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Abstract This paper is a theoretical attempt to show how the Aristotelian notion of phronesis may provide a fruitful viewpoint to trigger and animate a series of discussions on educational design-based research. In particular, we focus on the overall meaning that the notions of intervention and theory can acquire. What concerns the former, phronesis helps avoid interpreting intervention as the making of an object, be it a learning environment, an application, a piece of software. Conversely, it posits that intervention can be fruitfully located within teachers' professional judgment. The specific focus on professional judgment helps point to a different conception of "theory", which does not revolve around the development of generalized principles informing the practice. Conversely, theory can be viewed as the effort to articulate teachers' experiences in the form of stories "from the field".

Keywords experience
intervention theory
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A phronetic approach to educational design-based research: Issues and aspirations

Emanuele Bardone | Merja Bauters

1.0 Introduction

The main aim of this paper is to offer a discussion concerning educational design-based research (EDBR) in the light of the Aristotelian notion of phronesis. Specifically, this paper is a theoretical attempt to illustrate how the notion of phronesis may provide a fruitful viewpoint to trigger and animate a series of discussions revolving around the notion of intervention and that of theory, which we take as the two pillars of the educational design-based research approach. Such discussions provide insight into the way in which we interpret, and thus accept, how these two notions may lead to different and competitive ways to look at educational research and their role in society. Bringing alternative and competitive interpretations to the fore enriches the current debate and, indeed, shows the potential of the educational design-based research approach.

The paper is divided into three main sections. The first section provides the historical background in which our contribution is situated. As we will show in the opening section, educational research is (still) very much a “contested field” of research. The reason is that it is somehow caught in between, on the one hand, the aspiration to be a rigorous science and, on the other, the necessity to contribute in a meaningful way to a practical, value-laden, hands-on practice such as education. We argue that the notion of phronesis articulates a proposal worth considering. In a nutshell, the whole idea of phronesis opposes the view that the practice of education can be approached with the kind of objective rigor characteristic of a Newtonian kind of science (or the idealized image we can derive from it). Phronesis specifically addresses the inevitable tension between the general and the particular. For it points to the importance of practitioners’ first-hand experience and the centrality of their judgment necessitated by the uncertainty and contingency of the practice.

In a way, educational design-based research can be considered an attempt to face the never-ending controversy concerning how to frame the relations between theory and practice. Placing a greater emphasis on educational interventions and the principles concerning how to design them, educational design-based research has already posed the questions concerning how educational research can be practical. In this sense, the notion of phronesis may help broaden the current debate. Specifically, our main intention is to show that educational design-based research can be considered as a practical approach rather than an applied one.

In the second and third section we try to see the meaning intervention and theory could acquire, if we looked at them in

the light of phronesis. The main idea we develop in the second section is how the notion of intervention should not be mistaken for the design of a particular product meant to (allegedly) increase the efficacy of learning. Conversely, we will argue for re-locating intervention into teachers' professional judgment, which is viewed as a direct response to the type of contingency that teachers together with students face in everyday situations – where education happens. In other words, intervention opens up a phronetic space in which teachers are called to apply professional judgment in particular and unique situations.

In the third section, we address the meaning that the notion of theory may acquire within such a framework. We will argue, and try to support, how theory should not necessarily come in the form of law-like principles informing the practice. Theory may constitute an attempt to articulate and communicate experiences that practitioners have actually lived, in a way so as to generate what Robert Stake called “naturalistic generalizations”. That is, accounts or cases that the reader can try to relate to their own situation in order to see how to act wisely.

2.0 Caught in between theory and practice. The contested field of educational research

2.1 From episteme to phronesis

In the last twenty years or so, several educational researchers belonging to the English-speaking community have posed the question related to the practical relevance as well as the implications of educational research for practitioners, notably, teachers (Winch et al., 2015). This view was voiced by those researchers who tried to react in a constructive way to the various lamentations concerning the products of educational research, which became a contested field. The discussion that followed addressed questions that concern the foundation of educational research and its practical role, which stretches back to Dewey's seminal work *The Sources of a Science of Education*, originally published in 1929.

One way in which the issue was posed is in terms of scientific rigor. This has been put forward, among others, by Hargreaves (1996 and 1999) and it states that, if we want educational research to count, it should be based on a model of knowledge production analogous to the so-called hard sciences, which is based on “evidence”. According to Hargreaves, the main role of educational research is to provide practitioners with evidence proving that, for instance, a learning environment, one pedagogical method or framework is actually more effective than another. Evidence should therefore be decisive and conclusive for practice (Elliott, 2001). Which means that educational research should focus on what works as opposed to what Hargreaves termed “a hermit stance”. According to which the researcher withdraws from the messiness of the practice to provide general reflections, which Hargreaves felt to be “obscurities masquerading as profundities” (Hargreaves, 1999, p. 243).

According to this evidence-based stance, we may say that theory informs practice by providing the law-like statements that would then guide the practice of education. As such, educational research is viewed as a body of knowledge that comes to prescribe the way in which practitioners should deal with their work. The prescriptive validity of such a body of knowledge is granted by the way in which it has been constructed, by the rigorous application of the scientific method. The answer to the issue concerning how to make educational research more relevant is therefore addressed by appealing to the rigor in devising experimental situations, collecting and analysing data that allows researchers to make valid and therefore prescribable claims concerning the effectiveness of different options.

What is interesting here is that the gap between theory and research, on the one hand, and practice, on the other, is not solved by moving the former closer to the latter, but by making a stronger plea for the epistemic constituents of educational research. In other words, to increase its practical relevance educational research should be more “scientific”, where the word “scientific” generally appeals to the type of research corresponding to an ideal version of what is done in the natural sciences. It follows that the pair “theory and research” is practical in the sense that the results are applicable and applied to the practice of education. So, theory and research come to engage practice by guiding it in a top-down fashion. Thus, the educational research can be considered an applied science. It should be noted that this is not anything new in the history of educational research. It is a recurrent theme that has characterized the history of the discipline almost since its academic establishment, and as such it concerns the whole spectrum of the social sciences.

In contrast to this, a number of educationalists have presented a different stance (for instance, Carr and Hartnett, 1996; Carr, 1999 and 2004; McLaughlin, 1999; Eisner, 1999; Nixon, 2004; Elliott, 2001; McIntyre, 2005; Biesta, 2012; Hammersley, 2005; Oancea and Furlong, 2007; Furlong, 2013; Hostetler, 2016). Unlike those appealing to an evidence-based applied science, they invite one to take a step back and reflect on the very nature of educational research. The main intellectual move they suggest, is to start with the so-called “Aristotelian triad” (Carr, 2004; Biesta, 2012). Aristotle in his *Ethics*, chiefly, in Book VI, offers an unmatched treatment concerning three different intellectual virtues that correspond, in turn, to three different forms of knowing and knowledge. The three terms are: *episteme*, *techne* and *phronesis*. In Western culture we are familiar with the first two terms, namely, *episteme* and *techne*. Their original concept is present in the words *epistemology* and *technology*, respectively. As Flyvberg (2001) observed, *phronesis* does not have anything analogous in our contemporary conceptual landscape. This is a case of what we may call “*hypocognition*” (Levy, 1975). Although we may be aware of the phenomenon under consideration, we are not fully able to talk about it, because we lack the proper word. Let us now see them one by one.

Episteme refers to the domain of universal and context-independent knowledge. It is therefore chiefly theoretical and deals with activities such as demonstration, certification, validation (Carr, 2004). In a more modern terminology, we would say that episteme concerns the law-like generalizations, regularities, patterns, etc. Therefore, what episteme aims for is to provide predictive and explanatory knowledge. In one word, episteme is rooted in the idea of nomothetic knowledge that we often see represented in the natural sciences. This is what Alexander Luria termed “classical science” (Cole et al., 2014).

The original notion of *techne* variously refers to terms such as technique, technology, technical reason, instrumental rationality. It generally refers to the domain of production or fabrication, bringing something into existence. If episteme is essentially theoretical, *techne* is practical in essence (Dunne, 1993).

Phronesis does not really have a precise translation. It is usually translated as practical wisdom (Dunne, 1993), prudence (Jullien, 2004) or practical reason (Wiggins, 1980). For Gadamer (2004) it is related to moral deliberation. But this does not explain everything. At first approximation we may try to describe what phronesis is or what it refers to by comparing it with the other two terms. First of all, phronesis is not episteme, because, analogous to *techne*, it is essentially practice oriented. It deals with the practice. It does not aim at generalization or demonstration, but it provides us with the type of orientation that we need when we are acting or deliberating and not in the mere sense of calculating (Ellett, 2012). Unlike episteme, it is not nomothetic, but idiographic. Phronesis does not concern universal laws, but the “cognizance of particular” as Aristotle put it (Ethics, 1141b 15-17). This explains why it cannot come in the form of general rules, regularities, patterns, etc.

Like *techne*, phronesis is practical too. However, its being practical does not deal with the production of an object. *Techne* is essentially output-driven in the sense that we start from what we want to produce and we walk backwards to find the right way to achieve the desired outcome. Sometimes this is accomplished via trial and error to find out what works and what does not. Conversely, phronesis is essentially an expression of the individual himself/herself, as it deals with decisions and choices. Phronesis is about judgment in the sense that it deals with what to do in the concrete situation, here and now.

Going back to educational research, the question is to see which is the most suitable category. And when and how each of the three terms should or could be applied. The aforementioned educationalists claim that the evidence-based movement (or stance) has simply picked out the wrong category – episteme, when in fact it is phronesis the one that would better suit, say, the nature of educational research. Carr (2004) argued that educational research simply does not map on episteme. The problem with episteme is that in the context of educational research (and social sciences in general) it does not refer to single “entities”, be it a course, a learning environment, a student, a class, etc., but cohorts of single entities. Let us use a rather trivial

and simplified example to discuss how this approach translates into educational research practice. Suppose that a study states that 70% of university students decide not to quit their studies if lecturers and other staff members are able to detect early signs of disaffection. Even if this piece of information would be actually true, it might not be of much practical help. As we can intuitively observe, a lecturer always deals with single students and, even when we know this study holds true, we may not be able to detect when and if our students are becoming dissatisfied. Or if the student right in front of us belongs to the 70% or to the 30% for which early detection would not do much.

Such “facts” have created a growing body of guidelines that teachers (or facilitators as they are also called) are supposed to follow. The guidelines, though, are often based on the idea of “best practices” that can be a collection of how to do things, what tools to use, or how to evaluate. They are based on a particular challenge in a context that appear often enough, or are parts of the challenge and the solution can be detected in different contexts. The solutions become worth sharing and are re-used (see for example KNORK, Promoting Knowledge Work Practices in Education: <http://knork.info/website/re-use-library/>).

The major problem is that the evidence-based knowledge, which can indeed be assimilated to episteme, is constructed in such a way that it is devoid of contextual elements, which, as far as practitioners and the practice are concerned, are of fundamental importance. This, incidentally, seems to apply, for example, to the field of Learning Analytics, in which the massive amount of data that can be collected may not necessarily translate into real improvements (Gazulla and Leinonen, 2016). That is because contextual and often unique elements may not be factored into the “equation”. At best, statistical generalizations can provide some sort of heuristics, a hook to start with. Generalizations that are based on the type of experience gained from years of practice are very different from those that can be inductively generalized from the data collected. Even if the data amount is huge, the patterns arising from it may still not provide the same knowledge of how to act as broad long-term in depth experiences.

Phronesis seems to offer the right category to address and think of educational research, because phronesis points to, and is founded upon, a fundamental attention and sensibility to the particulars, the minutiae of the educational practice, which is therefore eminently a praxis (Carr, 2004; Biesta, 2012). Following phenomenology and pragmatism, phronesis is also fallible, because it is improving all the time through practice. It is also temporal, situational and concrete, and based on the person’s experiences, where the experiences have been consciously valued – meaning it is responsible decision-making (Coltman, 1998; Bernstein, 1983). So, in general, phronesis deals with 1) the concrete as opposed to the abstract (of episteme), 2) the personal as opposed to the mechanical (of the techne), 3) the experiences and situated decision-making opposed to formal generalized learning.

2.2 Educational design-based research

This long prelude is meant to introduce our claim that education design-based research is a valid research approach, if it is positioned correctly – namely as phronesis. First we will discuss where educational design-based research sits. Educational design-based research is said to be an inter-disciplinary mixed method research approach, which is conducted “in the field”. As such it has been mainly interested in how to support learning rather than a general approach to education. It aims at refining theories or rather models of learning and, at the same time, providing means to change learning practices “in the field” (Reimann, 2011). Wang and Hannafin describe educational design-based research as:

a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories. (Wang and Hannafin, 2005, p. 6)

Generally speaking, we may claim that it is characterized by five main points: 1) pragmatic aims through design-oriented and intervention-oriented approaches; 2) theory and practice are intertwined; 3) it is interactive, iterative and flexible; 4) integrative and 5) pays attention to the context (Reimann, 2011).

From early on, the main aim has been to bring educational research out of the narrow confinements of laboratories into the “field”. And for two reasons: first of all, to make it easier to apply the new ideas into actual teaching practice and, secondly, to enhance theories or models through actual design results in the field, in the classroom, or in other kinds of learning settings. This is a new form of educational research and it now takes place within the authentic (or natural) learning settings, which involve the cooperation of teachers and students (Brown, 1992). The idea to bring educational research into authentic and context-dependent situations is supported by the situational and distributed learning approaches (Greeno, 1998; Salomon, 1993). Nowadays, it is even more emphasized by scholars researching mobile learning, such as (Sharples et al., 2005) and (FitzGerald, 2012).

Educational design-based research is often connected and associated with the so-called “design experiments” (Brown, 1992; Collins, 2014), “design research” (Edelson, 2002; Lesh et al., 2008), and “development research” (Akker, 1999). These are based on design processes implemented into research practices. The idea is that design processes provide a means to innovate, to have iterative and incremental interactions and invite the participants, namely students and teachers, to actively be part of the whole process. The approach has grown into designing entirely new learning environments. As such, it is connected to various technological implementations.

What is common in design-based research activities is that the design studies are extended over time. Without following and

having iterative cycles of designs, it is not possible to have meaningful relations between teachers' actions and outcomes. Iterations may last weeks or even months so that the same teachers and students are followed from beginning to end. To be able to enhance the design setting, researchers need to analyse the data continuously and iteratively. This means that the whole research activity affects teachers and students' understanding, which as a result changes the design setting. Researchers' conceptions change too, when they observe and interview students and teachers in the learning setting. Since educational design-based research involves a multitude of various methods, which can be combined in different manners, and it includes the participants in the design, it is more than a collection of methods. It is in fact more like a framework: the models guide and intertwine with the design practices in authentic situations. As mentioned, design-based research aims at supporting the development and appropriation of particular forms of learning. Educational design-based research is supposed to produce concrete outcomes, informing best practices helping design learning environments, but also tasks, materials, tools, patterns of communication and interaction, instructional sequences (Reimann, 2011).

There is an obvious difference between the educational studies with variables and control groups typical of evidence-based educational research, on the one hand, and educational design-based research studies, on the other. In educational design-based research, researchers do not primarily look at how quantitative attributes co-vary or change value over time. Researchers are primarily concerned with studying the event sequences. Which means that they focus on the "forces" that move the sequence forward, or any kind of resistance that hinders such movement. It is not a hypothetico-deductive or inductive-probabilistic type of reasoning (Hempel and Oppenheim, 1948), but it looks for "particular causation" (Maxwell, 2004) or „local causality“ in contexts, as Miles and Huberman (1994) argue. This means that analysis is on the learning trajectories. For instance, Cobb and Gravemeijer's developed an interpretative framework, which was used to describe changes, and to explain them in terms of abstract conceptions of learning. Referring to literature gives power to the arguments and maps the locational and specific cases in a broader framework (Cobb and Gravemeijer, 2008). The key point is to pay attention to the decision-making process, leading teachers and students to make conscious responsible judgments in particular situations for deciding what to do next.

Educational design-based research – in all its different historical developments – did not emerge in direct opposition to the evidence-based stance. The design-based research has emerged as a more bottom-up approach that would engage the practice first, and thus making educational research more relevant for teachers and students, rather than more rigorous. With this in mind, we argue that a reflection on educational design-based research as a way of practical knowledge production, would be helpful for positioning it correctly so that its worth is appreciated.

The general idea that we will try to pursue is that educational design-based research can be enriched, if it is properly understood in the light of the concept of phronesis, rather than as an example of epistemic science (episteme), or as an approach to produce something – be it a learning environment, a learning device, etc. (techne). We may identify therefore two issues that the notion of phronesis helps to clarify. The first is related to the notion of intervention and the second is related to the idea of theory and the role that it may have.

The notion of intervention and the centrality that it holds in educational design-based research points to the importance of practice. However, the practical nature of educational research can easily give in to an interpretation of the word “practical” rooted in the notion of techne. So, an intervention can be seen as a product or means for the design. By explicit reference to the notion of phronesis as an alternative stance, we claim that intervention and its design is simply an ongoing and open-ended process, which engages teachers (and potentially students), and as such it resists codification into a formula or technique. More specifically, we will argue that intervention is fundamentally linked to the full engagement with the practice and it is therefore rooted in teachers’ professional judgment (Section 2).

On the basis of this particular interpretation of intervention, we present a corresponding idea assigning a specific role to the term “theory” (Section 3). We will argue that theory in the phronetic sense cannot be mistaken for the nomothetic science supplying law-like type of knowledge. By stressing the importance of personal previous experience, we will argue that theory can be viewed in the activity of sharing and making sense of the situation along with its articulation.

3.0 The notion of intervention

3.1 The centrality of intervention in educational design-based research

The question that we are going to address in this section: is turning away from a typical laboratory type of setting to a real one, a clear departure from the idea of applied science? In order to answer to this question, we go back to the Aristotelian triad. More specifically, we are going to present a discussion about the notion of intervention by making a comparison between a techne-based approach and a phronesis-based one.

Educational design-based research has contributed more than other strands of educational research to bringing light to, and thus problematizes, the natural/authentic settings of learning in education. This more naturalistic approach, so to say, brought research out of the rigid confinements of laboratories to focus on the complexity of the actual learning environments. Such renewed interest in what we may call “the ecologies of learning” led to the re-consideration of the way in which intervention can be conceived, both theoretically and practically. Instead of investigating learning of un-contextualized tasks in a laboratory, which is an environment artificially set up to observe the behaviour

of a restricted number of variables, educational design-based research directs its effort to inquiring into how actual learning environments can be designed to support the actual learning processes.

A valuable example of this approach is provided by Brown (1992). As early as 1992 she argued that, as a design scientist, her major concern was to “attempt to engineer innovative educational environments and simultaneously conduct experimental studies of those innovations” (p. 141). Such experimental studies were called by Collins design experiments (Collins, 2014). What is interesting to note here is that design experiments are not simply meant to passively observe what is going on in the learning setting, as the traditional notion of experiment would suggest. They are meant to put to the test, in real situations, ideas concerning how to manipulate actual learning ecologies.

This view takes seriously that learning processes are distributed (Hutchins, 1995) and situated, and that the learning setting is not cognitively inert, but it is already structured as a cognitive niche [reference removed for blind review]. This means that a particular part of the general environment one lives in locally affords certain actions while potentially hiding and constraining others. So, bringing the notion of the learning environment to the fore of our attention means having the opportunity – at least in theory – to have a say about how learning settings could be specifically designed so as to afford or facilitate learning. Along similar lines, for instance, Barab and Squire argued that “the research moves beyond simply observing and actually involves systematically engineering these context” (Barab and Squire, 2004, p. 2).

One may interpret the contributions as leading to a conception of intervention, which is fundamentally “engineering-centred”. For instance, Cobb and colleagues (2003, p. 9) argued that particular forms of learning can actually be “engineered” (Cobb et al., 2003, p. 9). This remark seems to suggest that intervention is somehow interpreted through the lens of *techne* and thus it misses the importance of acting and deliberating, which constitute the pillars of a *phronetic* interpretation.

A voice critical of the *techne*-based stance, has been recently raised by Richter and Allert (2014). They have argued that the whole notion of designing interventions might be biased towards what they called “the engineering model”. Designing interventions is unproblematically accepted as a linear sequence of steps, such as analysis, design, evaluation and revision. This sequence is reiterated cyclically so as to achieve a satisfying result, a result that reaches a trade-off between what one had in mind and what actually turned out to be achievable. Specifically, they list three main potentially problematic issues. First off, the “engineering model” is simply static. Problems are assumed to be given and well-defined, awaiting to be solved. Researchers are therefore solutionists, they are providers of solutions without apparent concerns regarding the way in which the problems themselves are formulated. Secondly, a clear separation between means and ends is assumed. This implies that issues concerning valu-

es are not necessarily linked to the actual practice of designing interventions, which is viewed essentially as a technical issue. Thirdly, designing interventions can be reduced to “a series of well-described, discrete, rational, and structured methodological steps” (p. 3).

In our terminology we may re-describe the three points raised by Richter and Allert the following way. First of all, the idea that there is a problem and the problem is awaiting to be solved refers essentially to bringing about directly and purposefully a specific outcome desired and/or expected. Secondly, as the main purpose is to make something, then there is a clear separation between what is made and the maker. This has a major consequence: that the maker steps outside the process, as they become a mere executor of a procedure composed of certain methodological steps to follow – a technique, which eventually leads to the desired outcome (Dunne, 1993). In this case, we see how *techne* and *episteme* come together, as the technique to use would be the one identified through “scientific means”.

From our point of view, Richter and Allert bring out elements describing the shortcomings that characterize a reductionist vision on intervention that conflates the practical meaning of *phronesis* with that of *techne*. *Techne* informs what we call a stance, which focuses on the production or fabrication of something. Provocatively, we may say that intervention equates to the designing of a product, in the sense that it aims to produce something. This is highly problematic when it comes to learning and more general to education. Unlike *techne*, *phronesis* introduces a different way of looking at learning and education. *Phronesis* is not practical in the sense of “being applied” or “applicable”. It is just practical. As *phronesis* does not deal with the fabrication of something, it does not refer to the capacity of making. Rather, *phronesis* identifies a class of situations in which a person (or a group of persons) tries to deliberate and act well (Carr, 2004). In the educational context, this means that a teacher is not simply a kind of technician who manipulates the learning scene by following alleged best practices. A teacher is called to act in specific situations that are characterized by a number of layers tied together by the general goal of forming future citizens able to act responsibly (Biesta, 2012).

The shift from fabrication (or making) to acting and deliberation describes a mode of engagement that takes seriously and consequently faces the uncertainty characterizing the practical matters of supporting and enhancing learning (Biesta, 2012; Peters, 1966). *Techne* is the proper approach when the outcome of action is known in advance. As such it orients action before one engages the world. This simply implies that *techne* is a mode of behaviour that cannot operate under condition of uncertainty. Indeed, we are not assuming that uncertainty is not anyhow present in the fabrication of objects. We may even say that the essence of craftsmanship is precisely being able to deal with unpredictable situations, that is, problems as they arise (see Kristjánsson, 2005 for a discussion). At the same time we are not denying that we can reasonably say that teachers are trying to

make good citizens out of their students. What we are arguing is that the type of uncertainty characterizing learning and in general education deals with the fact that students cannot be reduced to mere objects of manipulation. Their subjectivity is fundamentally in the becoming. In this sense the outcome cannot be pre-determined. By assuming that outcomes cannot be known in advance, teachers and students cease to be mere makers, detached subjects that execute a pre-ordained plan. The uncertainty of the outcome deprives the maker of the so-called “bird’s eye view”, which is necessary to ensure that the process will lead to the desired outcome by selecting and then implementing, as Richter and Allert pointed out, “discrete, rational, and structured methodological steps”. In other words, uncertainty forces them to step into the activity itself and thus abandoning the reassuring position of the technician (Jullien, 2004) – or the solutionist. The outcome, which should be brought into existence through the application of a technique, is dynamic; it changes during the process, based on what occurs. Therefore pre-set outcomes can no longer orient and inform action. It does not mean that action is aimless. The aim of forming future citizens remains, but it cannot be directly linked to a specific outcome known beforehand. Conversely, it will take shape in due course, and deals with what is eventually a developmental and educational challenge. This has an important consequence for the notion of intervention. Shifting from a techne-based conception to one that is phronesis-based, helps see that the design of educational interventions for learning is in fact open-ended. In addition, it helps identify who is the agent of intervention and how to ground this. This is particularly relevant, as the agents change during the process. The trigger of intervention may be a researcher, followed by teachers, after which teachers may be replaced by students as the agents of intervention.

Since its earliest days, educational design-based research was fairly committed to taking seriously that education and learning happen in specific settings. Educational design-based research has also affirmed the importance of practitioners’ engagement in the very process of knowledge production (Juuti and Lavonen, 2012), as well as students (Missingham and Matthews, 2014). This is a significant difference to the evidence-based stance we have sketched out above, which relegates practitioners to a position of mere implementers of some sort of guidelines “approved” by educational scientists (see the experiential account provided by Bossman, 2015). Educational design-based research, values and makes use of various forms of participatory/ collaborative research, forms of research in which practitioners, namely, teachers, are actively involved in doing research and design alongside researchers.

The idea of full engagement makes all this even more radical. If we renounce the idea of techne, then intervention cannot be separated from teachers’ full engagement in and with the educational practice. Such an engagement results in a form of intervention that can be better described as (although not entirely reducible to) a continuous activity of tinkering with what comes in handy in the here and now of the practice. By tinkering, we

mean that teachers have to keep adjusting their intervention according to the necessities emerging from real-time interactions with students, in a loop that potentially never comes to an end. In this sense, interventions can never be entirely designed, let alone be interpreted as objects or applications. Rather, objects as well as applications are what teachers may come to tinker with.

3.2 Intervention as a phronetic space: the importance of professional judgment and experience

On a more abstract level, intervention can be viewed more as a phronetic space. That is, a space in which teachers exercise professional judgment (Elliott, 2001; Kinsella and Pitman, 2012). Professional judgment cannot be mistaken for the type of abstract, generalized and context-independent evidence-based expertise, which is often advocated by some researchers and policy-makers (see e.g. Australian awards for university teaching in Devlin and Smarawickrema, 2009). Conversely, professional judgment is what teachers are called on to apply, as they should often respond to situations as they arise without the opportunity (and time) to, suspend judgment and ponder about what they should do next (Hostetler, 2016).

In this sense, professional judgment is related to perceiving, which is a much more immediate and holistic response than for instance pondering, considering, meditating, weighing – all attached in one way or another to reflection (and the idea of the reflective practitioner). Therefore, Hostetler (2016) talks about judgment-in-action as opposed to reflection-in-action (Schön, 1984). Judgment-in-action provides a summary appraisal of a situation, and it is inherently linked to reading situations correctly, having a finger on the pulse, developing insight and caring. Ultimately, it is taking full responsibility for the decision.

So, even when we acknowledge the potential role that a nomothetic approach to educational research may have for the practice, a teacher cannot be viewed as a mere executor of a sort of script that has been empirically validated. The reason is not dependent on the truthfulness of the evidence-based type of knowledge (episteme) that was produced. The reason is that the teacher's professional judgment will always play a crucial role in order to match law-like generalizations to "particular contingencies" (Carr, 1999). This is the case in all practical domains. It is even more crucial in education, where teachers, face the kind of uniqueness, uncertainty and value conflict (McLaughlin, 1999), which require elasticity and discretion, which the whole notion of professional judgment actually refers to (Hostetler, 2016).

Professional judgment does not come out of a vacuum, though. Professional judgment depends on the first hand experience of particulars. Aristotle makes an interesting example that can be analogically applied to teachers as well. Let us suppose that a person knows that "light flesh foods are digestible and wholesome". Aristotle fairly observes that, even if this rule were true, it

might not be of practical help, because what is crucial is to know what kinds are light. Aristotle continues saying that for a person to stay healthy it is sufficient to know that chicken is wholesome. As paradoxically as it may sound, we do not need to know the light flesh foods are digestible and wholesome. “Chicken is wholesome” is not nomothetic knowledge - knowledge of regularities. It is knowledge of particulars and as such it can only be acquired via experience.

Aristotle’s example is quite close to the one we have made above. We may know that 70% of university students decide not to quit their study if lecturers and other staff members are able to detect early signs of disaffection. This piece of (nomothetic) knowledge might simply be of no practical value, if the teacher is not familiar with concrete instances of signs of disaffection - let alone early ones. The question to ask would then be: what does this mean in the specific context a teacher is actually facing? This is not a kind of sterile semantic exercise about words and their meaning. It is a question pointing to the fact that “what this means” cannot be separated from actual experiences, actual cases. So, what experience means and refers to is this particular student, this particular class, this particular group of colleagues, this particular event, the particular feelings, thoughts, reflections that this particular situation has triggered, particular anxieties. Experience is also the experience teachers have with particular theories, approaches, models, which might be indeed rigorously crafted pieces of evidence-based educational science.

Flyvbjerg (2001 and 2006) argued that knowledge of particulars (or context-dependent knowledge, as he called it) is fundamental in order to move from being a beginner to being an expert. Those that are called experts - he claimed - are not those who know the right rules (provided that such a thing like the right rule exists). Conversely, one’s “expertise” is composed of several thousand concrete cases, which would give a person, say, “the measure of man”. However, this body of cases should not be viewed as a body of explicit knowledge that can be transmitted as it is. Rather, it is the kind of knowledge that is tacitly enacted and transmitted and that provides the basis for applying judgment in professional contexts.

So, at a more general level, we may argue that the justification for a teacher’s application of professional judgment can only be built and drawn from “a bank of stories, analogs, and metaphors”, as Hostetler pointed out. (2016: p. 10). This is a very important point, because it opens up a different conception or, better use of theory, which is our topic under consideration for the next section.

4.0 Research Design and Methods

4.1 A weakened form of theory?

Educational design-based research is attached to the idea of evaluation, which is usually considered as a separate track from research. Evaluation studies is a well-established discipline that can be defined as the systematic acquisition and assessment of

information to provide useful feedback about some objects (Davidson, 2005; Sanders, 1994; Scriven, 1991). Data collected have the main function to provide the empirical basis to formulate judgments about the merit, worth, usefulness and/or significance of a given object (or set of objects) that could be, for example, a project, a course, a policy, or more generally an intervention – something we do in order to change and improve a situation. Educational design-based research, though, slightly differs from traditional evaluation because of its theoretical commitments. It aspires to develop theoretical claims (Cobb et al., 2003).

The main idea of the “theory” that was developed by the proponents of educational design-based research is that we can put our interventions to the test and derive principles, guidelines or even best practices, which can inform how to better design our interventions. Since educational design-based research takes seriously the real context in which learning actually takes place, the commitment to theory is about finding out what works and what does not and under what conditions.

In a way the notion of theory that is explicitly envisaged has weaker connotations if compared with the image of educational research advocated by evidence-based supporters. In this sense it seems that in educational-design based research the question about theory is more open to different interpretations. Indeed, principles can be considered as part of a theory that aspires to be applied in the sense that we described above. It provides a “scientific” foundation for action.

Although this is a perspective that has its appeal, what we are going to do in this last section is to take a different perspective informed by the notion of phronesis. If the success of an intervention rests on the teachers’ ability to apply professional judgment, and professional judgment is rooted in their experience, then we may argue that it is precisely in relation to experience that the whole notion of theory may acquire an important meaning. So, in the more phronetic sense of the word, theory may not refer exclusively to principles - no matter how weak they are. The word “theory” may deal with the way in which experience can be generalized without losing the commitment to representing particulars – what Luria called “romantic science” as opposed to classic science (Cole et al., 2014).

4.2 A phronetic conception of theory

It is not here the right place to reproduce the discussion around phronetic research (see Flyvberg, 2001 and Kemmis 2010 for a critical discussion). We are not actually endorsing any particular version of phronetic research. In this section our main goal is to identify a conception of theory inspired by the notion of phronesis that would fit with the overall goals of educational design-based research. Indeed, we are aware that the kind of theory we are endorsing inevitably belong to the academic discourse. In this regard we agree with Flyvberg, who see (phronetic) researchers as fundamentally separated from practitioners. In Flyvberg’s terminology we do not necessarily see ourselves as action researchers (2001).

Our starting point is to observe that the word “theory” tends to denote the type of intellectual effort that aims at the identification of invariances, patterns, predictions, generalizations along with models, methods, and principles. This would fit with the notion of episteme, as already noted. However, this approach is rooted in the inability to see the same very term – theory – phronetically. In our view the term “theory” may refer to our attempts to scout, articulate and therefore communicate the particulars that appear in the practitioners’ own experience.

Flyvbjerg, in the last decade or so, has been one of the main advocates of the importance of case studies in the social sciences (2006). One specific point that he has raised concerns the crucial importance that critical cases can have. A case tells a story. But the story may have a broader meaning, as it may be exemplar of a concept, a form of understanding, etc., which we would better take into consideration. So, our theoretical efforts materialize in the presentation as well as the selection of an otherwise messy bundle of events. The selection is theoretically pregnant with a number of elements (concepts, perspectives, frameworks, even methods) and it may include a variety of ways of presenting the “data” themselves, which may include art-based forms such as such as ethnodrama (Saldaña, 2005) or ethnotheater (Saldaña, 2011) and even in comics form (Sousanis, 2015).

Phronetic theory may also include generalizations, but of a different kind. Robert Stake captures this aspect when he argues for the so called “naturalistic generalizations” (Stake and Trumbull, 1982; Stake, 1995). Unlike statistical ones, naturalistic generalizations engage the potential reader (for instance, teachers, students researchers and other practitioners concerned with education) in a sort of dialogue, in which he or she tries to relate the story, the case, the ethnographical account presented to his/her own.

What is worth adding here is that the more traditional form of theory as episteme, which we derive from the natural sciences, would not necessarily be rejected. Such an interpretation of theory may be re-interpreted within a phronetic conceptual frame as an attempt to articulate experience, which prioritizes, for instance, what is in common, rather than what it is not, what appears as pattern-like, rather than peculiar and unique to the situation at hand. So, for example, models of learning, which might be well rooted in the episteme tradition, could be of practical importance, as long as the practitioners would try to make sense of them in their own practice. In this regard, our phronetic account does not rule out the possibility that a law-like type of theory can actually be practically relevant. However, it is not relevant in the sense of guiding the practice independently from particular contexts and teachers’ application of judgment.

More generally, we posit that what phronesis looks at is more the way in which theory – in all its different forms – can actually be used by practitioners in the attempt to enlarge, broaden and deepen the basis of one’s experience in his/her profession. Which may also entail that a piece of theory may not be useful at all, independently from its rigor. Our phronetic account

therefore points to the use of theories rather than providing a prescriptive account based on some epistemologies concerning how theory should look. Experience is an experience of some particulars. Phronesis supports the issues found problematic by traditional research approaches. These are framing and seeing the worth of 1) the concrete as opposed to the abstract (of episteme), 2) the personal as opposed to the mechanical (of the techne). 3) the experiences and situated decision-making opposed to formal generalized learning.

5.0 Concluding remarks: Issues and aspirations

The effort that we have made is meant to provide an alternative phronesis perspective on educational design-based research rooted in the notion of phronesis. The main intent was to show how the notion of phronesis – along with its recent theoretical developments in the specific field of educational research – can provide a solid frame for talking about crucial issues related to educational design-based research and educational research as such. Indeed, what we have presented is a preliminary attempt to specify how a phronetic stance towards educational design-based research may look, and what kind of topics it might help bring out. Specifically, we have focused on two issues: the notion of intervention and that of theory. What we had in mind was to show how the notion of phronesis may help problematize issues and questions that remain in the background or are simply not sufficiently discussed.

Concerning intervention, we have argued that a potential problem is how educational design-based research might be reduced – either tacitly or not – to the making of an object, be it a learning environment, an application, a piece of software. Conversely, we have tried to point out that the agent of intervention is the teacher along with students. It is in the learning settings where intervention takes place and it is therefore intimately related to the teachers' professional judgment. It is the ability to read the situation and decide in the here and now what to do and how to do it. It is based on the concrete contextual occurrences rather than abstract rules.

Focusing on professional judgment meant also to re-describe the kind of conception that we may hold about “theory” as well as the type of more theoretical work researchers can be engaged with. If professional judgment is central in practices like education, then it is the sharing of teachers as well as students' personal experiences in the form of stories and narratives that takes central stage rather than generalized principles. This is not indeed neutral from a theoretical perspective, because the selection, composition and presentation of a case requires an effort, which does not exempt researchers from making theoretical claims and thinking up alternative ways of looking at learning and teaching. Although a story or narrative does not provide a law-like type of knowledge, they may come to be exemplars, cases in point, which may challenge teachers as well as encourage them to enlarge their own repertoire of experiences vicariously.

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