Units of analysis in learning research: Transparency, fit for purpose and purposeful fit

Commentary by Nina Bonderup Dohn on articles in Special Issue on The Unit of Analysis in Learning Research: Approaches for Imagining a Transformative Agenda

Abstract: In this Commentary, I draw out and discuss several issues that emerge in the juxtaposition of articles in this Special Issue on unit of analysis. The issues are: 1) Determining units of analysis in advance of inquiry or in the process of the inquiry; 2) The degree to which units of analysis should be of theoretically informed; and 3) Alignment of units of analysis to learning phenomena. In addition, I raise the question whether it is possible, without being reductionist or totalitarian about units of analysis, to be normative beyond demanding transparency. Can we also require that units of analysis be “fit for purpose” and display a “purposeful fit” to learning phenomena, broadly conceived? With reference to Bhaskar’s philosophy of science, I answer these questions in the affirmative.

The aim of this Special Issue is, according to the guest editors’ Introduction, to explicate units of analysis inherent to different theoretical and methodological traditions, in the service of clarity and transparency for researchers as regards their choice of approach to investigate learning phenomena. The selection of articles amply fulfills this aim, by illustrating how the question of unit of analysis - its role, definition, interplay with theory, use in research practice and more - emerges differently for different approaches to learning, for different research foci (as regards learning phenomena), at different analytical levels, and for different ambitions concerning potential scope and impact of the research undertaken.

Arguably, the six articles represent three overall philosophical positions as regards the “human predicament” (i.e. the relationship between the world and who we are as human(s)) and the role of theory in understanding this predicament: Phenomenology (Dieumegard et al), Empiricism (Chan & Clarke), and Interactionism (the remaining four). All articles display a nuanced understanding of the interwovenness of empirical observation and theoretical stance, and its significance for defining and using a “unit of analysis”, as indicated for instance by the fact that they all refer to Säljö (2009) to make exactly that point. Authors might therefore justifiably object that my classification of their position is too crude. Certainly, the article by Chan & Clarke is not empiricist in the sense of e.g. logical positivism, according to which theories are built inductively from sense-data. Still, their advocacy for reserving “unit of analysis” for “units of empirical data” as “basic materials upon which specific analyses [informed by different theories] can then be conducted” signifies a basic stance of “data first, interpretation afterwards” which is characteristic of empiricism. Similarly, Markauskaite et al. might insist that their outset in Barsalou’s situated cognition and their focus on constructing actionable conceptualizations is a far cry from interactionism, understood as the position that meaning is constructed anew (from moment to moment) in social interaction. Yet, understood as the basic sociocultural view stemming from Hegel that we as humans are constituted as who we are in our interaction with each other and the world, this article along with the ones by Ritella et al., Lund & Vestøl, and Jornet & Damsa are clearly identifiable as interactionist. Incidentally, one might wonder whether the somewhat skewed representation of positions here - perhaps unsurprising given the profile of Learning, Culture and Social Interaction - might result in a skewed illustration of methodological issues pertaining to the choice of unit of analysis. I tend to think rather the opposite: the great divergence in methodological views, which the four articles show, illustrates that many of the questions that can be posed and discussed differently across positions also find different answers within positions. Somewhat like fractals, many of the general questions asked between positions are repeated en miniature within positions, even if the specific answers are not repeated.
Be this as it may, the divergence in views even within the interactionist position underscores the need for clarity and transparency on the matter of unit of analysis and therefore the significance of this Special Issue. Transparency allows stringent delimitation of the learning phenomena which different units of analysis provide access to. This makes it possible to make a purposeful choice of unit of analysis for new research designs. It also allows gauging existing research as regards how fit for purpose their unit of analysis is for investigating the phenomena they aim to. More generally, it opens for comparing and contrasting the aspects of learning investigated by different approaches, letting us ask whether results from different studies are combinable, complementary, commensurable, consistent. It becomes clearer how different approaches can be delimited from one another, what the strengths and limitations of each of them are - and which blind spots they may have concerning interesting questions about learning. In other words, it allows raising the question whether a given unit of analysis is defined in such a way that it precludes - or alternatively answers by fiat on beforehand - certain questions which rightly ought to be investigated empirically. The discussion in the article by Dieumegard et al. may be read as a diplomatic hint that sociocultural approaches are guilty of something like this because their unit of analysis per definition foregrounds “the social nature of the situation”, rather than leaving it a question open for investigation what roles social circumstances play, with the possibility in any specific situation that the answer be “none of significance”. I think this is a valid challenge to sociocultural approaches, which, incidentally, I have made similarly elsewhere (Dohn, 2016) - a challenge which, it should be emphasized, is not equivalent to denying that all situations are social in the sense that we live in and are formed by human relationships. It is only a denial that we in all situations can reasonably decide on beforehand - before investigation, by choice of unit of analysis alone - that social aspects are going to be of significance. Similar points could, of course, be made about other kinds of circumstances: material, personal, biological, physical etc... In all instances, the point to ask is, not only whether the unit of analysis is fit for purpose (as determined by the aims and questions of the research), but also whether it is a purposeful fit for the set of learning phenomena, broadly conceived. At the very least this seems a reasonable consideration, which transparency makes available for one to reflect on, perhaps most importantly for one’s own research and approach.

Now, the aim of this Special Issue, as stated in the Introduction, is explicitly not to be normative in the sense of “advocating for a generically ‘appropriate’ unit of analysis”. Rather, it is to “offer... an overview... making the different units of analysis and their theoretical and methodological implications visible.” At the end of this Commentary, I shall return to the question whether one might reasonably go beyond the benign overview and take a normative stance on “fit for purpose” and “purposeful fit” without thereby necessarily being reductionist or totalitarian about units of analysis. Before doing so, however, I wish to make my contribution to the overview by engaging in the “comparing and contrasting” of the six articles. Taken together, they explicitly as well as implicitly through their juxtaposition raise a number of methodological issues concerning units of analysis. I shall point out and discuss a few of these issues here.

A first issue is the question whether to determine the unit of analysis in advance of inquiry or in the process of the inquiry. This question is raised explicitly in the article by Jornet & Damsa. They argue for the latter with reference to Dewey’s concept of inquiry as pragmatically integrated in (and motivated by) real life problem situations, stating that this “demands that units are not pre-established but actually found in and through inquiry” and that such units are “evolving social wholes” (claim 1). They further claim 2) that when units are established in this way, they will necessarily follow a logic of events, experiences and situations (rather than of things, entities and their relations) and 3) that their account applies to all sociocultural and situative approaches, because of its focus on the ecology of actual life situations. I do not have space to go deeply into the validity of these claims (though, in fact, I tend towards challenging them all and especially the claim that they follow from one another), but it seems clear, at least, that claim 3 must be rejected: A
counterexample is provided in this Special Issue itself in the form of the article by Lund & Vestøl. This article is precisely an argument for endorsing a specific unit of analysis in advance of inquiry. Specifically, they argue for investigating transformative agency with a dialectic unit of analysis focusing on the Vygotskian principle of double stimulation (of, respectively, problem situation and tools to resolve the problem situation). Of course, what in an empirical case will be designated problem situation and tools is something that is decided “in and through inquiry”, but this is no different from other units of analysis decided upon ahead of inquiry. That is simply the question of which phenomena in the world are deemed to correspond to the classifications of the unit of analysis.

The unit of analysis proposed by Lund & Vestøl does, however, follow a logic of events, in correspondence with the second of Jornet & Damsa’s claims listed above. Between them, the articles by Lund & Vestøl and by Jornet & Damsa therefore illustrate how research is performed - and performed differently - when the unit of analysis overall follows the same type of logic (a logic of events), but is determined, respectively, in advance, and in the process, of inquiry. Furthermore, they also illustrate (classic and well-known) advantages and problems adhering to each: A predefined unit of analysis acts as searchlight for the same reasons that a hypothesis does (Popper, 1972), but may also bias one towards seeing the unit where it is not or at least towards over-interpreting situations with the classificatory framework to which the unit belongs. Some of Lund & Vestøl’s examples arguably display this last pitfall, in that fairly mundane learning situations are characterized as situations of transformative agency, making one wonder what would not fit into this category. Conversely, Jornet & Damsa exemplify a unit of analysis that was established in the process of inquiry, starting with an abstract problem of teacher frustration as regards aligning subject-matter requirements with creative learning processes. Their resulting unit of analysis, established through inquiry, becomes “the work involved in leading and facilitating subject-oriented tasks in ways in which there were conscious efforts to make room for emergence and the exercise of creative freedom on the part of the students”. This unit is certainly nuanced and fit for the practice at hand. It is, however, also at risk of being so complex that it will dissolve into practice and denote “everything”. The risk is particularly high since the unit is established through inquiry, on the basis of what teachers found problematic, so that any and all undertakings by teachers may be interpreted as concerning this problem.

Furthermore, the two articles between them illustrate my point above that issues which arise between overall positions on “human predicament” may also be found within these positions - here the question of determination of units in advance versus in the process of inquiry. Jornet & Damsa argue that this is a distinguishing characteristic between classical non-ecological learning theoretical approaches and emerging ecological ones. As shown, the issue is in fact also displayed between these two examples of interactionism, within the overall logic of events.

A further issue made visible by the selection of articles is the question how theoretically informed units of analysis are or should be, and what strengths and weaknesses are involved in opting for “closeness to data” or “integration with theory”, respectively. The whole Special Issue serves to bring transparency to this question by clarifying how different theoretical approaches designate units of analysis differently. In particular, however, juxtaposing the articles by Chan & Clarke and by Ritella et al. highlights the matter. As indicated, Chan & Clarke advocate for focusing on “units of empirical data” ahead of specific theoretical interpretations. Ritella et al., on the other hand, stress that on their view, “what is considered as an appropriate unit of analysis connects tightly to the theoretical perspective adopted in a given research project”. Now, it might be argued that the disagreement here is merely terminological, concerning only what aspect of research the term “unit of analysis” should refer to, but not a divergence in understanding of the research process itself. Chan & Clarke after all also emphasize the significance of “focal constructs”
which differ between theoretical approaches and are investigated by means of what they call “unit of analysis” (i.e. unit of empirical data). They acknowledge that different focal constructs cannot necessarily make use of the same unit of empirical data because of potential mismatches with the theories underpinning the focal constructs. Conversely, Ritella et al. recognize “units of data” as “a pragmatic-technical construction that defines how data are segmented for the analysis”. This could be read as an acknowledgement of the possibility of identifying empirical data ahead of interpretation.

The apparent agreement here is, however, mainly that: apparent. The two articles still differ on the significance they accord to theory in determining the segment of data to be looked at. Quite as important, they differ in their attitude towards the fact that theory has at least some significance in this. There is a tone of regret on this matter in Chan & Clarke, as their overall aim is for different theories to complement each other in their analysis of the same social interaction. Accordingly, their initial approach was precisely to try to agree on standardized empirical data units applicable for all the theoretical perspectives involved in their multi-theoretic research collaboration. On realizing that this approach was not viable, they changed their strategy and instead required that empirical data units be chosen to best fit the purpose of operationalizing the focal construct in question. The units are not seen as determined by theory, though, but only by the operationalization requirement, i.e. that the focal construct should be investigable through it. In consequence, their examples of empirical data units are not theory-loaded to any high degree: “negotiative events”, “negotiative events with a maths focus” and “0.5 to 1 min video episodes”. In contrast, in the research discussed by Ritella et al., the empirical data units appear loaded to a much larger extent by the authors’ theoretical focus on “chronotypes”. The concept of chronotope is defined with Bakhtin as “socially emergent configurations of space-time where space and time are considered as interdependent social constructions” and examples of data units are “segments of discourse” designating specific “space-times”; and “changes of scene” understood as “moments when the space-time arrangement was transformed through embodied movements across physical, symbolic and virtual spaces.” Ritella et al. stress that space-time frames are “often implicit” and therefore “not easy to observe”. A consequence of this, it should be noted, is that designating empirical data units requires quite strong guidance by theory. In concurrence with this, the attitude of Ritella et al. towards theory-loading of empirical data units is supportive.

Between them, the two articles highlight the difference in doing research with a relatively “theory-minimizing” approach to designating empirical data units as compared to conducting investigations with an explicit strategy of being theory-led. They also point to the risks involved in each of these approaches: The flipside to data units being implicit and not easily observable without strong theoretical guidance is that theory may over-guide and skew our investigations to the point of making us see something in the data that is not actually there. On the other hand, the risk of data units being identified without explicit theory guidance is that they are implicitly so guided without our being aware of it. Taking 0.5 to 1 min video episodes as data unit may seem a fairly theory-free choice of unit for investigating “key affective events”. Yet, one need only recall Scheflen’s (1978) exposition of the divergent explanations of Susan’s smile, given different approaches within family therapy, to realize that this is not so. Different theoretical frameworks require different segmentation of video excerpts to identify the incidents which, within each framework, would count as “key affective events”.

The last issue that I wish to point to as brought forward by the juxtaposition of articles in this Special Issue is the question of access to the learning phenomenon which one’s unit of analysis addresses. In particular, the question is when and how we can gain access to what the unit of analysis concerns; how the access we can gain aligns with the unit of analysis; and what about the learning phenomenon we might fail to get
information on, given the access we have. In other words, the question concerns the purposeful fit of the unit of analysis (given our access to data) to the learning phenomenon. A key distinction here is whether data is collected as the investigated learning phenomenon plays out; as participants’ after-the-fact reconstruction of the learning phenomenon; or as their before-the-fact preparations for it. The articles by Dieumegard et al. and Markauskaite et al., both interested in cognition as enacted in practice, may serve to illustrate the differences. The units of analysis in the articles are quite different, in that Dieumegard et al. focus on the individual’s “lived experience,” phenomenologically understood, and Markauskaite et al. look at “construction of actionable conceptualizations” where actionable concepts are defined as “cognitive entities... entangled in organizing situated embodied performance”, often for several participants at once.

As stressed by Dieumegard et al., lived experience appears “active and passive, holistic, situated in a complex temporality, and partly pre-reflective”. Ideally, therefore, Dieumegard et al. should have access to the actual experience of their participants, as they live through them. This is, of course, not possible, as the access would change what the experience was of (it would then be an experience of someone getting access - in whatever way - to the person’s experience). Instead, Dieumegard et al. suggest what they call a second-person approach where an interviewer stimulates the participant to recall and retrospectively introspect “what it was like” to live through the experience, including the pre-reflective aspects of it. The problem of course is that the retrospective introspection is a re-construction of the actual lived experience, in a sense doubly removed from it: it takes place at another time and place (which the participant will then have a here-and-now lived experience of) and constructs what allegedly was pre-reflectively given in the original experience. Further, it is limited to what the participant can verbalize in this retrospective situation. This means that tacit knowledge is precluded from analysis. This goes for background knowledge of the kind that Merleau-Pontian phenomenology emphasizes as overlooked by the Husserlian phenomenology adhered to by Dieumegard et al. That is, background knowledge which is so much a part of the person’s outset that it also cannot be expected to become apparent in retrospective analysis of pre-reflective aspects. It also goes for the kind of knowledge that is tacit as a matter of principle, namely experiential knowledge: the qualitative feel of “what it is like” to experience a situation. Such qualitative feels can be ‘pointed to’ with words but only for listeners who - to quote Nagel (1974), to whom Dieumegard et al. refer - are “sufficiently similar” to imagine them. More precisely: they will only be comprehensible for listeners who have had experiences sufficiently similar to allow imaginatively extrapolating to the ones in question. The upshot of these considerations is that “lived experience” as a unit of analysis may not be well aligned with the learning phenomenon it is supposed to give access to, and that, in consequence, the researcher may be barred from important information about this phenomenon.

On the face of it, the unit of analysis proposed by Markauskaite et al., “construction of actionable conceptualizations”, stands a better chance of alignment with the learning phenomenon it is supposed to give access to. Building on grounded cognition and distributed object-oriented practice, actionable concepts are viewed as dynamically emergent in situated action, in participants’ collaboration with each other, as structuring resources in organizing situated embodied performance. The learning phenomenon that Markauskaite et al. are interested in is learners' construction of such concepts in learning for professions. More specifically, they look at teacher education and at teacher students’ preparing in groups for a practicum experience. The preparation involves distributed multimodal processes including bodily actions, linguistic expressions, construction of artifacts like drawings etc. It is these distributed multimodal processes that are investigated with the unit of analysis of “construction of actionable conceptualizations”, i.e. with the focus of finding out how actionable concepts are established for the students. In their analysis, Markauskaite et al. more specifically utilize a distributed resources version of Fauconnier and Turner’s concept of conceptual blends (Fauconnier & Turner, 2003). They stress that their data (video recordings)
are only a “proxy” for the learning phenomenon, as the conceptualizations themselves “extend beyond observable actions to the mind and body”. A similar caveat would apply to other data from practice, such as in situ observation. Still, given their understanding of actionable concepts as entangled and distributed in situated, embodied action, the proxy appears justifiable: It is not a re-construction after the fact, nor a pre-construction before the fact, but the observable part of a to-some-extent-observable phenomenon “as it becomes a fact”. In other words, the proxy and the unit of analysis arguably are fit for purpose, given the theoretical outset of Markauskaite et al., and given the specific learning situation that they report from.

Nonetheless, one could query the alignment of unit of analysis and learning phenomenon in situations beyond this one, or rather, the access the specific distributed Fauconnier and Turner-inspired analytical approach in general would give to the learning phenomenon: What if students were not to prepare in groups so that the distributed resources and the linguistic utterances utilized would (presumably) not be nearly as many - how would the approach of Markauskaite et al. then afford investigating conceptual learning? More importantly: Though Markauskaite et al. quite convincingly investigate the learning phenomenon of students preparing for their practicum experience as this preparation “becomes a fact”, it is an open question how - if at all - the actionable concepts established in this situation will carry over (transfer, transform, transition, transpose etc.) to the actual professional context of the practicum. From the perspective of situated embodied action in professional contexts, the study presented by Markauskaite et al. only looks at “before-the-fact” preparation for practice but does not provide us with insights concerning conceptual learning in actual professional practice. Presumably, Markauskaite et al. would argue that the same unit of analysis of “construction of actionable conceptualizations” would also be fit for purpose in investigations of actual professional practice. This, however, appears yet another open question. As the “hot action” of classroom interactions with students is qualitatively different from discursive group preparation with peers (hot as this may be, too), conceptualizations may be much more tacitly evoked, constructed or put to background use and therefore much less easily discernible. In this sense, the unit of analysis proposed by Markauskaite et al., and in particular their distributed Fauconnier and Turner concretization of it, may not always provide access to the learning phenomenon as intended. In particular - like the unit of analysis proposed by Dieumegard et al. - tacit, enacted background aspects of the learning phenomenon may be prone to elude it.

This brings me back to the question raised above: Is it possible to be normative concerning units of analysis beyond demanding transparency, without being reductionist or totalitarian? Can we require more of units of analysis than that they be “fit for purpose” - can we ask also how “fitting a given purpose is”? Is there a further issue of “purposeful fit” of units of analysis to learning phenomena, broadly conceived? My answer to all these questions is yes. Drawing on Bhaskar’s critical realism (Bhaskar, 1975), it is possible to be pluralistic about purposes, without relativistically accepting them all, and about research questions and aims, whilst still asking whether they are adequate to the field we are investigating. With a human- and human sciences-centered variant of Bhaskar’s philosophy of science, one can claim that research allows us access to a field of learning comprising structures, processes, dispositions, patterns of behavior, even mechanisms, that exist independently of our epistemologically realizing their existence. The field is of course not “independent of human interaction” as these are exactly structures, processes etc. of (amongst others) human interaction. Their ontology, in other words, is one of (amongst others) human interaction. This, however, does not mean that they are amenable to all and any human characterization. Epistemological access to the field is a different question than its ontological nature. Understanding the structures, processes etc. of human interaction requires purposeful fit of one’s research question and unit of analysis to these structures, processes etc. (i.e. to the learning phenomena). With Bhaskar, one can claim all this and be equally adamant that research is a social practice and that the access it allows us to the field
of learning is mediated. Research allows potential events - determined as possible by the structures, processes etc. of human interaction - to be actualized as observable phenomena, conceptualizable for us with the concepts, tools, resources etc. developed historically in our social practices. Different theoretical frameworks and empirical settings will allow different phenomena to actualize, so pluralism on units of analysis is viable. Relativistic acceptance of all research purposes, aims, and units of analysis is not.

On this Bhaskarian approach, it is thus not only possible but indeed advisable that we ask of units of analysis questions like: Which phenomena will they allow us access to? Are they the phenomena that we wish to investigate? Is the access they allow distorted so that aspects of these phenomena are not available for investigation? Have we decided what ought to be left for empirical investigation by definitional fiat on beforehand? On this approach, therefore, transparency about units of analysis are paramount for securing that our research is both fit for purpose and a purposeful fit to the field of learning. The selection of articles in this Special Issue makes out a good starting point in ensuring this.