A Comparative Review of Sociocultural and Sociomaterial Approaches to Creativity

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Abstract

This paper examines and compares the conceptual foundations and practical implications of sociomaterial and sociocultural approaches to creativity. The two qualities of originality and utility have historically been used to characterize creativity, which has often been studied within a psychological framework that focuses on individual cognition. However, more recent research supports a more comprehensive viewpoint that considers the contextual and relational aspects of creative processes. In addition, the more everyday forms of creativity are also highlighted, where any act of learning beyond mere repetition can be described as a creative act. Sociomaterial approaches strongly emphasize the dynamic interactions between people and materials and assume that creativity emerges from these interactions. In contrast, sociocultural approaches emphasize how historical and cultural contexts shape creative processes and assume that creativity is embedded in and influenced by cultural practices and symbols. This paper compares the contributions of both frameworks to our understanding of creativity as a collaborative phenomenon. To present a more comprehensive understanding of creativity, it also highlights the possibility of integrated methods that draw on the advantages of both sociomaterial and sociocultural viewpoints. This comparative review ultimately aimed to increase our understanding of how sociomaterial and sociocultural forces are argued to influence creativity. The generated insights provided several promising possible implications for learning and education.

Keywords: sociomaterial, sociocultural, creativity, learning, education

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Creativity has been a subject of intellectual inquiry for centuries (Runco & Jaeger, 2012). However, a significant milestone in its conceptualization came in the 1950s when Stein and Barret proposed a definition that remains widely accepted in contemporary research on creativity (Runco & Jaeger, 2012). According to this definition, creativity involves the two components of originality and utility (Runco & Jaeger, 2012), where a creative product is both distinct from existing works and perceived as useful by a relevant audience (Stein, 1953). However, within the framework of this definition lie nuanced magnitudes of creativity (Boden, 1998; Stein, 1953). On the one hand, some manifestations of creativity result in groundbreaking contributions appreciated by large audiences; on the other hand, some take shape in the personal realm of individual experience (Stein, 1953; Boden, 1998).

In a similar vein, Boden (1998) distinguishes between two types of creativity: P-creativity, where individuals creatively assimilate information into their worldviews, and H-creativity, which occurs when an idea is both original and useful to a larger group. These terms seem to form a spectrum into which a creative idea can fall depending on the magnitude of originality and utility. This view of the spectrum is consistent with Guilford's (1950) emphasis that creativity is the capacity for original thought that is normally distributed in humans. Thus, this implies that everyone has the capacity for creativity to some degree and only a few people have the capacity to create original thoughts that appear to be original and useful to a large number of others. In the case of P-creativity, it is sufficient if the idea is original and useful for the person herself to fulfill the two proposed criteria (Boden, 1998). Therefore, any act of learning beyond mere repetition can be called a creative act (Runco, 2007).

This comprehensive definition considers creativity to be fundamental to human development. More specifically, it suggests that any idea that is original and useful to some

degree, whether on an individual or societal level, is the result of a creative act. This perspective therefore expands our understanding beyond the extraordinary works of genius and emphasizes the more mundane P-creativity (Boden, 1998).

This framework establishes the standard definition and importance of creativity. However, scientific studies of creativity, examining different contexts, antecedents, correlates, and so forth, are usually done from a perspective that places individual human psychology at the center of research (Glăveanu, 2010; Paaßen et al., 2022). Some scholars contend that this viewpoint is overly restrictive, suggesting that creativity occurs within transformative relationships rather than in isolation. Thus, they advocate for alternative approaches to comprehensively explore and understand creativity (Glăveanu, 2010; Parolin & Pellegrinelli, 2019; Tanggaard, 2013). Both sociocultural and sociomaterial approaches, which are recent and alternative approaches to creativity, expand the understanding of creativity beyond individual cognition. Consequently, these frameworks have been selected to facilitate a more comprehensive and holistic examination of creativity. Furthermore, the increasing recognition of both frameworks in psychological research underscores the importance of assessing the value of their perspectives on certain phenomena such as creativity (Schlauch, 2020). Moreover, the two families of approaches seem to share similar core assumptions of the world and its phenomena (like creativity), while still offering differences that need to be compared to assess the strengths and limitations of those frameworks (Schlauch, 2020).

In the following paragraphs, I will briefly introduce the ontological and epistemological assumptions of sociocultural and sociomaterial approaches before I begin the analysis and comparison of the approaches in the field of creativity. However, it is important to emphasize that both the sociocultural and sociomaterial approaches are rather heterogeneous in themselves. However, in this article, the emphasis will be placed on

examining the major similarities rather than the differences, insofar as this approach is conducive to the analysis.

Sociocultural Approaches

The foundation for today's work in the sociocultural framework was laid by Vygotsky and several other authors in the 1930s, who argued that the social world, including the culture that is shaped by it, and the individual human mind interact and depend on each other in ways that make it unreasonable to separate the two in research (Glăveanu, 2020; John-Steiner & Mahn, 1996; Lantolf, 2000; Sawyer 2012). However, sociocultural ideas only became increasingly prominent in psychological research when criticism of cognitive models intensified. This shift allowed for the emergence of approaches emphasizing meaning-making, context, and holism in the 1990s (Glăveanu, 2020; John-Steiner & Mahn, 1996). Nowadays, various approaches have developed from the original sociocultural theory and, despite their heterogeneity, have a recognizable affinity due to their common origin (John-Steiner & Mahn, 1996).

According to sociocultural theory, a person's position in the world largely influences how they interact with it (Glăveanu, 2020). This position in turn is influenced by social, physical, and symbolic circumstances that developed over a long historical process and shape our perceptions, thoughts, and ultimately behavior (Csikszentmihalyi, 2014; Glăveanu, 2020; Simonton, 2019). Thus, since the relationship a person has with the world depends on her position in it, it is also subject to change as circumstances and position are changing (Lantolf, 2000). In addition, the relationship is bidirectional, and the circumstances and their components are also influenced by the individual (John-Steiner & Mahn, 1996; Lantolf, 2000). Hence, humans of each generation are considered to influence the cultural landscape with its material and social aspects, which in turn constitute a part of the circumstance in which people from the next generations find themselves. Therefore, psychological

phenomena, including human behavior, are viewed from this perspective as being dependent on culture and society (Glăveanu, 2020; John-Steiner & Mahn, 1996; Lantolf, 2000; Sawyer 2012).

In line with this, sociocultural researchers try to grasp the processual nature of phenomena and their intermediate products by analyzing the entire sphere of the social and culture, where person and world are deeply and diversely interdependent, rather than considering the individual as an isolated subject that is interacting with its environment (Glăveanu, 2020; John-Steiner & Mahn, 1996; Lantolf, 2000; Sawyer 2012).

Sociomaterial Approaches

Similar to the sociocultural approaches, the sociomaterial approaches offer a new perspective on the individual-world relationship (Hultin, 2019; Sørensen, 2007). This perspective contrasts with the prevailing ontological assumption that distinct entities exist and relate to each (Decuypère & Simons, 2016; Fenwick, 2015; Hultin, 2019; Sørensen, 2007). In the sociomaterial understanding of the world, the boundaries of these seemingly separate entities are broken down. This is justified and explained by the assumption that the world and everything it contains is constantly in the process of an interdependent becoming (Decuypère & Simons, 2016; Fenwick, 2015; Hultin, 2019; Sørensen, 2007). The world is seen as a flow of relational interactions and material constellations constantly forming and transforming (Fenwick, 2015; Hultin, 2019). Nothing happens just by itself in a vacuum and nothing stays the same at any given moment.

Therefore, the understanding of concepts such as agency in the sociomaterial approaches is also largely characterized by the idea of a world in the making (Fenwick, 2015; Hultin, 2019). This perspective assumes that every action and thought is initiated by a continuous flow of social and material conditions, which shape and legitimize these actions and thoughts (Hultin, 2019). Agency, from this viewpoint, is not a static attribute but an

emergent property that arises and transforms within the dynamic interplay of all involved actors—both social and material (Fenwick, 2015; Hultin, 2019). Hence, agency is distributed between the social and the material dimensions of the world, that have created the conditions for the action in question. It emerges through the enactment of these forces, with no single entity owning it (Fenwick, 2015; Hultin, 2019).

It becomes evident, then, that sociomaterial researchers view the world as relational, a worldview in which the notion of isolated entities is deconstructed (Decuypère & Simons, 2016; Fenwick, 2015; Sørensen, 2007). This entails that everything is only what it is in relation to other actors (Hultin, 2019; Sørensen, 2007). Decuypère and Simons (2016) illustrate this with the example of the delete key on a computer keyboard. This thing is only a delete key in conjunction with other human and non-human actors, such as the hardware (e.g. the keyboard, the screen), the software (e.g. the writing program, the internet), and the human who presses the key and perceives the deleted object. The same applies to everything else, including the human subjects themselves.

Therefore, when analyzing a phenomenon like creativity, sociomaterial researchers decenter and deconstruct both the human subject and the material object. Instead, the constantly evolving and relational, sociomaterial realm is at the center of the analysis (Decuypère & Simons, 2016; Hultin, 2019; Sørensen, 2007).

Research Questions

These brief introductions already present some similarities and differences between the two approaches. In both cases, the unit of analysis tends to be relational and processual in nature. However, the highlighted parts that make up these relational processes and their interpretation diverge to some extent and may lead to different conclusions about them. Therefore, this review aims to examine the similarities and differences between the two frameworks, specifically in the area of creativity. Two research questions will be approached.

How do the sociocultural and sociomaterial approaches differ in their understanding of creativity? And what are the possible implications of the findings of these approaches for educators?

Analysis

To answer these questions, I will discuss four aspects of sociocultural and sociomaterial approaches to creativity. First, the broader perspective of *creativity as a process* as opposed to an individual trait. Second, the way *agency* is understood and distributed between potential actors. Third and fourth, a more detailed analysis of what role the *social* and *material* aspects, respectively, play in creativity. These aspects have been chosen because they seem to be central points in both frameworks that distinguish them from other, more conventional, and individual-focused frameworks. In addition, they are suitable for assessing the differences and similarities between sociocultural and sociomaterial approaches to creativity.

Processual Nature of Creativity

As mentioned earlier, both frameworks emphasize the processual nature of phenomena such as creativity, which means that creativity is not confined to a single place or moment but that it is an aspect of a world of interdependence that is always in a mode of becoming. This perspective contrasts with the common view in more individual-focused psychology, where phenomena like creativity are considered to be human traits or cognitive phenomena that can be identified and analyzed within individuals (Sawyer 2012). Furthermore, the moment of the idea or the moment of the finished product is not at the center of the analysis but is only considered part of a larger process across time and space called creativity (Brand, 2020; Glăveanu, 2020; Tanggaard, 2013).

Despite similarities, researchers from the two frameworks examine the creative process from differing perspectives. In sociocultural approaches, researchers analyze

creativity from a broader viewpoint, focusing on the historical and cultural contexts from which it arises. They view creativity as an embedded social practice, tracing historical and cultural influences to understand the present phenomenon's specific embeddedness (Csikszentmihalyi, 2014; Glăveanu, 2010; Simonton, 2019). Through this analysis, sociocultural researchers have established that the moment of the emergence and realization of an idea is preceded by an accumulation of information that is stored in practices, symbol systems, and language and is then only further developed and changed (Csikszentmihalyi, 2014). Thus, while the immediate creative process and individual work are acknowledged, they are seen as dependent contributions to a larger creative process (Csikszentmihalyi, 2014; Glăveanu, 2010).

In contrast, sociomaterial approaches typically involve researchers closely following the immediate process of creativity, focusing on its social and material compositions (Parolin & Pellegrinelli, 2019; Rudnicki, 2021; Stierand et al., 2017; Strandvad, 2011). These researchers emphasize the inherent unpredictability of the creative process, making them receptive to unforeseen interactions of all kinds (Fenwick, 2015; Sørensen, 2007). By observing the immediate process with this open attitude, Fenwick (2015) argues that sociomaterial researchers bring new ways of analyzing the world in its natural state of becoming, thereby gathering more detailed information about why phenomena like creativity occur. It is contended that by decentering the individual in their analysis of creativity, researchers become more attuned to the integral roles of other humans and the often overlooked material participants in the creative process (Fenwick, 2015; Rudnicki, 2021; Strandvad, 2011).

In both frameworks, creativity is therefore an interaction of different actors that perform the creative process in mutual dependence. However, the different perspectives lead to different types of analyses, where different actors are emphasized. What these emphases

entail and how the concept of agency is shaped by them will be explored in the following sections.

Agency and Non-Duality

Researchers from the sociocultural and sociomaterial approaches argue that an individual is never at the center of the creative process, rather, creativity is constituted by multiple interactions (Brand, 2020; Glăveanu, 2020; Parolin & Pellegrinelli, 2019; Sawyer & DeZutter, 2009; Tanggaard, 2013). Within these perspectives, it is possible to distinguish between two categories of potential actors in the creative process: human or social actors and non-human or material actors (both pairs of terms are used interchangeably). Even when an individual works alone on a project, they remain dependent on influences from both human and non-human actors across time and space. These influences include the general cultural environment, as well as encounters outside and within the direct creative process and any material that influences the process (Brand, 2020; Glăveanu, 2020; Parolin & Pellegrinelli, 2019; Sawyer & DeZutter, 2009; Tanggaard 2013). However, the degree of involvement of the aforementioned parts in the process varies between the two frameworks (Schlauch, 2020).

Sociocultural researchers generally assume that entities are interdependent, constitute each other, and co-produce processes such as creativity. Therefore, creative works are always the work of many people who influence each other in various ways. In addition, the material also plays a major role in the creative process, albeit arguably a more passive one than the human actors. More specifically, materials are described as contributing to the creative process through people and not through themselves, as they carry culturally and therefore humanly assigned meanings across time and space (Csikszentmihalyi, 2014; Glăveanu, 2020; Sawyer & DeZutter, 2009; Sawyer 2012; Simonton, 2019). Overall, degrees of agency are assigned to certain material and social entities. Consequently, the assumption of the existence of such entities, even if they are highly interdependent, is part of the ontology of the

sociocultural framework (Glăveanu, 2020).

In sociomaterial approaches, on the other hand, the boundaries and the resulting dualism between environment and person, creator and created - and ultimately between material and social - are theoretically deconstructed even further (Brand, 2020; Hultin, 2019). Consequently, no entities are assumed (Brand, 2020; Hultin, 2019). Agency is thus a decentralized construct that develops in the flow of material and social configurations and has no origin in a single entity (Brand, 2020). Therefore, sociomaterial researchers trace the flow of quasi-subjects and quasi-objects, to use Brand's (2020) language, and explore their involvement in the process of creativity. These quasi-subjects and -objects are not viewed as "real" entities but as dynamic components of an ongoing process, that emerge from various social and material relationships and are constantly evolving, reflecting the world in a state of becoming (Tanggaard, 2013). Consequently, each quasi-entity consists of social and material parts, which again are only quasi-entities and consist of social and material parts.

Despite ontological differences, the authors of both frameworks sometimes talk about creativity similarly due to this conceptualization and the work with quasi-entities in sociomaterial approaches, which are treated similarly to assumed "real" entities of sociocultural approaches (Brand, 2020; Parolin & Pellegrinelli, 2019; Sawyer & DeZutter, 2009). For example, sociomaterial researchers in one study talk about the *participation* of sketches, diagrams, etc. in the creative process (Parolin & Pellegrinelli, 2019), while sociocultural researchers in another study similarly talk about the *use* of such objects in the collaborative creativity process (Sawyer & DeZutter, 2009). The distinction lies more in the terminology used to describe *how* material influences creativity—whether actively or passively—rather than in differing assumptions about the nature of entities or quasi-entities. Furthermore, the difference between the sociomaterial and sociocultural approaches blurs especially when authors from the sociocultural perspectives grant materials more agency and

emphasize the non-dual nature of reality (e.g., Glăveanu, 2020) as well as when sociomaterial researchers tend to assign less agency to non-human in comparison with human parts on the creative process (e.g., Tanggaard, 2013).

Despite some overlap, in the following analysis of the material and social influences on the creative process, I will take the aforementioned tendencies as a basis and discuss them in more detail.

Social Influences

The social influences in sociocultural and sociomaterial approaches concern the interdependent relationships between people and the environment on several levels. These social influences can be divided into two broad categories that affect the creative process in different ways and are methodologically analyzed differently. Firstly, there is the historical influence in the form of the transmission and adaptation of culture by people, where the past that influences the creative process can be historically and theoretically analyzed (Csikszentmihalyi, 2014; Glăveanu, 2020; Simonton, 2019). Secondly, there is the immediate influence in the form of direct interaction that leads to collaborative creativity, which in contrast is the subject of a more qualitative and observational analysis of the momentary unfolding of the creative process (Parolin & Pellegrinelli, 2019; Sawyer & DeZutter, 2009).

Historical Social Influence

According to scholars of both frameworks, the social represents, in part, the circumstances in which and from which creativity emerges (Csikszentmihalyi, 2014; Glăveanu, 2020; Parolin & Pellegrinelli, 2019; Tanggaard 2013). The historical social effects concern everything that people have created and that still influences the world we find ourselves in today (Csikszentmihalyi, 2014; Glăveanu, 2020; Simonton, 2019). This is partly the culture that is shaped by people and transported across generations, influencing perception and providing the objects and ideas that can be combined in creative ways

(Csikszentmihalyi, 2014; Glăveanu, 2020; Tanggaard 2013). Furthermore, the world we live in determines the challenges and possible solutions and thus also the directions and limits of our thinking and actions (Glăveanu 2020; Simonton, 2019; Tanggaard, 2013). In this context, Csikszentmihalyi (2014) emphasizes the dependence of creativity on what was and what is to become, noting that every creative act is to some extent an extension of the past rather than something new that comes out of nowhere. Therefore, the historical influence can be seen as the social part of the soil from which creativity can develop.

Researchers of the sociocultural framework almost always emphasize this dimension of social influences. Due to the recognition and emphasis on culture as a crucial part of the creative process (Csikszentmihalyi, 2014; Glăveanu, 2020; Simonton, 2019), which by its very nature evolves more slowly (Simonton, 2019), they tend to examine the past to understand the cultural influences and trace the variables that lead to and constitute a particular cultural setting, sometimes called the Zeitgeist, that is interacting with the creative potential of humans (Glăveanu, 2010; Simonton 2019).

Sociomaterial researchers, on the other hand, place less emphasis on culture and its historical background when analyzing creativity. In some cases, authors describe cultural circumstances but not their historical development (e.g., Rudnicki, 2021; Stierand et al., 2017), while others refer to sociocultural research to acknowledge the importance of historical social influence without giving it further attention (e.g., Parolin & Pellegrinelli, 2019; Strandvad, 2011). In general, most sociomaterial researchers seem to be mainly concerned with immediate social influences (Parolin & Pellegrinelli, 2019; Rudnicki, 2021; Stierand et al., 2017; Strandvad, 2011).

Immediate Social Influence

Immediate social influence concerns direct interaction with others who influence our thoughts and actions. It is argued that every experience we have enriches our thought content,

which can be combined and expressed creatively (Glăveanu, 2020). Therefore, not only people working together on the same creative product but also any other direct encounter outside the immediate process has the potential to influence and become part of the process (Glăveanu, 2020; Parolin & Pellegrinelli, 2019; Tanggaard, 2013). These types of interactions and collaborations are discussed in several articles in both frameworks (Glăveanu, 2020; Parolin & Pellegrinelli, 2019; Sawyer & DeZutter, 2009; Tanggaard, 2013).

The reason why the study of immediate social influences is more emphasized in the sociomaterial approaches lies in the ontological assumptions of the framework, which describe the world as constantly and interdependently evolving. Consequently, these assumptions also inform the methodology of the research (Hultin, 2019), where most researchers in this framework seek to follow the immediate process of creativity, including the interactions between human actors (Parolin & Pellegrinelli, 2019; Strandvad, 2011) and use ethnographic and qualitative methods to analyze these types of interactions (Sawyer 2012).

An example of one such immediate interaction observed with a sociomaterial lens concerns the direct interplay of people communicating about an idea. An idea is a dynamic thought that changes a little each time it is put into action (Rudnicki, 2021). This characteristic of an idea is what makes discussing and joint playing with ideas so valuable, especially before they are written down and take on a more concrete form (Strandvad, 2011). This type of interaction can change the idea in several ways. For example, aspects of an idea that trigger an emotional response in another person can draw attention to certain aspects and direct the conversation (Strandvad, 2011). Building on this, Tanggaard (2013) argues that an idea of a creative process is only creative if it is not only new but also triggers an emotional response that makes the person confronted with the idea want to engage with it, otherwise it is likely to be lost in the landscape of new things. If it does not appeal to people in some way

which makes them interact with it, it is ineffective (Stierand et al. 2017; Tanggaard, 2013).

Sociocultural researchers, on the other hand, do not always analyze the immediate social influences. Some researchers focus exclusively on the larger cultural influences, with nations, civilizations, and entire historical periods forming the units of analysis (Csikszentmihalyi, 2014; Simonton, 2019). However, other works recognize both the immediate and historical social influences (Glăveanu, 2010, 2020) and still other authors, departing from the sociocultural perspective, even specialize in the immediate social influences (Sawyer & DeZutter, 2009; Sawyer 2012).

Glăveanu (2020), for example, discusses theoretically the potential of group creativity and Vygotsky's idea of the 'zone of proximal development', where collaboration with more experienced others is seen as particularly enriching and where the enriched mind can consequently make a more creative contribution than before. A further and more specific finding when analyzing the immediate social influence on creativity is that the development of an idea depends on the interpretation of another, regardless of the original intention (Csikszentmihalyi, 2014; Sawyer & DeZutter, 2009). Sawyer and DeZutter (2009) describe an interesting case in which two people begin to interact in an improvised play. Both actors react to each other and with this reaction determine the meaning of the other's creative act. This can be extrapolated in the sense that even great creative achievements only become what they are through the interpretation of others. This is most obviously the case in art, but I would argue that it is also the case in science or other professions. Retrospective interpretation, i.e., the meaning of an idea, and the degree of creativity can change over time and space depending on what others do with it (Sawyer & DeZutter, 2009). Therefore, working in groups can be helpful to the creative process, as one can serve as a social reference for the engagement potential and meaning of an idea to another (Sawyer & DeZutter, 2009). When it comes to social encounters, those consisting of heterogeneous

people seem to be particularly enriching and helpful (Glăveanu, 2020).

Overall, how immediate social influences are analyzed seems to be convergent in both frameworks. I suspect that this is because most researchers using sociomaterial approaches analyze the immediate interaction of the aforementioned quasi-subjects (Brand, 2020; Hultin, 2019). This is reflected in the studies that have examined the production of plays (Parolin & Pellegrinelli, 2019) and films (Strandvad, 2011). Both studies empirically examine creativity from a sociomaterial perspective and use the language of interacting subjects (Parolin & Pellegrinelli, 2019; Strandvad, 2011), making this part of the analysis comparable to sociocultural studies of immediate social influences. This is underscored by similar findings, such as the importance of collaboration in allowing the emotional engagement of others to guide the creative process in a direction that ultimately produces an engaging and meaningful product.

In conclusion, the exploration of social influences on creativity within sociocultural and sociomaterial frameworks reveals both complementary and contrasting elements. Both approaches acknowledge the significance of social interdependencies between individuals and their environments, yet they diverge in their emphasis on historical versus immediate social influences (Csikszentmihalyi, 2014; Glăveanu, 2020; Parolin & Pellegrinelli, 2019; Tanggaard 2013). Sociocultural researchers tend to focus on the historical transmission of culture and its impact on creative processes, emphasizing the enduring influence of past cultural developments (Csikszentmihalyi, 2014; Glăveanu, 2020; Simonton, 2019). In contrast, sociomaterial researchers prioritize the immediate social interactions that directly shape and modify creativity (Parolin & Pellegrinelli, 2019; Strandvad, 2011). Despite these differences, both frameworks underscore the complexity and multifaceted nature of social influences on creativity, illustrating that creativity is not an isolated act but a process of deep interconnection influenced by various social dimensions. However, this process is not only

influenced by social dimensions but also material.

Material Influences

Both the sociomaterial and sociocultural frameworks recognize the significant role that materials play in the creative process (Glăveanu, 2010; Lantolf, 2000; Rudnicki, 2021; Strandvad, 2011; Parolin & Pellegrinelli, 2019). However, the researchers of these two frameworks differ in their views on how specifically materiality influences creativity (Glăveanu, 2010; Lantolf, 2000; Rudnicki, 2021; Strandvad, 2011; Parolin & Pellegrinelli, 2019).

Sociomaterial Perspective

Sociomaterial approaches emphasize the *active* role of materials that directly contribute to creative practices (Hultin, 2019; Parolin & Pellegrinelli, 2019; Rudnicki, 2021; Stierand et al. 2017; Strandvad, 2011; Tanggaard, 2013). Rudnicki (2021) argues that the existence of Rembrandt's art depends not only on Rembrandt himself but also on the drawing material. Without both, the artwork would not exist. This simply illustrates the integral part of materiality in the creative process. However, according to sociomaterial researchers, materiality not only enables the act of creativity but also actively influences its development in various ways (Rudnicki, 2021; Tanggaard 2013).

Every object has a certain texture, and a certain appearance and most of them have a smell, a taste and can produce a sound. These multidimensional properties of objects activate a person's senses, stimulating thinking and action. Since these properties evoke certain potentially creative responses, the object is assumed to be an active participant in the creative process (Tanggaard, 2013). Once someone is inspired by something in the physical world, the material is part of the creative process.

This participation becomes even more evident when the creative process is materialized by writing down an idea, building a prototype, etc. (Parolin & Pellegrinelli,

2019; Rudnicki, 2021; Strandvad, 2011; Tanggaard, 2013). When an idea is materialized, certain physical features of the resulting object trigger emotional reactions that influence the process (Strandvad, 2011). Sociomaterial researchers argue that in such a case, the object evokes something, like curiosity or boredom in the person who interacts with the object and adapts it based on that something. Indeed, it is reported that people decide which features to develop and which to negate based on their emotional reactions to these features (Stierand et al. 2017; Strandvad, 2011; Tanggaard, 2013). The material therefore does something to the person, and the person in turn does something to the material. This interaction gives rise to the sociomaterial process of creativity.

Furthermore, it is argued that materials are associated with affordances and constraints that, in conjunction with human potential, constitute the realm of possibility (Hultin, 2019; Parolin & Pellegrinelli, 2019; Rudnicki, 2021; Tanggaard, 2013). These affordances (the possibilities for action offered by the materials) and constraints (the limitations imposed by the materials) significantly shape the creative process and guide people's exploration and problem-solving activities (Hultin, 2019; Parolin and Pellegrinelli, 2019; Rudnicki, 2021; Tanggaard, 2013). Parolin & Pellegrinelli (2019) give an example from their research on the production of theatre plays, where the details of the scenes were developed with the help of the script in combination with the possibilities of the stage and the available material. By playing with and being inspired by the material conditions, the play took increasingly concrete forms.

This type of active participation goes beyond art and also works in creative problem solving, as Rudnicki (2021) illustrates using the example of the cholera outbreak in Soho, London, in 1854, where doctor John Snow drew up a map of deaths and noticed a cluster around a water pump. This led him to hypothesize that cholera was waterborne, which led to public health measures such as the use of boiled water. Only through the materialization of

data could the problem be solved.

It has been argued that even materials that are not present at the moment influence the creative process through the imagination and the imagined affordances and constraints (Parolin & Pellegrinelli, 2019; Tanggaard, 2013). Therefore, the material influence begins at the abstract level of the idea, which emphasizes the inseparability between the social and the material proposed by sociomaterial researchers.

Sociocultural Perspective

In contrast to the sociomaterial approaches, sociocultural approaches focus on the historical and cultural background, and context of materials and how it contributes more *passively* to the creative process through people (Glăveanu, 2010; Lantolf, 2000). It is argued that culture operates within humans rather than as an external force, meaning that even seemingly internal higher cognitive acts such as creativity are deeply interwoven with the surrounding cultural framework including its objects. The relationships and interactions between material objects and human subjects are shaped and guided by culture. In the context of creativity, this means that historically and culturally evolved objects meet contemporary issues and challenges, as well as individual and collaborative human potential, which together constitute the potential for creativity as a sociocultural process (Glăveanu, 2010; Lantolf, 2000). It is argued that the interaction between the social and the material is mediated by the symbolic meaning that the material has acquired through cultural development (Glăveanu, 2010).

Glăveanu (2020) further argues that the conventional understanding of the material influence on the creative process is generally too limited. From this perspective, the material merely influences the creativity of the individual from the outside. In contrast, he emphasizes the non-dual stance of sociocultural approaches, which includes a view in which materials are an integral part of the creative process. However, he also emphasizes that the material does

not have the same agency as the human being in this process and explicitly distances himself from the sociomaterial ontology in this regard.

In another article, Glăveanu (2015) adapts the idea of affordances and constraints to his sociocultural approach to creativity. Similar to sociomaterial approaches, he argues that the affordances of materials form the spectrum of possible options for action. However, he also claims that these possibilities are shaped by people's intentions and interpretations. The intentions of the person who has created or modified an object thus communicate with another person through the properties of the object. The resulting interpretation and utilization also shape the perception of the objects´ possibilities by other people and create social norms for objects. This perspective suggests that people communicate through objects rather than objects communicating with people - the latter is something that sociomaterial scholars would argue (Glăveanu, 2015).

Other authors from the sociocultural framework do not give much space to material influences. The topic is only touched upon and then left aside to discuss social and cultural influences on the creative process (Csikszentmihalyi, 2014; Glăveanu, 2010; Sawyer & DeZutter, 2009; Sawyer 2012; Simonton, 2019). It seems as if material influences are summarized under the term cultural influences. Culture, according to sociocultural approaches is the human-made circumstances that communicate themselves on a conceptual and material level. In this way, even the material influences are considered largely social, as they transmit the socially constructed culture (Csikszentmihalyi, 2014; Glăveanu, 2010; Sawyer & DeZutter, 2009; Sawyer 2012; Simonton, 2019).

Ultimately, these different perspectives illustrate the complexity of creativity as a process that is influenced both by the tangible properties of materials, which is the focus of sociomaterial approaches and by the intangible cultural contexts in which materials are embedded, which is the focus of sociocultural approaches.

Discussion

Before moving on to discuss the implications, I will summarize the results of the analysis and propose the idea of more integrated approaches that combine the theory and practice of both frameworks, because I think both frameworks point to a blind spot of the other.

When comparing the perspectives on the *processual nature of creativity*, a clear tendency emerged. Although both frameworks emphasize the understanding of creativity as a process, they differ in their emphases (Csikszentmihalyi, 2014; Glăveanu, 2010; Parolin & Pellegrinelli, 2019; Rudnicki, 2021; Simonton, 2019; Stierand et al., 2017; Strandvad, 2011). In sociocultural approaches, the focus is on the historical and cultural background that has contributed and continues to contribute to the creative process (Csikszentmihalyi, 2014; Glăveanu, 2010; Simonton, 2019), while in sociomaterial approaches the more direct contributions of the social and material composition are emphasized (Parolin & Pellegrinelli, 2019; Rudnicki, 2021; Stierand et al., 2017; Strandvad, 2011).

A similar tendency was noted in the section on *agency and non-duality*. In sociocultural approaches, agency is mainly attributed to the human being. Materiality is an integral part of the creative process, but acts through the socially and culturally assigned meanings and not by itself (Csikszentmihalyi, 2014; Glăveanu, 2020; Sawyer & DeZutter, 2009; Sawyer 2012; Simonton, 2019). In sociomaterial approaches, no single entity is assigned agency, but agency emerges in and through the networked process. In this sense, the material has as much or as little agency as the human being (Brand, 2020; Hultin, 2019).

In the next section on *social influences*, the tendency becomes even clearer. Researchers from sociocultural approaches again seem to favor cultural and historical dimensions in their analyses, while researchers from sociomaterial approaches seem to focus on immediate social influences (Csikszentmihalyi, 2014; Glăveanu, 2020; Parolin &

Pellegrinelli, 2019; Tanggaard 2013).

The last section on *material influences* further reinforces the emerging trend. In the sociocultural framework, it is argued that materials mediate culture and contribute to the creative process as a context charged with cultural meaning (Csikszentmihalyi, 2014; Glăveanu, 2010; Sawyer & DeZutter, 2009; Sawyer 2012; Simonton, 2019). In contrast, in the sociomaterial framework, the material is seen as just as much a part of the creative process as the human being. It contributes through an interdependent back and forth of mutual exchange between materiality and humanity (Hultin, 2019; Parolin & Pellegrinelli, 2019; Rudnicki, 2021; Stierand et al. 2017; Strandvad, 2011; Tanggaard, 2013).

All comparisons point to a tendency that is already apparent from the names of the approaches. Sociocultural research emphasizes the social and cultural influences that historically and immediately co-constitute the creative process, while not paying much attention to the material influences. Sociomaterial research, on the other hand, emphasizes the immediate social and material interplay that constitutes creativity, while not paying much attention to the larger cultural influences. The latter also recognizably places more emphasis on the analysis of material than social influences. Researchers of the sociomaterial approaches argue that other approaches that focus on the social origins of phenomena such as creativity underestimate material influences (Fenwick, 2015; Strandvad, 2011; Tanggaard, 2013), and in most cases, they seem to focus on closing this gap. Therefore, it seems that neither approach fully realizes its potential or achieves a truly holistic account of creativity, as each underestimates crucial aspects of the phenomenon.

Two researchers are attempting to eliminate these blind spots and pave the way for more integrated approaches. Tanggaard (2013) writes from a sociomaterial perspective but incorporates social and cultural influences, both historical and immediate, more than other sociomaterial researchers. Glăveanu (2020) is even more explicit in his framework-crossing,

integrative approach. He emphasizes a non-dual stance that recognizes the deep interconnectedness of material and social parts and criticizes perspectives that view the material merely as an externally imposed constraint or facilitator for human creativity. Above all, he emphasizes the socially acquired meanings of materials but recognizes that material also brings its own properties that influence creativity beyond social expectations. In his 2020 paper, he recognizes the heterogeneity within his field and proposes a "psycho-socio-material and cultural" account of creativity to make room for more holistic approaches.

Due to the missing holistic approach of most authors, the sufficient analysis of differences, and the expressed need for the integration of knowledge (Csikszentmihalyi, 2014; Sawyer 2012; Simonton, 2019), the following discussion on possible implications will be done in an integrated way. Furthermore, a pragmatist evaluation of the findings will follow, as I firmly believe that science is meant to create a shift in the world by facilitating the emergence of new, helpful viewpoints on life (Glăveanu, 2020).

Implications

Having compared the two frameworks and their perspectives and contributions to creativity research, it is important to discuss the implications in the context of learning and education. As mentioned in the introduction, creativity is mostly an everyday process (personal creativity) in which people creatively process their constantly and unpredictably evolving lives and integrate new information in creative ways (Boden, 1998; Glăveanu, 2015; Runco, 2007; Tanggaard, 2013). This learning process can also lead to significant breakthroughs, where a new understanding transforms the world on a larger scale (Runco, 2007; Tanggaard 2013). With this in mind, I would like to discuss the findings in the context of learning and how they can inform educators.

From the research conducted in both frameworks, we can learn a lot about creativity, including what facilitates the creative process. These insights could be particularly useful in

schools and other learning organizations. In general, the research suggests that more importance should be attached to the social, cultural, and material influences on creativity and thus on learning. It is not possible to include all the valuable findings here, but some interesting results are discussed to illustrate the potential of these two frameworks.

Firstly, it is argued that becoming aware of our environment and its past creative development provides us with important information to continue creating with what is there (Tanggaard, 2013). Csikszentmihalyi (2014) aptly emphasizes the need to find a way to make past creativity accessible to as many people as possible so that new creativity can emerge. Therefore, educators should teach about the ongoing process of creation and the origin of educational materials to stimulate people and inspire them with past creativity. Emphasizing this topic in public schools could be a way to implement Csikszentmihalyi's (2014) request.

In addition, educators should try to activate the intrinsic motivation of their students through the emotional appeal of educational materials so that they want to engage with them creatively (Csikszentmihalyi, 2014; Tanggaard, 2013). The importance of intrinsic motivation and its positive impact on creative task engagement and cognitive flexibility is also emphasized in more individual-focused psychological research (Deci et al., 2001). Therefore, this motivational potential through emotional stimulation is one of the great powers of material influences and should be utilized to facilitate creativity and learning. This is one example of how more conventional and the here discussed perspectives can complement and inform each other.

Another useful insight from the sociomaterial research was the co-creative role of the material in the process of idea generation and development. Not only does the material inspire certain directions in a creative process, but it also interacts with the overall development of an idea. Once an idea materializes, its exact expression is influenced by the properties of the material involved. An idea is different when it is written down than when it

was a dynamic mental event, and it will be different again when it is materialized in a different way (Rudnicki, 2021). Therefore, educators should take this into account when designing the classroom environment, which brings with it certain possibilities and limitations of material expression. However, this does not necessarily mean that the more material possibilities are available, the more creativity will emerge. Glăveanu (2020) argues that some imposed limitations in the choice of material to work with are accompanied by an increased sensitivity to undiscovered possibilities of the material, which can then be utilized more creatively. Therefore, educators should keep in mind the influence of material on the creative process and experiment with different constellations.

Another point raised about materiality was the emphasis on an open exploration and experimentation with the material so that the joint sociomaterial potential can be better realized (Glăveanu, 2020; Strandvad, 2011). Another way to encourage creativity could therefore be to allocate time and space for free and open exploration of material. This effect could be further strengthened through encounters with different perspectives in these spaces that are argued to enrich each other minds and help to overcome stagnation (Glăveanu, 2020). Therefore, groups that want to learn together, such as school classes, should be taught how to deal with different perspectives with an open, curious, and respectful (Glăveanu, 2020) attitude to utilize this potential.

Limitations and Future Research Directions

Despite some intriguing findings, it is important to acknowledge the limitations of this review. Even though sociomaterial research works with quasi-entities and sociocultural research assumes real entities, researchers from both frameworks argue for a deep interconnectedness of these (quasi-)entities, which makes it rather unreasonable to break them down into parts for analysis (Decuypère & Simons, 2016; Fenwick, 2015; Glăveanu, 2020; Hultin, 2019; John-Steiner & Mahn, 1996; Lantolf, 2000; Sørensen, 2007).

Nevertheless, I have chosen to do such a dissection. However, some scholars apply milder entanglement claims in the frameworks that allow for the separation of the parts that make up phenomena such as creativity (Hultin, 2019; Sawyer 2012), and still others make more radical inseparability claims but are then inconsistent in their actual implementation of these claims in their work (Hultin, 2019). Therefore, I join in the limitation of other authors due to the challenges in consistently working with inseparability claims, despite a general sympathy towards these perspectives.

Moreover, I have simplified the discussion by focusing on the greater similarities within each framework rather than examining the heterogeneous approaches within each of them. I still believe that it is justified to start in this way due to the recognizable and consistent similarities, but suggest that future research should examine the individual approaches in more detail.

Furthermore, all of the studies included in this review are theoretical or contain observational data. It would therefore be an important future research avenue to investigate the potential of quasi-experimental studies. Some of the results could be implemented in specific settings to investigate before-and-after effects and thus gather evidence for the usefulness of these approaches for education.

In addition, I and other authors argued that it seems important to integrate findings as well as ways of research to create a more holistic account of phenomena like creativity. A study observing the suggested "psycho-socio-material and cultural" (Glăveanu, 2020) sphere and process of creativity could gather complex, but useful insights.

Conclusion

Overall, the articles analyzed in this review collectively point to different epistemological foci and ontological assumptions between the two approaches. Sociocultural research focuses on analyzing social and cultural influences on creativity and assumes that

separate entities exist, even if they are deeply interconnected. In sociomaterial research, the focus is on analyzing the material influences on creativity, and no entities are assumed to exist. In practice, however, the researchers from the two frameworks seem to work and analyze creativity in complementary ways. Researchers applying the sociomaterial approaches still use quasi-entities to make the collaborative process of creativity visible. Therefore, the results can and should be combined to draw a more holistic picture of the phenomenon of creativity.

These approaches claim to accept the inherent complexity of the world and its phenomena such as creativity. As a result, researchers become open to inquiry and receptive to the world in its nature of uncertain becoming, including social, cultural, and material forces. The educational landscape can be informed and inspired by these approaches. It has been shown that both frameworks can contribute in their way to the body of knowledge about creativity and these findings lead to some promising suggestions for educators. However, these still marginalized branches of research must demonstrate their practical utility.

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