how wide a geographical area they cover—will depend on the focal object. For a biology task of discriminating between trees, it may be only one clearing if all species on the assignment sheet are visible there. An example of the use of this physical-geographical sense is found in [73].

The *institutional sense of location* also lends itself to the metaphor of the container: The focal object is understood to be placed in independently and pre-existing institutional surroundings such as "the school", "the museum" or "the after-school program". This understanding is exemplified in the uses made by Davies and Guile of the term "context", as well as by Winch's mention of "professional" and "instructional" contexts (cf. above). "Institutional surroundings" are not equivalent to the physical surroundings in which they are materially realized. The school class on a biology excursion from the physical location of the school to the physical location of the forest is still in the institutional context of school. That is why the person leading the excursion is still the teacher, and the ones following are still the students; why the questions posed by the teacher are "tasks" and the answers provided by students "solutions". Thus, the institutional location exerts its supplementary role on each of the mentioned phenomena to make them what they are. At what institutional level "institutional location" is understood (e.g., a given class, a particular school, the national school system) will depend on the focal object.

The next category is *knowledge domain* which applies primarily to the focal objects of task and skill. The category is prominent in discussions about the existence of general skills, referred to above. The issue at stake is precisely whether the focal objects of task and skill (of e.g., critical thinking) are fully determined by the context of knowledge domain or whether there is a core which is the same across the context completion of different domains [27].

Though Säljö does not clearly define his concept of "cognitive context", his examples indicate that he intends to refer to the category of *knowledge domain* [15]. It has been contested as a meaningful category by situated learning theory, with the argument that what constitutes task, skill and knowledge is fully determined by context. Thus, referring to several studies of arithmetic practices out of school, Lave goes so far as to suggest "the possibility of an indeterminate number of arithmetics" [12] (p. 63), seemingly giving up on the idea of arithmetic as a clearly demarcated knowledge domain.

A further context category is *sequence of occurrences*. This category applies most naturally to the focal objects which are themselves occurrences, i.e., (the presenting of) task and learning process.

The sequence of occurrences in which the focal object occurrence takes place—and its placement in the sequence—is important for determining its significance. Presenting students with an example of an exam assignment in the beginning of a course has a very different significance than doing so at the end; as have the mistakes the students may make in answering the assignment. The category may be viewed in one of two incompatible ways: (1) as an objectively unfolding sequence of occurrences where prior occurrences may influence later ones causally, but where later ones have no effect on prior ones; (2) as a holistic significance structure where the meaning of former occurrences will in part be decided by later ones. The former view is found e.g., in behaviorist approaches to teaching, as represented in [74]. An example of the latter would be the significance of students failing an exam for deciding whether their hours of study had been occurrences of “studying hard” or not. Bateson’s view of how individuals determine contexts and sequencing of contexts may be viewed as falling within this category [4].

The next context category, *activity*, applies to all five focal objects. Studies of how student performance is affected by the very fact that they are participating in an exam activity illustrate a causal construal of this category and its supplementation [75]. Supplementation by activity can also be in terms of significance, in that e.g., what counts as a display of knowledge may be determined (partially or fully) by the activity [25]. “Activities” may be understood at more or less encompassing levels, ranging from *short-term engagements* with tasks (one occurrence) over *longer-term patterns of interaction* with people and resources (including several occurrences, but not in general a “sequence of occurrences”) to *cultural practices*. Examples of the latter are ways of communicating with each other (orally, in writing, per email) and of arranging for learners to demonstrate their skills in practice or at exams etc. A prominent educational research approach which emphasizes this category with all its levels is activity theory [52,76,77].

The next category, *historical period* may be viewed as a combination of the categories of *sequence of occurrences* and *activity* understood in its widest sense of cultural practices: Cultural practices develop over time, but not in a steadily linear way. Radical changes of political, societal, technological, and/or philosophical nature make it possible, retrospectively, to delineate (or construct) historical periods (i.e., sequences of occurrences) characterized by certain political-societal structures and socio-technological ways of dealing with the world (i.e., cultural practices). This category appears to roughly correspond to Säljö’s “historical context”.

We can illustrate the way historical periods supplement our understanding of focal objects with the significance we accord to historical period in evaluating the skill of recitation. Formerly, recitation was a prime indicator of competence; today (in our historical period) it is at most viewed as a prerequisite to competence [78]. The supplementary role played by historical period (or rather the cultural practices prevalent at the time) may be both causal and significance structuring: The value accorded to recitation will e.g., influence learners to pursue skills within this area. A mistake in recitation will be evaluated according to the significance structuring provided by the period.

A further category is *social relationship* (roughly Säljö’s “communicative context” and Winch’s “social context”) understood as the history of communicational interactions and emotional relations between the persons involved. Social relationship will act to supplement the meaning of current communicative acts, both specifically, by building on prior communication and established common ground [79], and more broadly, by supplying the communicative atmosphere to establish whether a given utterance is e.g., an outburst of anger or an ironic joke. The category applies to all five focal objects because their significance (task, skill, knowledge, learning process) and social role (learner) are determined in part by the meaning of communicative acts.

Our last category is *individual’s set of experiences*. This category applies to all the focal objects in that it supplies individual significance structure and meaning to each of them. How a student will understand a given task, what import she will attach to it, why it is to be undertaken, and how, will for instance be influenced by her former, positive or negative, engagement with others in activities around learning tasks. Similarly, she will make sense of her interaction with the other

students and the teacher based on the experiences she has had in other social relationships concerned with learning. Here, as with the category *sequence of occurrences* there are two opposing ways to view the category of individual experiences: (1) as the sum of more or less atomistic and independent experience-occurrences which may individually supplement current events by providing a point of comparison. Examples are studies of the effect of “prior experience” on development of scientific understanding and conceptual change, e.g., [80]; (2) As a holistic significance structuring, a “*horizon of significance*” where the meaning of each experience is given “in the light of” the whole of the person’s experience. This latter sense captures Dewey’s understanding of experience and context [1,81].

As stated, the presented typology is an analytical one which points to different aspects of “that which may be brought in to supplement and explain a focal object”. The order in which these categories are presented does not reflect a prioritizing of them. Nor are the categories meant to be exclusive. Quite the contrary, some of them may be combined and taken as one, which may yield more specific “supplementary understanding” to the focal object than each could provide alone. Likewise, the categories are not all at the same analytical level, neither in terms of designated time span nor in terms of the number of people and artefacts involved. Finally, not all categories will apply to all five focal objects, but they do apply to more than one. Table 1 presents an overview of categories, the focal objects they apply to, and examples of texts making use of this category.

Table 1. Overview of context categories, the focal objects they apply to, and examples of texts making use of each category.

Context Category	Focal Objects	Text Example
Location, physical-geographical and institutional senses not distinguished	Task, skill, knowledge, learning process, learner	Jewitt, <i>Technology, Literacy, Learning</i>
Location, physical-geographical sense	Task, skill, knowledge, learning process, learner	Hull and Schultz, “Literacy and Learning Out of School”
Location, institutional sense	Task, skill, knowledge, learning process, learner	Guile, “Learning across contexts”
Knowledge domain	Task, skill	Smith “Are There Domain-Specific Thinking Skills?”
Sequence of occurrence, causal construal	Task, learning process	Skinner, “Teaching Science in High School—What is Wrong?”
Sequence of occurrence, significance structuring	Task, learning process	Bateson, <i>Steps to an Ecology of Mind</i>
Activity—causal construal	Task, skill, knowledge, learning process, learner	Cassady, “Test Anxiety”
Activity, significance structuring	Task, skill, knowledge, learning process, learner	Dohn, “Knowledge and Skills for PISA”
Historical period	Task, skill, knowledge, learning process, learner	Säljö’s “historical context”, <i>Lärande i praktiken</i>
Social relationship	Task, skill, knowledge, learning process, learner	Säljö’s “communicative context”, <i>Lärande i praktiken</i>
Individual set of experiences, causal construal	Task, skill, knowledge, learning process, learner	Burbules and Linn, “Response to Contradiction”
Individual set of experiences, horizon of significance	Task, skill, knowledge, learning process, learner	Dewey, “Context and Thought”

For specific focal objects, the different aspects may combine in their causal influence on the object as well as in their significance structuring of the focal object. The combination need not be a simple addition of “contextual elements”, but may yield emergent ways of supplementing the focal object. Still, distinguishing the different categories will aid clarification of unclear conceptualizations, as we demonstrate in the next section.

A final comment: The categories in the typology display an important difference, in that some of the contexts are identified from a perspective external to the learner and some contexts are determined by the participants’ own experiences or understanding. The category of *horizon of understanding* is

obviously of the latter, “internalist”, type. By contrast, the categories of *physical location*, *sequence of occurrences* and *historical period* represent more externalist notions of context. They comprise features of which learners need not be aware or which they themselves would conceptualize in markedly different ways.

Actual descriptions of learning contexts comprise both internalist and externalist elements, or move back and forth between more or less internalist perspectives. They may e.g., involve both descriptions of the classroom as a physical location (which objectively affords and constrains various kinds of actions) and of the classroom as experienced by the learner as an enabling and constraining factor (e.g., [15,68,71]). Since both external and internal factors may be needed to adequately explain or understand a learning process, there is nothing wrong with a mixed approach. The categories of activity or social relationship, and some uses of the category of historical period, may even be viewed as more or less deliberate attempts to integrate both kinds of factors. Nonetheless, a clearer awareness of the difference, of when and why external or internal features are emphasized, would surely benefit research within the educational field. This holds even though it must be granted that the distinction between external and internal factors is neither simple nor uncontroversial. Thus, on some views, the character of individual experiences are in part constituted by social relations or even relations to the physical environment [12,13]. However, one need not conceive of the internal in a highly individualist or subjectivist fashion, or of the external in a correspondingly objectivist fashion, to make sense of the distinction. “Internal” could thus mean “internal to negotiation of meaning in a community of practice”, rather than internal to the individual, and “external” could mean “external to participants, from an observer’s point of view”, rather than external as in “from no point of view”.

6. Understanding Transfer

We illustrate the significance of our analysis of context by showing how it helps clarify the question of learning transfer, central within educational psychology and the learning sciences for more than a century (cf. the end of Section 2). Our aim is not to answer the question, but to show how the discussion of it is muddled—with contestants often talking past each other—because it is unclear which type of context it is claimed that transfer can or cannot take place between. Our typology will enable a clearer formulation of the question. This, in itself, may ultimately be a contribution to the endeavor of answering it.

As indicated, situated learning theorists have argued that what constitutes task, skill and knowledge is fully determined by context. Indeed, they have questioned, not only the existence of transfer between contexts, but the very meaningfulness of the notion [12,66,82]. Others have stressed incredulously that skills such as chess playing, reading, and playing the violin transfer between contexts of use [39,83]; to which we might add the mundane examples mentioned above of children’s reproduction of school knowledge to their parents.

Part of the problem, as Lave also notes, is that the adversaries implicitly subscribe to differing metaphors, with situated learning theorists adhering to the rope metaphor and their challengers to the container. Another part of the problem, we submit, is that neither of the adversaries are clear on the category (/ies) of context—and the relationships between them—which their claims pertain to. However, clarity here is important since for some of the categories, the question of transfer quite clearly does not arise, whereas for others transfer occurrences seem commonplace. The former is the case for the categories of (a) *historical period* (b) *individual set of experiences* and (c) *sequence of occurrences*. Emphatically, we are not claiming that these categories will not be significant in determining tasks, skills and knowledge. Quite the contrary, as the preceding discussion shows, we view them as playing important supplementing roles in determining these focal objects, alone or—most often—in combination with other categories. We are only making the simple observation that skills and knowledge cannot transfer between historical periods, between individual sets of experiences, and between sequences of occurrences. They cannot do this because, regarding (a), people cannot travel between historical periods and, regarding (b), one will always be within one’s own set of experiences.

Any change in experience will by that very fact be a change in the set. Radical changes, as those postulated in Kuhnian revolutionary gestalt switches [84], will be a restructuring of one's whole experience, understood as a horizon of significance. Regarding (c), one can only meaningfully speak of transfer for this category if it is combined with other categories. This is so, because the event of alleged transfer, if it is not delimited further (e.g., by location), would simply itself be part of the sequence.

Conversely, for the category of *physical location*, the question of transfer between contexts is the question of how knowledge and skill from one physical location may be "carried forth" and be introduced and used in other physical locations. Examples here abound, including the abovementioned ones of reading and playing an instrument, though transfer is not a given, straightforward matter for this category: Material prompts in physical locations may be decisive for the utilization of knowledge and skill. Getting the vibrato right on a violin is for instance easier in a studio with optimal sound conditions than outdoors with hardly any resonance and many noises to distract the player.

Transfer across *institutional locations* does not necessarily involve a change in physical location (though it often will). The question of transfer here is the question how knowledge and skill displayed within one institution (e.g., school) may "relocate" to other institutions (e.g., work or family life). A case in point is our mundane example of students passing on facts learned on a biology excursion to parents on a family outing to the same forest.

Quite a lot of the ambiguities in the literature on transfer hinges, we submit, on the lack of distinction between the categories of *physical location* and *institutional location*, along with the two further categories of *activity* and *social relationship*. The question of transfer for the category of activity is the question of how knowledge and skills established in one activity may be re-established in the person's other current and future activities. Similarly, the question of transfer for the category of social relationship is the question of how knowledge and skills established in communicative acts within a given social relationship may be re-established in other social relationships. Now, theorists claiming the regular occurrence of transfer will often focus only on physical locations (e.g., practicing the violin at home and in an orchestra [39]), neglecting that both instances will be part of e.g., the activity of practicing for a concert, within the institutional location of the music school. On the other hand, theorists denying extensive transfer will often conflate all four categories in their understanding of the situated setting and thus ignore that transfer between institutional locations may be facilitated by activities and social relationships extending across the institutional locations (as in projects undertaken by student groups for external companies).

As for the category of *knowledge domain*, the question of transfer here is the question how skills pertaining to one knowledge domain are applicable to other knowledge domains. The discussion of this question, as of the closely related one of possible domain-specificity of skills, is muddled by a failure to distinguish between the context categories of knowledge domain and institutional and physical location. It is e.g., unclear in which of these senses, Winch intends his distinction between "architecture" and "cooking" as contexts where the "polymorphous activity" of planning takes on different forms [26]. For this reason, it is unclear whether he is arguing that planning differs for the institutional contexts of the architecture and cooking professions, but might take the same form across knowledge domains (e.g., physics and aesthetics) within the institutional context of architecture (and similarly for cooking). Or whether he is arguing that planning differs between knowledge domains, but might be the same across instantiations of a given knowledge domain in different institutional locations. Similar confusions are present in discussions of domain-specific versus generic thinking skills [7,28].

In Table 2 we explicate how the issue of transfer concretizes for each category in our typology.

Table 2. Explication of how the issue of transfer concretizes for each category.

Context Category	Further Specification	The Issue of Transfer
Location	Physical-geographical sense	How may knowledge and skill from one physical location be “relocated” and be put to use in other physical locations?
	Institutional sense	How may knowledge and skill from one institutional location be “relocated” and be put to use in other institutional locations?
Knowledge domain		How are skills pertaining to one knowledge domain applicable in other knowledge domains?
Sequence of occurrence		NA
Activity—different levels of granularity:	Short-term engagement with task (one occurrence)	How does knowledge and skill established in engagement with one task become re-established in work on other tasks?
	Longer-term patterns of interaction (several occurrences)	How does knowledge and skill established in a set of interaction patterns become re-established in other interaction patterns?
	Cultural practices	How does knowledge and skill established in a set of cultural practices become re-established in other cultural practices?
Historical period	Combination of categories “sequence of occurrence” and “cultural practices”	NA
Social relationship		How can knowledge and skill established in communicative acts within a given social relationship be re-established in other social relationships?
Individual set of experiences		NA

7. Concluding Remarks

In this article, we have clarified the concept of context. This is motivated by the recognition that there is hardly any consensus within the educational field on what “context” is, despite common accept of the claim that learning is context-dependent to some degree, and despite a widespread interest in researching learning in specific contexts such as museums, classrooms, or workplace settings. We have provided a minimal concept which, we submit, will be applicable to all references to context, properly construed. We argued that contextuality and compositionality must be reconciled and balanced out if the role of context in relation to learning is to be understood. We then fleshed out the minimal concept with a typology of context categories relevant for understanding the significance of context for learning. The categories identified were *location*, understood both in a physical-geographical and an institutional sense, *knowledge domain*, *sequence of occurrences*, *activity*, *historical period*, *social relationship*, and *horizon of significance*. We illustrated the usefulness of the typology through pointing out how it could help clarify discussions about transfer of knowledge and skills.

By way of concluding, we would like to make one final comment on internalist versus externalist notions of context. As indicated in Section 6, strongly internalist notions such as “horizon of understanding” are difficult to apply directly to questions of transfer. Hence there is a cost to embracing a strongly internalist notion. There is also a gain, however. The notion of a horizon of significance may be an important tool for analyzing transfer—and hence indirectly applicable to it. Assuming that most learning objectives must, eventually, be somehow reflected in the experience or understanding of the learner, an internalist approach becomes relevant at least when it comes to the upshot of learning. Furthermore, while horizons of significance may at first seem too complex, fluid or idiosyncratic to be of any help in the attempt to understand the process of transfer, the fact that learners take their horizon of significance with them wherever they go might serve to explain how transfer is at all possible. Moreover, it is likely that such a horizon, for all its complexity and changeability, does have a relatively stable core (in the sense that one’s understanding is always conditioned by a common and pervasive

life-world), so that it can actually add an element of “compositionality” that balances the tendency to exaggerated contextualism and thus can help to meet Packer’s concerns.

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