

Exploring the Implications of Cognitive and Sociocultural Theories of Learning to Teaching and
Schooling

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Abstract

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Learning Sciences & Human Development

In their everyday choices, teachers and educators deal with profound questions about the efficacy of diverse teaching methodologies and the purposes of education. The learning sciences should shed light on these matters, helping practitioners to make better decisions sustained by evidence and sound theories. However, drawing implications from the learning sciences to teaching and schooling is not an easy task: diverse theories and perspectives understand learning differently and can make suggestions in opposite directions. To find a coherent framework that might be helpful to guide the decisions and reflections of teachers and educators, I review the main ideas and findings of cognitive and sociocultural theories of learning; I propose a synthesis of how people learn based on both perspectives and suggest three general implications for teaching: focusing in relevant activities, being aware of the different mediators of participation, and scaffolding participation and re-mediation. Next, I argue that a good education must help us—as individuals and communities—to live a "good life", for which

we need to be able to participate in, imagine, read, and transform the world. Finally, I argue that the main role of schools is to be a community of learning.

To the memory of James Greeno, bell hooks and John D. Bransford.

Y a todos los muertos que alumbran el camino.

Preface

The present work is based on two assumptions about the task of teachers and educators. First, that every day, teachers make choices about what and how they teach based on their conscious or unconscious theories of learning. In other words, teachers are answering *in practice* how they think people learn, and what they think a good education is—at least to the extent of what they believe is possible in their contexts. It may be that they are not aware of their implicit theories, that their ideas contradict each other, or that they are not satisfied with them; nevertheless, it is part of all teachers' job to face these questions in their daily activities within the exigencies of practice, regardless of the complexity of the questions and the constraints of their job.

Second, I assume that the cumulative knowledge of the learning sciences should help teachers to answer those questions. I don't expect, though, that learning scientists be able to solve teachers' challenges for them, or that teachers be able to use the learning sciences to find definitive solutions. Rather, I assume that teachers informed by the learning sciences should be able to understand and make better choices about their practice.

The goal of this work is then to give a reasonable answer—informed by the learning sciences—to how people learn and what a good education is that may be helpful to guide the practice and reflections of teachers and educators. This work is divided into two parts. The first section is dedicated to exploring different perspectives on how people learn and their implications for teaching and learning. I focus on the conceptions of learning of cognitive and sociocultural theories for being the predominant perspectives on education since the second half of the last century. Based on the literature reviewed, I propose the following claims as a framework to understand how people learn: (1) Every human activity is mediated by the environment, cultural artifacts, and the participants; (2) we learn to participate in activities through our participation in those activities; and (3) learning changes the learner and the activity. From these claims, I draw the following implications for teaching: (1) Teachers should

focus on engaging students in relevant activities; (2) teachers should pay attention to how mediators shape participation; and (3) scaffolding participation and re-mediation is the main role of instruction.

In the second part of this work, I explore the meaning of a “good education” and the role of schools in that project, having in mind the framework of the first part. I argue that the purpose of a good education is to help us to live a good life and, that to do so, a good education must help us to *participate in the communities we live with, critically read the world, imagine new futures, and engage in the construction of those futures*. Finally, I argue that a good education is not a task solely of schools, but the whole society, and that the role that primarily should concern schools is to be a community of learning.

Part 1: How do we learn?

Two main perspectives of learning that have coexisted in the field for a long time with different strengths can be found today in the learning sciences: an acquisition and information processing perspective, mostly present in cognitive theories, in which learning is acquired by individuals through transmission or construction; and a sociocultural or situated¹ perspective, in which learning is developed through participation in culturally organized activities (Greeno, 1997, 1998; McKinney de Royston et al., 2020; Rogoff, 1994, 1997; Sfard, 1998). According to Sfard (1998), learning as acquisition has been the default perspective on learning through history. For instance, Oxford Dictionary defines learning as “[t]he acquisition of knowledge or skills through experience, study, or by being taught” (Oxford University Press, 2021), clearly understanding learning with an acquisition perspective. The situated perspective of learning has a long tradition as well—for example, Leontiev (1932), Luria (1928), Vigotsky (1929), Dewey (1916)—but it did not gain relevance until the end of the 20th century, when scholars began to

¹ In the literature, it can be found the use of “situated” (e.g., Brown et al., 1989) as well as “situative” (e.g., Greeno, 1997) to describe this perspective of learning. Here I use both terms interchangeably.

focus—again—on the concept of activity as the unit of analysis (e.g., Brown et al., 1989; Cole & Engeström, 1993) and framing learning in terms of participation (e.g., Lave & Wenger, 1991; Rogoff, 1990).

Being the dominant perspective on learning, a broad and diverse group of theories can be classified within the acquisition paradigm. Among them, cognitive theories became the most influential during the second half of the 20th century (Mayer, 1992). These theories focus on the inner structures of the mind that allow individuals to process and retrieve information (Mayer, 1992; Kirschner et al., 2006). In the next section, I will do a brief review of the main claims of cognitive theories and their implication for learning to then analyze how sociocultural theories of learning differ from this perspective.

Cognitive Theories of Learning

According to Kirschner et al. (2006), modern models of human cognitive architecture are based on the Atkinson and Shiffrin (1968) sensory memory–working memory–long-term memory model. Kirschner et al. (2006) understand long-term memory as “the central, dominant structure of human cognition” (p. 76). According to them “[w]ithout our huge store of information in long-term memory, we would be largely incapable of everything from simple acts such as crossing a street [...] to complex activities such as playing chess or solving mathematical problems” (p. 77). Further, they argue that “[t]he aim of all instruction is to alter long-term memory. If nothing has changed in long-term memory, nothing has been learned” (p. 77). In consequence, Kirschner et al. (2006) define learning simply as “a change in long-term memory” (p. 75).

The other key component of the architecture of human cognition of Atkinson and Shiffrin (1968) is working memory. Kirschner et al. (2006) explain that working memory is “the cognitive structure in which conscious processing occurs” (p. 77). There are two well-known characteristics of this memory: first, it has a very limited duration and capacity when processing

new information—around 7 bits of information and 30 seconds long (Miller, 1956; Peterson, 1959); and second, those limitations can be bypassed with the help of information that has been already learned.

Based on the same cognitive architecture model, Mayer (1992) argues that meaningful learning happens when “the learner selects relevant information [from the sensory memory], organizes that information into a coherent whole [in the working memory], and integrates that information with appropriate existing knowledge [in the long-term memory]” (p. 408). The limited capacity of the working memory implies that it can be easily overloaded when the learner tries to organize new information. However, when relevant information is already stored in long-term memory, people can organize new information in more efficient ways. Thus, chess experts can use their extensive knowledge to easily reproduce board configurations taken from real games after looking at them for a couple of seconds, but they don’t do it better than novices when they have to reproduce random board configurations where their knowledge of chess is not helpful (de Groot, 1945/1965; Chase & Simon, 1973). Therefore, according to Kirschner et al. (2006), “[w]e are skillful in an area because our long-term memory contains huge amounts of information concerning the area” (p. 76).

Within an acquisition understanding of learning, there are different perspectives on learning and the implications for teaching. For example, Mayer (1992) makes a difference between early cognitive theories in which the learner was viewed as a recipient of knowledge, from latter theories in which the learner is understood as a constructor of knowledge. Mayer argues that the purpose of instruction in the former group of theories is “to increase the amount of knowledge in the learner’s repertoire so that learning outcomes can be evaluated by measuring the amount of knowledge acquired” (p. 407). On the other hand, authors that understand learning as the construction of knowledge focus on “how to help students to become more effective processors of information” (Mayer 1992, p. 408). Although the current understanding of cognitive theories is that knowledge is constructed by the learner instead of

just being transmitted by someone else, there are still different interpretations of what this means for instruction. Resnick (1989) summarizes the two main perspectives in the following way:

If learning depends on elaboration and extension of prior knowledge, should instruction expend its resources directly adding to that knowledge so people can reason and elaborate more effectively or on teaching them to reason and interpret information so they can more easily acquire new knowledge for themselves? (p. 2)

Kirschner et al. (2006) are an example of the first option presented by Resnick. For instance, they advocate for a Direct Instruction teaching method that “fully explains the concepts and procedures that students are required to learn” (p. 75). Their argument is that “working memory load does not contribute to the accumulation of knowledge in long-term memory” (p. 77), and therefore teaching methods that imply a bigger load on working memory, such as inquiry or problem-based learning, are not effective. It is worth noticing that Kirschner et al. (2006) are not arguing in favor of memorization without understanding; what they argue is that without an extensive knowledge stored in our long-term memory we would not be able of doing complex cognitive tasks, and therefore they second teaching methodologies that facilitate the acquisition—sometimes called transmission—of knowledge and routines.

The second option presented by Resnick (1989) is to focus instruction on the development of reasoning and the interpretation of information. The emphasis on reasoning or interpretation does not mean that knowledge is irrelevant. In fact, it is well established that problem-solving and metacognition are domain-specific skills (e.g., Bransford et al., 2000; Kuhn, 2000; Mayer, 1998). The argument is rather that, first, it is impossible to teach all the knowledge that will be relevant during our life, and so our focus should be on developing the skill to use our knowledge to learn; and second, that having an extensive knowledge does not guarantee being able to use it in a flexible way in diverse contexts. Hatano and Inagaki (1986; Hatano & Oura, 2003), for example, notice a course of expertise that they called “routine

expertise” in which people are excellent at solving routine problems with speed and precision, but they struggle to adapt to changes in the environment—in contrast with what they called “adaptive expertise”. Why are there experts who, despite having extensive knowledge in their area, are not able to use their knowledge in new contexts? How can we teach for the development of flexible knowledge that can be used in diverse contexts? Questions like those have long intrigued learning scientists, usually under the terminology of *transfer*.

Resnick (1989) calls transfer “the holy grail of educators—something we are ever in search of, that hope pretends lies just beyond the next experiment or reform program” (p. 8). Resnick’s affirmation does not only emphasize how important transfer is as a goal for educators but also how difficult it is to teach for that goal. Detterman (1993), for example, argues that most studies do not find transfer, and if they do, they use a generous criterion that would not meet the classical definition of transfer, and therefore, he claims, “there is no evidence to contradict Thorndike’s general conclusions: Transfer is rare, and its likelihood of occurrence is directly related to the similarity between two situations” (p. 15).

Not all authors share Detterman’s pessimistic views on transfer. Bransford and Schwartz (1999), for instance, critique how transfer has been understood traditionally and they attribute the common failure to see transfer to a narrow definition of the concept. They argue that transfer is usually measured in a context where subjects cannot get any help from their environment, but that those conditions are seldom the ones in which people perform in their daily activities. Instead, they advocate for a paradigm in which the focus is on “people’s abilities to learn in knowledge-rich environments” (p. 68). They explain that a novice teacher who fails to apply to the classroom what she learned before would usually be considered a failed case of transfer; they suggest, instead, paying attention to if the teacher is able to use her knowledge to learn how to adapt that knowledge into the new context. Thus, Bransford and Schwartz propose to understand transfer as *preparation for future learning*.

Bransford and Schwartz (1999) argue that experience with contrasting cases is key for preparation for future learning. In their words, “[e]xperiences with contrasting cases can affect what one notices about subsequent events and how one interprets them, and this in turn can affect the formulation of new hypotheses and learning goals” (p.70). Here the authors are drawing from the interpretative function of knowledge described by Broudy (1977). Broudy argues that besides the replicative and applicative functions of knowledge—which are the most common to think of—knowledge has an interpretative function: we think, perceive, and judge *with* everything we know even if we are not able to recall it (Broudy, 1977, p. 12). In that line, Bransford and Schwartz (1999) argue that life experiences, whether personal or through the experience of arts and humanities, are part of the knowledge with which we think, and thus they also work as contrasting cases. However, they also notice that “it seems highly probable that people need help thinking about their experiences and organizing them into some coherent view of the world” (p. 85). Accordingly, Schwartz and Bransford (2008), and Schwartz et al. (2011) explore the effect of direct instruction *after* students have had the chance to explore contrasting cases, and argue that the experience with contrasting cases prepares students to better understand the content of the lecture. Similarly, more than one century ago, Judd (1908) argued that “theory is not a substitute for direct experience; it is rather a frame in which experience may be properly held apart and at the same time held together” (p. 38). Whether experiences prepare us to understand the theory or the theory gives us a frame to understand experiences doesn’t seem too relevant—and neither does it have to be one or the other. What seems relevant is that *the interaction between experiences and theory*—which Judd (1908) described as the synthesis of the cumulated experiences of humans—prepares us to learn and use what we know in flexible ways.

Hatano and Inagaki (1992) explore as well the relation between experience and theory to explain the development of adaptive expertise. They argue that cognition is situated in the specific context in which it occurs—a fundamental idea to sociocultural theories of learning that

I will explore deeply in the next section. Then, the failure of routine experts to adapt to changes in the environment is explained as a consequence of the situative nature of cognition— those experts know how to do things in one context, and so they struggle when the context changes. However, they argue that the development of conceptual knowledge allows adaptive experts to *desituate* their cognition. Hatano and Inagaki (1992) explain that the knowledge of adaptive experts “is still situated in the sense that it reflects the history of its acquisition and its use, but is desituated in the sense that it is no longer associated tightly with the situation in which it was originally acquired” (p. 117). One of the questions Hatano and Inagaki (1992) explore is what conditions facilitate the construction of mental models by people. They, as Piaget (1950), believe that people naturally try to understand the world and that to do so it is necessary to analyze the effects of variations upon the outcome, but they additionally claim that is more likely that people engage in that process when some conditions are met. Through the study of children taking care of rabbits and golden fishes, Hatano and Inagaki (1992) explore how conceptual knowledge is developed from experience. They propose four conditions for the development of mental models with direct implications for teaching: (1) frequent experience of a phenomenon that disconfirms a prediction based on previous knowledge; (2) dialogical interaction about the phenomenon with other people; (3) a lack of urgency to obtain rewards from the activity; and (4) a community that values understanding. In short, they argue that people need an environment in which they can experience changes—contrasting cases, would say Bransford and Schwartz—and that encourages them to try new things and reflect on them.

Schwartz et al. (2005) offer a similar idea. They suggest that adaptive experts have a high performance in two dimensions of learning and transfer: efficiency and innovation. Efficiency, which is mostly developed by practice, allows people to solve known problems with precision and speed; innovation, which they propose is developed by having the chance of experimenting with different alternatives, allows people to use their knowledge in flexible ways. To Schwartz et al. (2005), efficiency and innovation are not mutually exclusive, but they can interfere with each

other. They claim that although “people need to acquire the kinds of well-organized, fluently-accessible sets of skills and knowledge that are represented on the efficiency dimension (...) innovation often requires a movement away from what is momentarily most efficient” (p. 43-44). Hence, they propose that training in both dimensions should be done more or less simultaneously to develop adaptive expertise.

In conclusion, cognitive theories have been the dominant perspective in education during, at least, the second half of the last century—spanning from the renowned reports *The Process of Education* (Bruner, 1960) and *How People Learn* (Bransford et al., 1999). These theories pay special attention to modeling the inner structures that allow us to process and retrieve information, and they understand learning as a process of construction of new knowledge based on our previous knowledge. Regarding teaching, there are two main perspectives: one that emphasizes the acquisition of knowledge and procedures, and another that emphasizes the ability to apply knowledge in flexible ways. It is well established that problem-solving and other skills alike are knowledge-dependent, but many authors argue for the necessity of having diverse experiences and opportunities to try new things in order to develop flexible knowledge as adaptive experts do.

Cognitive theories, and more in general, all the theories that understand learning in terms of acquisition (by transmission or construction) implicitly assume that knowledge exists independently of the contexts in which it is acquired. Thus, the failure of transfer is attributed to an incomplete acquisition of knowledge, the failure of noticing its relevance to the context, or the lack of motivation to apply it (Hatano & Greeno, 1999; Resnick, 1989). To Resnick (1989), this assumption is what justifies the current project of schooling— having one designated place in which we should learn most of what we need. However, that assumption is challenged by sociocultural theories of learning and those who take what has been called a situated perspective, which is the topic of the next section.

Sociocultural Theories of Learning

The roots of sociocultural theories are in the work of Vygotsky, Luria, and Leontiev, in which they argue that human cognition is mediated by cultural inventions (e.g., Leontiev, 1932; Luria, 1928; Vygotsky, 1929)—although important ideas of sociocultural theories of learning can be found in the work of Dewey (2010/1916, 2015/1938). For Luria (1928), humans differ from animals by the use of tools—which are cultural inventions. The tools used by humans, he argues, “not only radically change [human’s] conditions of existence, they even react on [them] in that they effect a change in [them] and [their] psychic condition” (1928, p. 493). The attention that Vygotsky, Luria, and Leontiev pay to the influence of culture on the development of the child set them apart from the classic schools of psychology that were “mainly interested in the changes of individual functions in the process of natural growth and maturation of the child” (Luria, 1928, p. 494), such as children’s associations, memory, development of attention and ideas—a description that resonates with the cognitive perspective reviewed in the last section. For instance, Luria (1928) argues that if we compare a village boy with another boy of the same age that lives in a town, we will see huge differences in their mentality, but those differences won’t be so much due to their development of natural functions, such as memory, but “*as in the subject-matter of their cultural experience and those methods which are used by those two children in realizing their natural abilities*” (p. 494, emphasis in the original). Thus, Vygotsky, Luria, and Leontiev understand learning mainly as a cultural process.

Cultural inventions do not only refer to material tools, such as a knife or a pen; tools and symbols are considered two aspects of the same phenomenon, and both aspects are present in every cultural artifact (Cole & Engeström, 1993). One of the most important artifacts humans have developed is language. Language allows us, according to Luria, to “deal with things that [we] have not perceived even indirectly and with things which were part of the experience of earlier generations” (Luria, 1981, p. 35). Cole and Engeström (1993) argue that the double world

that Luria describes (what we can perceive directly and what we can access through symbols) is not well represented by the classic model of subject-medium-object. Therefore, they add another dimension—time—“in the course of which the two worlds (...) are constantly synthesized to provide the mental foundations of people’s real-time actions in the world” (p. 6). Adding time as another layer of mediation implies that other human beings—in the present and the past—play a crucial role in human cognition. In their words:

Cultural mediation implies a species-specific mode of developmental change in which the accomplishments of prior generations are cumulated in the present as the specifically human part of the environment; culture is, in this sense, history in the present. (Cole & Engeström, 1993, p. 9)

This focus on the collective nature of human cognition implies a change in the unit of analysis from the individual cognition toward the activity-systems, which are defined as “historically conditioned systems of relations among individuals and their proximal, culturally organized environments” (Cole & Engeström, 1993, p. 9). The authors conclude that taking “mediation through artifacts as the central distinctive characteristic of human beings” means the “adoption of the view that human cognition is distributed” (p. 42). Claiming that human cognition is distributed contradicts the main assumption of cognitive theories: that knowledge is independent of the context in which it is learned. Instead of talking about *knowledge* as an abstract entity that belongs to the individual learner, a situated perspective of learning describes *knowing* as an action done by people, within a specific environment, in the context of an activity—often in direct coordination with others (Greeno, 1997; Lave & Wenger, 1991). Thinking, knowing, learning is not done by an individual by herself, it is distributed. Furthermore, Cole and Engeström (1993) argue that cognition is distributed in the person (any act is not localized in a particular place of our brain, but it requires the combination of multiple processes), the medium culture (by artifacts: tools and symbols), the environment, the social world (rules, division of labor) and time.

Abandoning the notion of knowledge as self-contained entities and using instead the concept of activity has important implications for how we conceive of learning. For instance, to Brown et al. (1989) concepts, the same as tools, “can only be fully understood through use, and using them entails both changing the user’s view of the world and adopting the belief system of the culture in which they are used.” (p. 33). Moreover, a tool can be used in many ways, and those different uses are inseparable from the activities and cultural contexts in which the tool is used. The same can be said about learning and knowing. For example, people do not learn fractions in a vacuum: people learn to use fractions in a particular activity and context—such as calculating the percentage of free-throws made by a basketball player, or while cooking—which does not guarantee they will know how to use fractions in a different activity—such as resolving a written problem of percentage in a math class (Lave, 1988; Nasir, 2008).

A common issue in schools, then, is that the focus is on teaching contents or procedures but without the context that makes the authentic activity relevant. For example, Cole and Griffin (1983) critique that reading has been tried to be taught as a mechanical process. Instead, they argue, it is necessary to pay attention to the cultural history behind the act of reading. In their words:

“The misunderstanding is that reading means ‘read the individual words so that they sound right’(...) The fundamental nature of reading, from a socio-historical perspective, is that reading includes looking at the sign, knowing what’s coming, knowing where you’ve been, knowing where somebody else is” (Cole & Griffin, 1983, p. 71).

In other words, reading is a cultural activity that is made in a context, with particular goals, and in interaction with the world and other people. Learning to read is, then, learning to participate in the activity of reading. The difficulty with this approach, the authors argue, is that students need to learn the mechanical process (decoding) and the cultural meaning of the activity (comprehension of what other people are saying) at the same time. Cole and Griffin (1983) conclude that “procedures need to be taught as cultural vehicles to help children

experience that emergent activity” (p. 73) so they can understand what the activity is about. Therefore, teaching should focus on basic activities instead of basic skills. Skills are needed to perform an activity, but they are developed in the context of an activity.

The fact that learning and knowing happen in the context of activities also implies that they are inherently cultural. Following the analogy of concepts and tools, Brown et al. (1989) argue that “[b]ecause tools and the way they are used reflect the particular accumulated insights of communities, it is not possible to use a tool appropriately without understanding the community or culture in which it is used” (p. 33). From a sociocultural perspective, however, culture must not be understood as a fixed trait of groups or individuals. Gutiérrez (2002) argues that culture is both: patterned and varied, stable and improvisational. This is because, to Gutiérrez, culture resides in people's everyday practices, which share some features within a community but are at the same time dramatically varied across individuals. Similarly, she argues that the cultural beliefs, values, and practices of a community persist across generations, but their instantiations are not universal across individuals and communities. For example, regarding the culture of classrooms, Gutiérrez (2002) claims that “the relatively stable characteristics of these environments are in constant tension with the emergent goals and practices that participants construct” (p. 315). Having in mind this dynamic nature of culture, Gutiérrez and Rogoff (2003) propose to understand culture in terms of the repertoires of practices with which people engage in different communities. Thus, “[p]eople’s varied *participation* in the practices of dynamic cultural communities can be distinguished from *membership* in ethnic groups” (Gutiérrez & Rogoff, 2003, p. 21, emphasis in the original). In the same line, Goodenough (1994) also understands culture as rooted in human activities, and he additionally highlights that the different roles of one activity have a different (sub)culture.

In conclusion, to participate in an activity is to engage with the culture of the community in which that activity happens. Culture, in this context, can be understood as the repertoire of practices that people develop through their participation in varied communities; those

communities share some practices among their members—because, as Goodenough (1994) notices, communities need to share enough understanding to engage in their activity—but, at the same time, the culture of the participants is varied, and the culture of the community as a whole will change as a result of the dynamic participation of its members.

Given the cultural nature of learning, instead of the acquisition of knowledge or skills, learning is understood by sociocultural theories in terms of participation within a community of practice or a community of learners (Lave & Wenger, 1991; Rogoff, 1990; Wenger, 1998). In other words, as Levine et al. (2020) brilliantly summarize: “cultural practices are both what people learn [...] and the means by which they learn” (p. 142). Examples of communities of practice are a science classroom, an orchestra, the learning sciences scholars, a basketball club, the community of amateur runners, the subreddit of Dungeons and Dragons, the community of K-poppers on Twitter, etc. In all these communities, their members have shared practices, rules, and goals—and therefore, a culture. Participating in any of those communities means engaging with the relevant practices of the community. If newcomers have access to the necessary resources, they will gain participation within the community, which in turn will allow them to engage deeper. What is learned during that process is to participate in the activity, and the way how it is learned is through participation in the activity.

Many authors have highlighted the relevant role that identity plays in learning (Bell et al., 2013; Nasir, 2002; Nasir et al., 2020; Wenger, 1998). For example, after studying basketball and dominoes players, Nasir (2002) concludes that learning, identity, and goals are inseparable from each other. Thus, the participation of newcomers in the activities of the community shifts their roles in the community, influencing how they see themselves and the activity, which in turn shifts their participation and the activity. In this sense, sociocultural theories understand that learning is ultimately a process of becoming.

It is fundamental to notice, though—as Lave and Wenger (1991) do—that a sociocultural or situated perspective about learning is not a pedagogical strategy or a teaching technique, but

rather an analytical lens. In other words, people are always participating in communities of practice, and in that sense, they are always learning, but their participation does not always lead to a meaningful shift in them—their identities, roles, etc.—or the activity. For example, a newcomer who is denied access to the required experiences and resources will probably not be able to gain participation in that community. This is especially important when we consider how marginalized communities' access to participation in formal learning settings has been historically restricted. For instance, Gallego et al. (2001) argue that traditionally schools, following a view of culture as something that some people have more than others, have tried to teach the culture created by (a small fraction of) humankind up to the present time. The fact that the cultural practices of some communities are not considered valid ways of participation (or even culture) limits their participation, and therefore, their learning. Thus, Gallego et al. (2001) argue that schools “have historically served as the means of social sorting and preservation of the social position of more powerful segments of society” (p. 957). Moreover, given that learning is a process of becoming, restricting the access to learning experiences and resources of some communities does not only limit their present participation but also conditions their possible trajectories in the future. Nasir and Hand (2006) explain this phenomenon as follows:

The identities and practices that an individual is exposed to and negotiates along a trajectory of activity support an array of imagined trajectories of becoming. A more constrained trajectory results in less variety in imagined identities. Thus, while the process of selecting activities and shaping behavior to motivate one's own development is flexible to some degree, the perceived choices of what can be done and how one should do it are necessarily constrained by a history of participation. In this way, identity links treatments of learning to issues of power and positional identities (p. 468).

I will explore the issues of learning, power, identity, and imagined futures further in the second part of this piece, where I address the question of what is a good education.

Although originally the work of Vygotsky, Luria, and others was focused mainly on the mediation of cognition by tools, whether material or symbolic, different authors have noticed how other factors of the environment where the activity is situated, and the people who participate in the activity also mediate the activity. For example, as discussed above, identity is an important mediator of our participation in one activity and the learning pathways we have access to. Other authors have highlighted the relevance of embodiment (e.g., McDermott & Pea, 2020; Vossoughi et al., 2020), space and mobility (e.g., Ma & Munter, 2014; Marin et al., 2020), land and more-than-humans (e.g., Simpson, 2014; Tuck, 2015), human evolution and ontogenesis, and neuro-physiological and other biological processes (Lee et al., 2020; Packer & Cole, 2020), among others mediators of human activity.

In synthesis, a sociocultural perspective understands that learning is an inherently cultural phenomenon rooted in the cultural practices of a community and mediated by cultural artifacts, the environment where the activity is situated, and the people who participate; instead of seeing learning as the acquisition of knowledge and skills, it understands it in terms of participation, meaning-making, and belonging.

Although it is clear that a sociocultural perspective of learning is drastically different from a cognitive perspective, I claim that they are not inconsistent with each other and that, in fact, they both can inform the daily practice of teachers and educators. In the next section, I discuss a set of claims based on the literature reviewed so far that, hopefully, might be a useful framework for educators to understand how people learn. Then, from those claims, I propose some implications for teaching and learning.

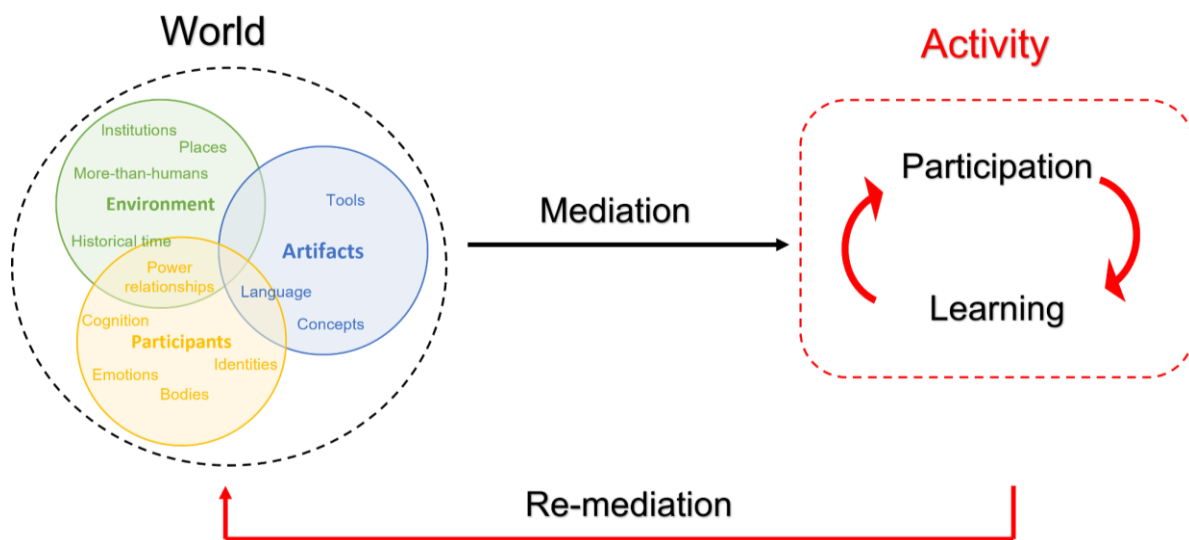
Claims on learning

I propose the following three claims based on the literature reviewed so far. Figure 1 summarizes these three claims in a diagram.

1. Every human activity is mediated by the environment, cultural artifacts, and the participants.
2. We learn to participate in activities through our participation in those activities.
3. Learning changes the learners and the activity.

Figure 1

Summary Diagram



As argued by many of the articles reviewed above (e.g., Brown et al., 1989; Cole & Engeström, 1993; Hatano & Inagaki, 1992; Resnick, 1989), human activities are situated, and therefore, mediated by the environment and cultural artifacts. By environment I mean, for example, the place where the activity is situated, the land and more-than-humans, the historical time, etc. By cultural artifacts, I understand material and symbolic tools, in which we can include language and concepts. Finally, by participants I mean the different dimensions that constitute us, such as our identities, bodies, emotions, cognition, and the relationships between the participants. These three dimensions overlap with each other. Rather than a clear distinction

between them, my point here is that these three dimensions are always present in every human activity, shaping the participation of people in them.

Within this framework, the cognitive architecture and the role of previous knowledge described by Kirschner et al. (2006) and Mayer (1992), as well as the role of mental models highlighted by Hatano and Inagaki (1992), and the relevance of experience with contrasting cases noticed by Bransford and Schwartz (1999) can be understood as particular examples of mediation. If concepts and other forms of previous knowledge are understood as tools, as Brown et al. (1989) argue, then it can easily be pictured their role in mediation similarly to how other tools and cultural artifacts mediate human activities. For example, having developed some conceptual understanding of an activity, or having interiorized some procedures to the point they become automatic allows us to access new levels of participation (e.g., Logan, 1988). A novice guitar player, for instance, has to focus so much on the hands' positions and keeping the rhythm that it is very difficult for her to do something else, such as speaking or singing, so her participation in the activity is very limited. With practice, changing chords at the right time becomes an effortless task, and so she becomes able to explore new and more complex ways of participating. The same can be said for any activity: the tools we are able to use mediate our practice—and by tools, we can understand vocabulary, concepts, procedures, etc.

Now, as important as the mediation of tools is the mediation of all the other elements that constitute the environment in which the activity is taking place and the participants who are participating in the activity. Our guitarist, for example, could have learned to play and sing a song extremely well in her room, but she might feel very anxious about playing on a stage in front of people that she feels are not supportive or don't value her music style. Thus, the activity of playing guitar and singing alone in our bedroom and the activity of playing guitar and singing a song on a stage for an audience have different elements that mediate them, and then, although they share some similarities, people's participation in them might be different as well.

My second claim can be divided into two parts: first, that what we learn is to participate in activities—instead of, for instance, knowledge and skills; and second, that we learn through our participation in those activities. If every activity, as it was argued before, is situated, then talking about knowledge as an abstract entity independent of the context is misleading, and instead, we should talk about *knowing* within the context of an activity. For example, Nasir (2008) shows how someone who is able to solve a percentage problem in the context of basketball free-throws may not be able to solve the “same” problem in the context of a traditional written math exercise. Although the mathematical content implied in both situations is the same, the elements that mediate the activities are not, and thus, they are two different activities. Similarly, Cole and Griffin (1983) and Brown et al. (1989) show that learning to read is to learn to participate in the cultural activity of reading rather than just decoding and that learning a new word is learning to use that word in a culturally relevant way rather than just learning its definition. This claim does not mean that content and procedures are not important; every activity, indeed, requires using some content and procedures to participate in it. The argument is that content and procedures are learned in the context of an activity, and therefore, knowing and performing them is mediated by all the factors that mediate the activity. For example, when students learn fractions in a math class in the school, they are not learning fractions in a vacuum, nor are they acquiring a piece of knowledge that they can use later in any context; the students are learning to participate in a very specific activity: they are learning to do some procedures, using some aspects of the concept of fractions, with certain tools, for a certain purpose, in interaction with some people, in a specific context. Their participation in this activity may help them to participate in a different one where a similar aspect of the concept of fractions is also used, but if the affordances and constraints of both activities are too different, they will likely need support to do it (Greeno, 1998).

The second part of this claim is well summarized by Brown et al. (1989), who claim that “[l]earning and acting are interestingly indistinct, learning being a continuous, life-long process

resulting from acting in situations” (p. 33). We play to learn the guitar by playing the guitar; we learn to dance salsa by dancing salsa; we learn to write essays by writing essays. As it is suggested in the diagram, participation and learning feed each other: participation creates learning, and learning creates participation. From a cognitive perspective, it could be criticized that, given that experts have developed their skills after a long training in which they also have acquired knowledge that they have ready to use—and that as novices lack that training, and therefore, the well-structured knowledge of experts—it cannot be expected that novices are able to participate before the proper training. Similarly, it can be argued that novices have not internalized the necessary knowledge yet, so they will likely suffer cognitive overload if they try to do tasks that require the use of that knowledge, and hence, instruction should equip students with the necessary knowledge and allow them to master it first, to then use it in more complex tasks. These critics point out something that we must be aware of: experts and novices differ in some fundamental ways, and so, it is naïve to expect that a novice will participate in an activity in the same way as an expert. Fortunately, nobody is discussing that. What is challenged by sociocultural theories is the assumption that novices need preparation—and instruction—outside the context of the activity before they can engage with it (Cole & Griffin, 1983; Greeno, 1997; Lave & Wenger, 1991; Rogoff, 1994). Novices need preparation—and sometimes instruction—to become full practitioners, but the process of becoming a full practitioner must be done in the context of the activity; if novices, instead, are prepared in a way that does not reflect the relevant context of the activity—as it usually happens in schools—novices are being prepared in a different activity; for instance, they are being prepared for the activity of schooling. Lave and Wenger (1991) use the process by which apprentices of tailors in Liberia become master tailors as an example of novices engaging in the authentic activity. They describe this as a process of peripheral legitimate participation: beginners start by doing peripheral—but legitimate—tasks, such as observing more experienced practitioners, or by doing a specific task such as attaching buttons, and then, as they gain experience, they transit to full participation.

The key aspect is that learners are involved in the actual tailoring activity during the whole process. In this case, neither instruction nor schooling is needed to become an expert; that doesn't have to be the case for all communities of practice, though. A person who wants to become a learning sciences scholar, for example, will receive a huge amount of instruction, and will engage deeply in the process of schooling (attending classes, reading books, writing papers, taking exams); the difference is that schooling is an essential part of the activities of learning sciences scholars, so instruction and schooling, in this case, fall within the practices they must learn to become an expert in the field. It is worth noting that we are always participating in activities; the issue raised by sociocultural theories is whether the activity to which a novice is being introduced is the same activity—or similar enough—to the one in which the learner wants to develop expertise.

The last claim points to an idea shared, although with different approaches, by cognitive and sociocultural authors: learning changes the person who learns. For example, Brown et al. (1989) claim that learning to use a tool changes the user's view of the world and makes him or her incorporate part of the belief system of the community in which the tool is used; Nasir (2002) argues that learning creates identity and goals; Kirschner et al. (2006) affirm that when something is learned it stops using space from the working memory, leaving space to do other or more complex tasks; Bransford and Schwartz (1999) claim that experiencing contrasting cases affects what we can later notice and interpret; and Hatano and Inagaki (1992) argue that the development of mental models allow to “desituate” cognition and adapt to environmental changes.

Key to understanding how learning changes the learner—and the activity—is the concept of re-mediation². To Cole and Griffin (1983), re-mediation means “a *shift in the way that*

² Here I use the form “re-mediation” instead of “remediation” to differentiate it from the remedy-related meaning of the word. The same form is used by Cole and Griffin (1983) and others.

mediating devices regulate coordination with the environment" (p. 70). Memes are an excellent example of re-mediation. Memes take an image—usually from a TV show or movie—and transform it into a new artifact with different meanings and uses. More often than not, the original meme will quickly be used in new contexts and with new meanings. The same is true for words and tools in general: how they are used, the purpose for which they are used, and the meaning they carry are constantly changing. Furthermore, they are changing through the process of their use. Thus, while the world mediates our participation, and therefore, our learning, at the same time, learning leads to the re-mediation of the world.

Wenger (1998) describes how our experience and the world shape each other as a consequence of engaging in social practices. To him, any practice is ultimately a meaning-making process. He argues that people negotiate meaning through the interaction of two constituent processes: participation and reification. By their participation, people engage with other members of the community—mutually recognizing themselves as negotiators of meaning—which shapes their experiences; by reification, people project their meanings into the world and “perceive them as existing in the world, as having reality in their own” (p. 58). During a conversation, for instance, participants use language as a tool to engage in communication, which implies recognizing the other person as someone who experiences meaning and to be shaped by the experience of the conversation. At the same time, we project our meanings through language, and make them, for a brief period of time, a concrete piece of the world that can shape the experience of others. Wenger describes this dual relation through the following analogy: “The world as we shape it, and our experience as the world shapes it, are like the mountain and the river (...) The river only carves and the mountain only guides, yet in their interaction, the carving becomes the guiding and the guiding becomes the carving” (p. 71).

Learning makes learners shift the way in which artifacts, the environment, and themselves mediate the activity; that is: to re-mediate the activity. The way in which a musical instrument mediates the performance of a musician will drastically change as she develops

mastery of the instrument; the way in which a concept mediates a student's thinking will change as she develops new layers of meaning for the concept; the way in which the interaction with her teammates mediates the performance of a basketball player will change as her identity as a team member and a basketball player shifts; the way in which a yoga practitioner's body mediates her practice will change as her body becomes more flexible. Learning changes us—our bodies, our identities, our cognition—and therefore, it changes how we participate and how we understand the activity, which changes the activity itself.

Broudy (1977) claimed that “the schooled man thinks, perceives, and judges with everything that he has studied in school, even though he cannot recall these learnings on demand” (p. 12). Judd (1908) went further and affirmed that “every experience changes the individual's capacity for new experiences” (p. 34). My claim is that all people think, perceive, judge—more generally, they participate in activities—with everything they are, with everything they have lived, and going back to my first claim, we can add that people participate in activities with everyone and everything that is there with them, even though they cannot name the connections on demand.

The three claims presented above are coherent with the summaries of the learning sciences literature made by other authors, for example with the six points about what we know about the process of gaining expertise by Hatano and Oura (2003), or more recently, with the RISE principles for a holistic view of learning by McKinney de Royston et al. (2020). Thus, the value of the claims I present is not in saying something we didn't know before but in summarizing a large body of literature in a way that is easy to understand and draw implications for practice. I will discuss the general implications of these claims for teaching in the next section.

Implications for teaching

Based on the claims on learning I made above, I propose the following three general implications for teaching:

1. Teachers should focus on engaging students in relevant activities.
2. Teachers should be aware of the different mediators that shape the participation of their students.
3. Scaffolding participation and re-mediation is the fundamental role of teachers.

Teaching usually focuses on the acquisition of knowledge and skills. This can be attributed to the implicit assumption made by the acquisition perspectives on learning that knowledge is independent of the context, and therefore, once learned, it should be available to use in any context. As Resnick (1989) notices, “[i]f knowledge can be acquired in one context and then freely moved into another [...], it makes good sense to designate a particular environment— school—as a place that specializes in helping people learn” (p. 11). I’m arguing, instead, based on sociocultural theories, that people learn to participate in activities through their participation in those activities. This implies that the focus of our teaching should be the activity rather than the content or procedures because participation in the activity is the product and the means of the learning process. As Cole and Griffin (1983) argue, content and procedures are necessary, but they must be taught as *cultural vehicles* to experience the relevant activity—which also was argued by Dewey (2010/1916, p. 31).

Let’s consider, for example, a science class about Newton’s laws. Newton’s laws are the content, but what is the activity we want to engage with? Do we want to engage with the academic activity related to the field of physics, and thus, resolve pen-and-paper problems, do mental experiments, and explain phenomena using physics concepts? Do we want to engage in scientific research? What kind: experimental, theoretical, or numerical? Do we want to solve engineering problems? Or maybe engage in philosophical discussions related to the nature of scientific theories? Each of these activities has its own goals, tools, and methods. Learning to

participate in one of these activities does not guarantee that we will learn to participate in the others. Someone excellent at solving pen-and-paper problems about Newton's laws might not be able to use her expertise in that activity to design and carry out an experiment to test one of the laws, and vice versa. I am not arguing here that our experience with one activity is only usable for that activity alone, nor that students should only engage with the exact same activities they will likely engage in in the future; the relevant idea here is that we don't learn "Newton's laws", we learn to use them as a tool for the specific activity we engage with. If that experience will facilitate our participation in other activities will depend on whether we are able to use that experience to re-mediate the activities to come. Then, I am understanding activity relevance in terms of *what potential activities it could facilitate participation in*. I will explore this issue further in the second part of this work.

As another example, let's consider the case of one person who wants to learn to play guitar. Again, the question is in what cultural activity this person wants to participate? Does she want to play classical music by reading sheet music? Or does she want to play and sing popular songs? Maybe she wants to jam with more people and be able to improvise a solo. Again, these three scenarios are examples of different activities. This case also shows us that, depending on the activity she chooses to participate in, our hypothetical learner will engage with different communities of practice. Thus, in the first case, she could enroll in a conservatory or take private classes; for the second one, she might watch tutorials on the internet and participate in a virtual community; and in the last case, she might join a band or frequent local jam venues. Even though she probably would learn some common things in the three cases, her experience, the communities, and the activity as a whole will be different in each case.

The second implication for teaching I am proposing is that teachers should be aware of the different mediators that shape the participation of their students; in other words, we should pay attention to how the environment, the cultural artifacts, and the participants mediate participation. Often, it will not be possible to change some factors that hinder the participation

of our students (such as structural racism, lack of basic resources, a history of academic failure, to name a few); in those cases, at least we should try to be aware of them. This does not mean that we should focus on all the mediational elements; it seems reasonable to focus on those that are more relevant to our context. Different teaching methodologies and pedagogical approaches pay more attention to some mediators than the rest. For example, culturally responsive and culturally sustaining pedagogy focus on how identities and whiteness mediate learning (Ladson-Billings, 1995; Alim et al., 2020); place-based and indigenous pedagogies focus on the mediation of the history and details of a place, the land, and more-than-humans, as well as in disrupting dominant western epistemologies (Grande, 2015/2004; Simpson, 2014; Warren et al., 2020); critical pedagogy focuses on power relationships, especially on how education may serve the interests of the dominant or the oppressed class (Freire, 1970/2012); explicit and direct instruction methods focus on the mediation of concepts and procedures in traditional schooling tasks (Rosenshine, 2012). However, regardless if we adopt a pedagogical approach that mainly focuses on one mediational aspect, we should be aware that all the other elements will still be mediating the learning process—just to lesser degrees of intentionality.

Coming back to the example of Newton's laws. Let's say we chose to focus on developing conceptual understanding and pen-and-paper problems. Students' participation will be mediated by their current understanding of physics concepts such as velocity, acceleration, and force, as well as by their expertise with mathematical tools such as vectors and equations; their participation will also be mediated by how they perceive the subject of physics (who is welcome in the field? To whom benefits? Whose ways of knowing are valued?), and how they see themselves on it (do they think about themselves as "science people"? Are they suffering stereotype threats? (Roger et al., 2020)); it will also mediate their participation the similitude or contrast of their ways of knowing and being learned in their communities with what is expected in the classroom (e.g., individual reasoning, without the help of books, notes or other people), and the kind of language and reasoning that is considered valid as an argument (Levine et al.,

2020). Similar elements will also mediate the participation of our guitar player learner (concepts of music theory, previous experience with music, her identity, and how the community welcomes people like her, etc.). Some of these mediators could be addressed by the learner or the educator: for example, a teacher could focus to welcome diverse ways of argumentation; or the guitarist player could study scales and harmony to improve their solos. However, it is clear that the learner, a single teacher or educator, or even the school, has no control over all the dimensions that mediate learners' participation. Nevertheless, being aware of them allows us to better understand the learning process of learners in all its complexity, and thus, avoid reductionist explanations about their performance that perpetuate learning inequalities.

Finally, I claim that the fundamental role of teaching is the scaffolding of participation and re-mediation. If participation creates learning, and learning creates participation, a logical question is how do we learn something new for which we are not able to participate yet? I propose we have two ways to begin to participate in a new activity: first, as legitimate peripheral participation, and second through scaffolding. As mentioned above, Lave and Wenger (1991) notice how novices begin to participate in peripheral, but legitimate ways. That means, their participation may be limited at the beginning—for example, just watching more experienced practitioners—but it is considered, nevertheless, a legitimate part of the activity. In this sense, regardless if we are completely new to an activity, we can always begin to engage with it, even if we do it in a very limited way such as just watching others' performances; from there, we have the chance of learning and gaining participation.

Even if watching and listening are two common ways of beginning to participate in a new activity, they alone may not be enough to learn and gain participation. Vygotsky (1978) proposed that learners could go beyond their actual developmental level—towards what he called the zone of proximal development—if their performance was scaffolded by more experienced practitioners. Hence, I claim, scaffolding is the main task of teachers and educators to help

learners to participate in activities that they would not be able to experience by themselves without support (social, material, or both), and thus, place them on a trajectory of learning and participation. By scaffolding, I understand the intentional facilitation of a process by an educator to a learner. Scaffolding could take the form of doing a procedure at a slower pace so it is easier to observe, a verbal explanation, a piece of advice, giving direct feedback, highlighting an obscure part of a process, providing an example, etc. The purpose is that learners may access experiences that will allow them to learn. It is worth noting that facilitation in this context means to make it easier to engage in the activity, which does not necessarily mean to make the activity easier. For example, a challenging question could be a way of scaffolding more sophisticated levels of participation and understanding of an activity that might be difficult to develop spontaneously. After all, it only makes sense to scaffold activities that are beyond the current level of the learner— otherwise, scaffolding wouldn't be necessary—so it is expected that those activities will challenge the learners at some level.

Further, it is not enough to scaffold participation: re-mediation might also need to be scaffolded. This is noticed by Bransford and Schwartz (1999), who affirm that the sole experience with contrasting cases may not be enough to organize a coherent view of the world and that it is very likely that people need help to do it. Similarly, Hatano and Inagaki (1992) show that repeated experience does not necessarily imply the development of mental models, but that people need the motivation to seek understanding to construct those models, which depends on a series of conditions such as the values of the community or having access to dialectical interactions with other people. The fundamental idea here is that, although learning changes the learner, people may need help to reorganize their experiences and re-mediate their participation accordingly.

Once again, let's go back to our example with Newton's laws. Let's consider a student who has already learned to solve pen-and-paper physics problems with precision. This student is able to model a given problem in terms of physics equations that then she is able to

mathematically solve to arrive at a solution expressed in algebraic terms. However, this student is not able yet of interpreting her solution, and therefore, even if she arrives at the mathematical solution, she is not able to describe what the solution means. Her teacher scaffolded her process telling her that she should analyze extreme cases (what happens when the mass becomes infinite? What happens when it becomes zero?) to see how the mathematical solution behaves in those cases, and to think about what that would physically mean. After some practice, she is not only able to interpret their answers, but she has developed new tools for sense-making that allow her to understand the problems and her practice with a new perspective.

Scaffolding re-mediation does not only imply helping to develop mental models and conceptual understanding of the activity. Re-mediation means a shift in the way that mediators mediate our participation in an activity. Then, scaffolding re-mediation implies supporting people so they can mediate their own participation in practices differently—for example, through identity development, the shift in roles, meaning-making processes, use of tools, etc.

One last thing about the relevance of re-mediation and its fundamental role for teaching. As discussed previously, transfer has always been a major goal for educators—our holy grail, according to Resnick (1989). The concept of transfer, though, only makes sense under an acquisition perspective of learning, in which people can take these context-free pieces of knowledge, and hopefully, use them in a new context. Under a situative perspective of learning, however, people know—and think, move, perceive, feel and do—in and with a context. A change in the context is a change in the activity. Then, a chess expert cannot apply the strategic thinking she uses in chess when she is doing her groceries, because her strategic thinking in chess is mediated by the board, the pieces, and her experience with thousands of games. However, my claim is that a chess expert is still a chess expert when she is doing her groceries, and in that sense, she does her groceries differently than when she was a novice chess player, because she is now a different person, and as a different person, she interacts with the world differently.

Becoming a chess expert, like any other learning process to some extent, will shape what we notice, how we interpret it, and how we interact with it.

Scaffolding re-mediation, I suggest, is extremely important because it means facilitating the process of becoming, which has the potential to change how we participate in all our future activities. Then, the main issue when choosing what to learn and teach should be: how does participating in one activity change us, and how will those changes affect our future participation in that and other activities? In the last part of this work, I present a brief essay in which I explore this and other ideas about what is a good education and the role of schools in that project.

Part 2: What is a good education?

So far, I have discussed how people learn according to cognitive and sociocultural theories, looking for a general framework that shows where these theories meet, and I have proposed some implications for teaching from that framework. The first one of those implications is that teaching must focus on engaging the learners in relevant activities. The second and third implications address two key aspects of the role of educators in the process of introducing newcomers to an activity and accompanying them while they become full practitioners. However, there is one issue that has not been discussed yet: what is a relevant activity? If, as I am arguing, a fundamental matter in teaching and learning is the activities in which we participate, what kind of activities should we prioritize in our learning? Or, to frame it in terms of Bruner's master question: "what should be taught to whom, and with what pedagogical object in mind?" (Bruner, 1999, p. 408). In other words: What is a good education? In the following short essay, I will explore an answer to that question that, hopefully, might be helpful to guide the practice and reflections of educators and other people who care about these matters.

I understand education as the sum of all our learning experiences, and learning as a ubiquitous phenomenon: we are learning all the time and everywhere. However, different learning experiences can have radically different consequences. Let's take, for instance, the different outcomes of learning to ride a bike compared to learning to be afraid of any hairy thing, as in the infamous experiment of little Albert by Watson and Rayner (1920). Both are examples of learning, but the effect of each learning experience on the learners, their identities, the paths that open and close to them, the communities they can engage with, and how they can engage with them will be very different. The question for a good education, then, is not about how long or how accurately the learner can remember what she learned—in which case, the experiment of Watson and Rayner would have been an outstanding learning experience—but rather about how a good education might transform us.

Due to the ubiquitous nature of learning, I claim that learning is inseparable from life, and then the question of a good education is inseparable from the Socratic question of the good life. Of course, there are as many answers about the good life as people in the world. Nevertheless, there are some basic elements, I claim, that most, if not all of those answers share: to live a good life we need to be able to live and be happy. If we agree with these two principles³, then we must agree that a good education should help us to at least do that: to live and be happy. I will argue next that this means that a good education must help us to participate, imagine, read the world and transform it.

Education to participate

Dewey (2010/1916) affirmed that “[c]ontinuity of life means continual readaptation of the environment to the needs of living organisms” (p. 5). Following that idea, we can conclude that the environment is a strong mediator of what we need to be able to do to readapt said

³ I am aware that there might be people who disagree with these principles. Some folks, for example, might think that it is not necessary to be happy to live a good life. I acknowledge that option, but I am not interested in exploring those projects of life.

environment. It is easy to imagine that what we need to be able to do in order to live will look very different if we live in a middle-class neighborhood of Seattle than if we live in the middle of the Amazonas. While in one case being able to hunt an animal could be a life-or-death skill, in the other case, knowing how to check and reply to an email is much more relevant. Whether we live in a cosmopolitan city, a rural area, or in the middle of a jungle, the communities living there have developed a series of practices to live there. Those practices are the product of the community's history; they have been shaped by the everyday interactions of the community and mediated by the environment; they are, in short, an essential part of the culture of the community.

Living in a community requires and implies being educated in its culture. Individuals cannot recreate in their lifetime the whole culture of a community by themselves; they, as Cole and Engeström (1993) notice, get access to the accomplishments of previous generations through cultural mediation. In other words, people learn the cultural practices of their communities through their participation in those communities. A good education, thus, must help us to participate in the communities that are most relevant to us. That means, to be able to learn the repertoire of practices developed by those communities and contribute to the development of new practices (Gutiérrez and Rogoff, 2003; Wenger, 1998).

Above, I discussed further the meaning and implications of understanding learning as participation in cultural practices. Here, in addition to that, I am interested in noticing the following: even if a good education everywhere must help us to participate in the communities we live with, participation looks and is different in different communities; so, even if the principles behind it might be the same, what a good education looks like must be defined in each community—and this will be a continuous process of negotiation within its members.

Education to imagine

Similar to the answers to a good life, there is not a unique understanding of what it means to be happy (Diener & Oshini, 2005). However, inescapably, to live implies making choices; the choices we make, along with the choices of others, and the material and cultural constraints we live with will affect our life and happiness (Raab, 2017). A good education, thus, must help us to navigate those constraints and make choices.

Cole (1993) argues that the choices people make are affected by the futures imagined by them based on their present and past, a process he calls prolepsis. In his words, “[t]he present is a dynamic, evolving, trajectory which not only integrates current sensory input with prior experience, but also “calculates” an “imagined future” which then “feeds back” to complete the fundamental, transformational cognitive cycle” (p. 249). Any decision, then, implies a prediction of imaginary trajectories to where that choice might lead us; the futures that we are able to imagine, then, not only informed our decision-making, but they become material constraints for the present choices we are able to conceive. In other words, our imagination mediates our present choices. For example, Cole (1993) describes a situation in which an adult sees a baby for the first time, and after categorizing her as female, he says that she will not be able of playing rugby. The future that this adult is imagining for the girl, which is based on his experience in which women don’t usually play rugby, will mediate the choices he makes regarding her, for example, if he gives her or not a rugby ball for her birthday.

We shouldn’t think about our ability to imagine futures in terms of individual skills, though. As Nasir et al. (2020) discuss, access to resources and experiences for learning and identity development are mediated by culturally organized pathways that are reproduced through institutions. In other words, depending on our personal stories and how those stories are valued by power structures, some learning pathways will be more plausible than others, which in turn conditions the futures we can imagine, and the choices we have access to. For example, Bell et al. (2013) explore how learning pathways related to STEM fields can be created

when students' everyday expertise is supported and valued, so they are recognized and able to see themselves as science practitioners. When, on the other hand, their informal expertise is not valued by formal science spaces—such as school science classes—it is more difficult for them to engage and gain participation in those spaces; in consequence, it is less likely that they imagine for themselves futures related to formal science.

Then, if one purpose of a good education is to help us to make better choices, it must help us to imagine new futures, new possible trajectories; otherwise, the lack of imagination will be a material constraint (Cole, 1993) that will reduce the choices we are able to conceive.

Education to read the world

As Cole (1993) argues, our imagined futures are mediated by our past and present experiences. We can add to that: they are mediated by our reading of our experiences. Then, if our reading of the world is not critical, our prediction of the future will be misleading.

Let's go back to the example described by Cole (1993). When the man says that she won't be able of playing rugby, he is doing a reading of the world and his past; in Wenger's (1998) terms, he is reifying, projecting his meaning to the world. It is obvious that his reading of the world is mediated by the world, but still, it is his interpretation of the world—rather than the world on itself—upon which his imagined futures are based. The trajectories we predict are not only uncertain because we are guessing the future; they are also uncertain because we are guessing—trying to make sense of—the present.

To Freire, one of the main goals of education was to develop the methodical rigor with which we must approach the world to read it critically. He called this the transit from a naïve curiosity made of pure common sense to an epistemological curiosity that is methodologically rigorous (Freire, 2015/1996). In contrast to what Freire (2012/1970) called *banking education*, which describes a static world that is well-known by the educators, the *problem-posing* pedagogy that Freire (2012/1970) advocates understands the world as historical, and therefore,

in constant change. Understanding the world as historical also implies understanding the historical nature of our knowledge, and thus, being open to its modification. Hence, to Freire (2015/1996), one of the conditions to think critically is “que no estemos demasiado seguros de nuestras certezas” [that we don’t be too sure of our certainties] (p. 29). Here, Freire is not advocating for a sort of relativism that prevents us to make any judgment—and neither am I. Rather, Freire argues that thinking critically implies humbleness to be able of engaging in a true dialogue with others and transform our thinking, but also a rigorous search for truth that constantly questions our understanding of the world, and how the world is understood and presented by others. The changing nature of the world, after all, is not a matter of chance: it is the result of a dialectical process between people with political agendas and asymmetrical power relationships. Therefore, the need for a critical reading of the world is not only because of our finite nature but also because without a critical revision of our understanding of the world, we will likely understand it only according to the dominant perspective.

Then, to be able of making better choices, a good education must not only help us to imagine new futures; it also must help us to critically read the world and see beyond simplistic and culturally dominant interpretations. For instance, a good education should make it less likely to see that rugby is played mostly for men, infer from it that women just don’t like to play it, and conclude that a girl won’t play rugby in the future. Instead, a good education should help us to question why women don’t play rugby as much as men, see the asymmetry in access, salary, role models, and assigned gender roles that affect men and women to decide if they want or not to play rugby, and imagine futures in which those conditions are different, and in which a girl can play rugby if she wants to.

Education to transform

If a good education is going to contribute us to living a good life by helping us to make better choices, then it cannot only allow us to see different options and future trajectories, it

must also help us to be able to participate in the construction of those imagined futures; otherwise, it wouldn't be helping us to *make* better choices but only to conceive alternative universes.

Coming back to the rugby example, I argue that it is not enough with being able to see how a patriarchal society limits the participation of women, neither is it being able to imagine a society that works under different conditions; a good education that helps us to live a good life must also allow us to participate in the transformation of the current conditions that prevent the realization of different futures. In short, a good education must not only allow us to participate in the world as it is; it must also help us to shape it.

I'm understanding here shaping the world in the sense of re-mediation and reification discussed above: as a projection of ourselves to the world that re-mediate ours and others' participation. I'm not arguing, for instance, that a good education must guarantee the realization of our future plans; I'm arguing that it must allow us to—in Freirean terms—say *la palabra verdadera* (Freire, 2012/1970). To Freire, saying *la palabra verdadera* [the truthful word] is a simultaneous process of action and reflection, and therefore, of *praxis*. By saying *la palabra verdadera*, we make sense of the world, we name it, and by doing that, we shape it. Further—Freire argues—we cannot name the world alone; naming the world implies engaging in a dialectic relation with others; to engage in a dialogue in which the others will name the world as well. This dialogue is at the same time a metaphoric and a literal figure: it is literal because engaging in a dialogue—as argued also by Wenger (1998)—implies a process of negotiation of meaning, in which we are constantly making sense of the world, being shaped by how the other participants make sense of the world and shaping them with ours. It is also metaphoric because the same can be said of any activity: we are constantly making sense of the world, expressing that meaning through our participation—which mediates the participation and sense-making of others—and being mediated and shaped by others while doing so.

In synthesis, what I mean by education to transform is an education that helps us to participate in the dialectic construction of the world, instead of only being passive witnesses of the process.

A good education and the threat of indoctrination

Given that I have argued in favor of an education to transform, and that I've been citing ideas of Freire as an example of it, I feel compelled to address a common critique of critical pedagogies: the threat of indoctrination.

A common worry about indoctrination comes from liberal authors (e.g., Bialystok, 2014; Brighouse, 2006). To Bialystok (2014), liberalism understands that “individuals should be free to pursue the life they want, complete with whichever beliefs, values, and goals they deem to be correct, as long as they do not thereby infringe on the ability of others to do the same” (p. 419). Accordingly, the main aim of a liberal education is to develop individuals' autonomy to pursue the life they deem to be correct. For instance, Brighouse (2006) proposes a set of principles for schools, policymakers, and educators to adopt that “centre on the interests of children, rather than those of the wider society” (p. 2), placing thus the autonomy of children over, for example, the needs of the community. A major worry for a liberal education then is to not interfere with students' autonomy; in consequence, any attempt to favor a particular view of the world over others—such as the understanding that we live under a patriarchal society—could be questioned as an act of indoctrination.

Bialystok (2014) acknowledges, however, that attempting to achieve a neutral education is unrealistic. Instead, she defends that a liberal education must both “develop students' capacity to make autonomous judgements” and “instil some comprehensive values and beliefs from which others can be later drawn” (p. 424). Not surprisingly, though, the values and beliefs that a liberal education must endorse are the values and beliefs of liberalism. In the words of Tanchuck et al. (2021): “For those, like Bialystok, who accept [compressive liberalism], liberal values—

however specified—must take moral priority *over* everyone’s other commitments, shaping and regulating them across the public and private spheres in any case of conflict” (p. 47-48). In other words, a liberal education could be classified as indoctrination in liberalism according to its own parameters.

To be clear: the point of critiquing the coherence of the liberal principles of education is not to argue against students’ autonomy—I defended above that a good education must help us to make better choices. Rather, the point is to illustrate that any educational project—including a liberal or a conservative one—is deeply ideological. Therefore, the support of particular ways of understanding the world, or even political agendas by an educational project is not a good criterion for qualifying it as indoctrination, because that is what every educational project does, regardless of whether it is aware of its own ideological basis or not.

Callan and Arena (2009) propose a different way of understanding indoctrination. For them, indoctrination can be understood in terms of close-mindedness: a learner is being indoctrinated when she is taught to closed-mindedly believe in something. The problem with an education that indoctrinates is twofold: first, indoctrination is an abuse of power done by the teacher to impose a particular belief in their students, which is in itself morally questionable; and second, even if we were able to accept that teachers could be entitled to impose their beliefs under some circumstances, an education that indoctrinates—that is that teaches to closed-mindedly believe in something—would not be contributing to a critical reading of the world, because one of the conditions to do that is the openness to review our understanding of the world, and hence, it would not be a good education.

The open-mindedness described by Callan and Arena resembles the humbleness that Freire (2012/1970) argued is required to engage in an authentic dialogue. Then, an educational project that understands itself as a process of authentic dialogue, like the one I’ve been advocating so far, if doing it right, does not indoctrinate. For instance, an educational project that encourages people to understand the world from a feminist perspective would not be

indoctrinating as long as it remains open to question and review their own beliefs and encourage learners to do the same.

In synthesis, if the purpose of a good education is to help us to live a good life, and to living a good life we need to be able to live and make choices, then a good education must help us to *participate in the communities we live with, critically read the world, imagine new futures and engage in the construction of those futures.*

I have been saying that a good education must help “us” without clarifying who I mean by “us”. There are two ways in which we can understand that “us”: as each of one of all us, or as all of us as a whole. I have meant both meanings at the same time. Under the liberal tradition, education aims to develop the autonomy of *individuals* (which is clear in Brighouse’s claim about his principles “centre on the interests of children, rather than those of the wider society” (2006, p. 2)); some considerations can be made to protect the functioning of the liberal democracy—such as teaching some *comprehensive* values and beliefs, as proposed by Bialystok—but ultimately the goal of education is to serve the interests of the individual. Again, I agree that education must help each one of us to live a good life, and that individual autonomy is an important aspect of a good life. However, given the intertwined and inseparable relationship between education and any social group—there is no education without a community, nor a community without education—I argue that a good education cannot only be concerned with the good life of each individual, but it has to serve the continuity of the community that allows the existence of the education in the first place. That is: a good education must not only help each individual to participate, critically read the world, imagine futures and engage in the construction of those futures, but also help the community as a whole to develop the distributed repertoire of practices that enable its continuity, to critically read the world, imagine new futures for the community, and to engage in the construction of those futures.

The role of schools

To finish this essay about the meaning of a good education, I want to address the role of schools in that project.

A fundamental idea to think about the role of schools is that they are only one among many places where people learn (Banks et al., 2007). If we understand learning in terms of participation in cultural practices, then learning is happening everywhere. Moreover, learning is happening all the time, with or without instruction. Learning is happening even when the learners learn something different from what was expected by the instructor. Instruction, then, is not a requirement for learning, although it might be essential for specific purposes. If learning is not exclusive to formal institutions, education—understood as the sum of all our learning experiences—is not exclusive to formal institutions either. Therefore, a good education is not a task solely of schools, but at the same time, it is a task that schools cannot refuse.

If the purpose of a good education is to help us to live a good life, as I've been arguing so far, then a school is not doing a good education, regardless that achieves excellent results in standardized tests, if it teaches academic content uncritically, without problematizing, for example, whose ways of knowing are being taught and whose are made invisible (Alim et al., 2020; Warren et al., 2020), because it would not be helping their students to read the world critically. Similarly, a school that does not help its students to develop the repertoire of practices required to participate in their communities and the construction of their imagined futures—by the lack of some basic math and literacy proficiencies, for instance—is not doing a good education either. On the other hand, schools are not and must not be responsible for all that a good education implies. If we learn while we engage with cultural practices, then schools, colleges, families, libraries, sports clubs, television, newspapers, social networks, workspaces, banks, stores, public transportation, online communities, to name a few, are all, in fact, educational spaces. To be clear: I'm not arguing they are *potential* educational spaces; they are educational spaces as they are because engaging with them implies learning to participate in the

activity they define; activity that people learn through their participation in it. In the words of Dewey (2010/1916), “the very process of living together educates” (p. 8). The issue is whether the learning those spaces facilitate is coherent or not with a good education. Let’s say for a community it is important to know about bank accounts; should not banks, the main space where people engage with those practices, be responsible for it to some extent? If for another community it is relevant to learn about films; shouldn’t the TV networks and streaming platforms take part in that responsibility? If it is necessary for an industry that their workers learn one practice; shouldn’t the same industry take responsibility for educating about that? Regardless of whether these and other spaces assume their educational responsibility, they are educating people. Schools represent only a fraction of people’s life (Banks et al., 2007), and therefore, only a fraction of people’s education. They cannot and should not, then, be accountable for the whole educational project of any community.

Based on the ideas exposed above, it is tempting to argue, as Illich (1971), that schools are not necessary, and that all our education could be done through informal learning. My view is that while we live in a society with structural inequalities that prevent the participation of marginalized communities—and therefore their access to learning experiences, pathways, and possibilities of becoming—it will be necessary to have formal endeavors of education, in the form of schools as we know them or others because, while it is true they can be an instrument of reproduction of those inequalities (Bourdieu & Passeron, 2003/1964; Gallego et al., 2001), they can also be spaces of resistance (Freire, 2015/1996; hooks, 1994).

I have argued so far that schools must contribute to the good education of the community, but that it is not their role to be the sole responsible for that task; a good education is a task distributed among all the participants and organizations of the community. Then, what role is unique or primarily to schools? To be a community of learning, which means to be a community whose cultural practices are centered on facilitating learning from diverse experiences.

Schools are communities of practice (Lave & Wenger, 1991; Wenger, 1998). They have their own cultural practices, power dynamics, roles, and goals that are in constant tension with new practices and goals that participants develop through their daily activities (Cole & Engeström, 1993; Gallegos et al., 2001; Gutiérrez, 2002). As in any other community of practice, being a member of the school community implies learning—and negotiating—the culture of the community. Successful participation in schools, then, means engaging with the activity done by schools. Let's call that activity *schooling*. What schooling looks like depends on each school community, and the material constraints and cultural context that mediate their activity. For example, a predominant way of schooling is the one described by Tyack and Tobin (1994) as the *grammar* of schools: classes grouped by age, attending to blocks of lectures on specific subjects done by one teacher, studying from textbooks and other resources, taking individual written tests that later are graded by the teacher. Those are the practices that students engage with during their schooling, and those are the practices they learn in a successful participation in school.

As Resnick (1989) argues, behind the current way in which schools work is the assumption that the knowledge acquired there can be transferred to any other context. That assumption is challenged by sociocultural theories of learning, which argue that cognition is situated in the context of the activity in which it happens, for instance: within schooling. Then, the question about schooling is not how to achieve that students transfer what they learn in school to other contexts, but rather *how can schooling help students to participate in practices and contexts beyond those they engage with during school?* As argued previously by different authors (e.g., Bransford et al., 2000; Broudy, 1977; Dewey, 2010/1916; Hatano & Oura, 2003), I believe that the main goal of schooling should be to help people to become better learners. In the words of Dewey (2010/1916): “The inclination to learn from life itself and to make the conditions of life such that all will learn in the process of living is the finest product of schooling”

(p. 40). There is no clear answer to how to do that. Nevertheless, there are some implications we can infer from the literature:

- *Future learning is mediated by our previous learning.* In particular, the more complex forms of participation might be accessible only after learning how to use some material or symbolic tools (Kirschner et al., 2006; Hatano & Oura, 2003). In other words, we need to know physics to do what a physicist does.
- *Academic training develops mostly academic proficiency.* Academic training in schools is important to develop the common practices required in formal learning settings and to engage with academic content, but the study of the subjects' academic tradition is often neither a necessary nor a sufficient condition to gain participation in non-academic activities (Lave, 1988; Nasir, 2008). For instance, we don't need to know physics to drive a car, nor does knowing physics automatically make us better drivers.
- *Identity is a key aspect of learning.* Communities that facilitate the learning of their members scaffold their sense of belongingness by including their members' cultural practices, and by creating trajectories of identification (Gutiérrez, 2002; McKinney de Royston et al., 2020; Wenger, 1998). Thus, physics students will learn better if they can use their cultural backgrounds to learn (express in their languages, make examples with phenomena that are familiar to them, use diverse forms of argumentation, etc.) and if picturing themselves as physicists does not mean renouncing to important aspects of their identities.
- *Innovation requires exploration.* Access to diverse experiences in a low-stakes environment where learners have the chance to explore, try new things, and receive feedback seems essential to develop flexible expertise and facilitate future learning (Hatano & Inagaki, 1992; Schwartz et al., 2005). Physics students will be more likely to successfully face a problem they have never seen before if they had

had the opportunity to explore diverse problems, use different methods, and discuss them with peers and teachers without the pressure of a grade.

- *Learning changes the learner.* Learning changes how we see ourselves, the activity, and how we interact with the world. However, people might need help to make sense of their experiences and re-mediate their own participation (Bransford and Schwartz, 1999; Dewey, 2010/1916; Judd, 1908; Nasir, 2002). In short, learning physics changes how we interact with the world, and in that sense, it changes how we drive a car; however, for learning physics to make us *better* drivers, we must engage in the re-mediation of driving by what we have learned about physics, which is not automatic, nor an easy task.

If we can transform schools into communities whose daily practices include the learning of relevant tools for diverse activities; the use of students' cultural resources to learn and the scaffolding of their identity development; opportunities for engaging with diverse experiences, trying things, and making mistakes; and where sense-making and the continuous re-mediation of the world are not only encouraged but facilitated, then schools could not only be a synonym of a good education but also of a community of learning.

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