Digital Bodies

On Signification, Learning, and Embodiment in Digital Teaching

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Social and cultural categories have long been seen as combined with the bodily »habitus« and its relevance for societal positions (Bourdieu, 1984; Foucault, 1988). In these approaches, the performance of the body is considered essential for socializing individuals in modern societies. Therefore, bodily performance as »habitus« is a relevant factor regarding social interactions and the social positioning of individuals and groups. Moreover, culture affects the embodied expression of social positions and concepts – the habitus serves as an indicator of social differences or even as a basis of discrimination (Brubaker, 2004; Hall, 1996). Additionally, digital performance has become a relevant form of interacting with others. Since the pandemic, digital performance has started to affect teaching as a new common form of interaction in higher education (Böhmer et al., 2022) and has also become a relevant factor in socializing the participants within their academic fields.

In this paper, two dynamics of modern societies are reflected on and considered together: culturalization and digitalization. Both developments lead to the question of what has happened to the two fields mentioned above, i.e., social embodiment by cultural positioning and by (further) digitalizing higher education. This paper thus deals with the following questions: What characterizes embodiment in a digital learning environment? What educational consequences does this have for future education in digital learning environments? To find answers to these questions, this article describes how significatory processes can be conceptualized (1). In the next step, cultural significations are explained in the field of culturalization (2) and with regard to learning as the embodied production of social meaning (3). Finally, these findings illustrate how and to what extent culture and digitality are shaping the process from mean-

ing to sense-making in modern societies (4) – and thus in current higher education.[1]

1. Signification

Social processes depend on the habitus, i.e., appearance, behavior, performance, and distinction of an individual and thus on her*his embodiment (Bourdieu, 1984; Bourdieu & Passeron, 1990).[2] In this way, actors are embedded in the cultural structures of the particular field. One of these fields, especially relevant for higher education, is the learning environment students work in. In the first approach to social and cultural aspects of digital learning environments, a differentiated understanding of what it means to address someone as a member of something is needed to understand the social structures that occur here. Therefore, practices of description and addressing need to be deconstructed.

First, the critical change structuralism brought into sciences has to be considered. When Saussure (1989) analyzed language and its use, he described the relation of signifiers to each other as crucial for understanding. In this view, the meaning and the sense of something are not »given« by the signifier – but produced by the signifier and its relation to other signifiers. Language becomes a dynamic practice of signification, identification, power, and difference (Laclau, 2006, pp. 36ff.).

Applied to the challenges facing the individual and its subjectivizing relations, this can be interpreted as saying that the subject is created by the relations of signifiers addressing the individual. The consequence of this shift in social sciences is a »decentering of the subject« (Beer & Sievi, 2010). On the

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2 As this reception of social theory shows, this paper's standpoint is neither phenomenological nor psychoanalytical, but is to be understood simply and plainly as a social constructivist theory of learning (Böhmer, 2016). Virtuality is thus not conceptualized here as a mere mental performance of an individual, but as a responsive practice (Waldenfels, 1994) within the field created by the embodied subject, digital learning environment, and the dynamics between the two (for more details on the strangeness of embodiment: Waldenfels, 2022, pp. 158ff.).

other hand, one can discover a structural openness of subjectivity to social and political attitudes that determine the manner and framework of address and reference.

The notions of knowledge, meaning, and sense need to be carefully differentiated (Posselt & Flatscher, 2018, p. 62) in a way that shows the construction of these epistemological relations. Various modes of signification occur when these relations are manifested in socio-linguistic interactions (for their »ideological« structure, cf. Hall, 1982). Among these are aural, visual, gestural, tactile, spatial, spoken, and written practices, as well as their layouts (Magnusson & Godhe, 2019). In this context, Kress (2010) describes aspects of socio-semiotic multimodality as »the result of a social and historical shaping of materials chosen by a society for representation« (ibid., p. 11). He clarifies that language modes result from social and historical frames and processes. Hence they are as arbitrary as a language but also relevant for the individual with its self- and world-relation called »subjectivity.«

For anyone to understand any undefined thing in a specific sense, the modes of language used for signification in a social interaction must manifest coherence of meaning. Neither the signified (as mentioned above) nor the signifiers are relevant in creating meaning. Nevertheless, the conceptualization of relations between signifiers is framed by specific forms and dynamics of their environment. As this coherence is achieved in social interactions, these social dynamics lead to »a more dynamic understanding, according to which coherence is conceptualized as a potentially variable co-operative achievement of the speaker/writer and the hearer/reader and seen as a context-dependent, hearer/reader-oriented and comprehension-based, interpretative notion« (Haase et al., 2007, p. 6). This cooperative understanding needs not only to be developed through language but can also be realized through material collaboration (Chen et al., 2021, p. 169). Thus, this meaningful coherence is not a static and finalized entity but situated within social processes and their variations. From this perspective, a socio-semiotic coherence produces »situated knowledges« (Haraway, 1988) and variations of the »same« so that iterations (Derrida, 1982) occur in the performance of meaning. Thus, every objectivity is infused with dynamic variations that do not allow a precisely fixed meaning; instead, objectivity is related to the meaning-making process of the subject and its perception.

Regarding social identity, this concept demonstrates the relevance of the subject's signification as an expression of general linguistic practice.[3] Because all members of a language community engage in almost the same linguistic practice (and its distinct differences), the individuals perform on a common ground of reality and meaning by participating in the same common practice of linguistic expression. A »community of linguistic practice« (following Lave & Wenger, 1991) occurs. Thus their identifying behavior, such as »A is one of us, but B is not,« expresses the social order of belonging and identity. Consequently, social belonging (or exclusion) is not an outcome of objectively given facts or subjectively committed attitudes, but the meaning of specific uses of semiotic resources and in addressing oneself and others. Addressing, therefore, leads to belonging and expulsion, inclusion and exclusion, framed by particular meaning-making of social groups.

Such an identity – that is group-oriented as well as field-specific – does not go beyond addressing somebody as someone. To be able to do this addressing, a speaker needs specific terms. »I am not doing away with the category, but trying to relieve the category of its foundationalist weight to render it as a site of permanent political contest.« (Butler, 1992, p. 8) In this view, signifying takes on a double meaning – as social practice, signification opens up the possibilities of belonging, and as a political practice, signification requires a specific relation to power. The category is thus the »nodal point« (Laclau & Mouffe, 2013) of discourses and social identity, belonging, and hegemony.

Kress specifies: »(1) that *signs are motivated conjunctions of form and meaning*; that conjunction is based on (2) *the interest of the sign-maker*; using (3) *culturally available resources*.« (Kress, 2010, p. 10) Thus we can understand this view as rooted in a social and power-related perspective: addressing is led by interest and formed by culture but connects individuals as groups by granting them a specific subjectivity (and rules out other types) within the particular field. Social identity as an outcome of a socio-semiotic approach is thus neither an individual nor a social score but a linguistic and cultural result. Hence, identity as social meaning is a threefold performance of logic regarding addresser, signifier, and addressed (following the communication theory of Lehmann-Rommel, 2015, p. 68).

3 For the relevance of culture to identity production, cf. paragraph 2.2 of this article.

2. Culture and Culturalization

2.1 The Term and its Capital

»Culture« is a term that is often used in global and international education projects. To give a short description regarding the societal phenomenon of culturality (here following Hall, 1996, 1997): The term *culture* describes a wide range of practices, customs, habits, and sets of meanings[4] formed by and based on historical, social, and power-related conditions of perspectives on hegemony, subordination, and resistance (for political aspects of this approach cf. Kruse, 2022, pp. 100ff.). Hegemonical and subordinated positions result from the culturalization of social differences, defined as »cultural differences« that matter in the particular field and its significatory aspects of the language classifying and framing this field (Hall, 1982). Thus, Hall brings together everyday practices on the micro level of society and structural perspectives on the macro level (Davis, 2004, p. 162). In doing this, he describes a norm of »Western« culture for social relations as well as for international contacts, producing hierarchies in terms of cultural attributions, and finds separation from the non-Western »Rest« (Hall, 1996).

This has at least two consequences for the question discussed here: First, culture is not only a term to describe traditions or officially acknowledged customs, but one that should comprise reference to every single practice performed by communities – and individuals as well. The cultural relevance of individual practices lies first in their performance of collective cultural protocols and their significance as »environmental elements« for community practices. In realizing a community's »culture«, individuals never perform those common practices, customs, habits, and sets of meanings twice in the same way, as has already been established with regard to Derrida's (1982) »différance.« Individual cultural performance is never the exact recapitulation of common cultural elements and prescriptions. Every single practice can

4 With this term, I would like to make a critical reference to the more often used concept of »values«. These values seem to mark a certain signification in social, cultural, and political discourses. But quite often they do not lead to specific, »value-oriented« practice, as has been shown for many cases in Western migration debates. These concepts therefore do not seem to value a certain perspective, behaviour, and political attitude, but to be signifiers in the aforementioned discourses that are as useful as »empty« (Laclau, 2006). Their emptiness is also the reason that the common debate on them does not seem to address sense, but meaning only (for more details cf. paragraph 4.3).

thus be seen as cultural practice in itself and embedded in a network of other cultural performances and structures.

Second, culture is often used in modern societies to mark differences. Culture is described as one form of capital (Bourdieu, 1986) that helps or obstructs social positionings. Culture also functions as a signifier of exclusion. This kind of social application occurs in the clarification of whether a given individual or a group shares the common ground of »us« or if they are »them«, the »others.« This form of »*othering* the different« (Böhmer, 2020a) can be described in its culturalized form as a particular version of signification (Böhmer, 2020b, pp. 177ff.). A particular speech or text therefore not only describes facts or articulates the speaker's self but also forms a relationship between the speaker/writer, the hearer/reader, and the object discussed. Both social partners in the textual relation, i.e., the speaker/writer and the hearer/reader, seem to depend on each other. That is, the one self in its identity seems to vanish without the other: »This […] necessity of the Other to the self, this inscription of identity in the look of the other finds its articulation profoundly in the ranges of a given text.« (Hall, 1997, p. 48) The text, whether spoken or written, marks anyone as someone and, at the same time, defines this »someone's« position in the particular social field, in relation to the others there.

This signification frames and pre-structures social identities and fields, but it is also historically and politically framed (Hall, 1997). Culture, therefore, is not only a term that describes human practices but also addresses the relation between power and subordination, inclusion and exclusion, and acknowledgment and disregard.

2.2 Social Constructivism

The previous reconstructions of socio-semiotic practices make clear that signifying practices do not lead to any kind of essentialism but to the verbal effects of addressing, identifying, and constructing. In the approach of cultural signification, social processes are constructed and performed within a particular field of language and identity.

Signifying practices and linguistically transmitted sets of meanings need to be considered more profoundly to understand the process of constructing social relations and societal realities by signifying anyone as someone. The reason for this reflection on language and sets of meanings in social practices is that language rests on those sets of meanings and reproduces them by defining

a person as a specific individual. As Althusser (2001) shows: Shouting »Hey, you there!« makes someone a specifically identified figure – e.g., the thief others are forced to address as a threat – and through this as a person in a particular social position. Therefore, cultural capital – as well as structural and symbolic (Bourdieu, 1986) – leads people to their individual and social opportunities of self-determination in »reified or living« forms such as embodied, objectified, or institutionalized statuses (ibid.). Being addressed as a member of a cultural group means being seen not only as an element of cultural practices but at the same time as connected to certain types of bodily appearance, being connected to particular cultural objects, or being placed at specific positions in an institution. This does not determine the individual in an absolute way but defines those spaces the individual is forced to find an answer to (Waldenfels, 1994). Thus, culturalization ascribes not only groupist identities (Brubaker, 2004) but also creates individual subjectivity.

Furthermore, cultural capital helps first and foremost in the meaning-making of a situation and all those who participate in it. Cultural capital signifies and produces the meaning of individuals as well as of particular objects or knowledge in the specific field. To give an example: the dress of an individual signifies not only fashion preferences and functional necessities but also the adequacy of representational appropriateness relative to a given or required social position within a particular social field (Bourdieu, 1984; for the field of education, classically, Bourdieu & Passeron, 1990). In this way, a specific social meaning is created by the situation, the individuals, and their behavior; but what is also conveyed is the meaning of this situation for the field in general: Is this guy dressed appropriately? Is s*he presenting their social role, relevance, and importance as would be expected? What does it mean if somebody appears like this? And so on. Invariably, a particular cultural significance is relevant for the emergence of a specific, field- and situation-related meaning for the individual, the other participants, and the situation itself.

Second, a particular instance of social reality not only means something to be understood; cultural capital also opens up the portals of »sense«, i.e., more complex thinking that »require[s] reasoning, reflection, and analysis« (Mason, 2014, p. 207) to create the cohesion of different emerging meanings in the particular social reality. There is not only a practice of signification at work here; even more than this, it is the relevance of functional interaction between individuals, groups, and classes – and culture thus becomes an active process of emerging meaning and sense (Scherr, 2012, pp. 321f.).

From this perspective, a concept of culture emerges that refers to the situated practices of individuals and requires their field- and self-determined interactions in the particular situation to develop meaning and, resulting from this, sense (for more details, see paragraph 4) with regard to their meaning-constructions and the more complex sense-creations.

2.3 Culturalized Discrimination

Stuart Hall describes »The West and the Rest« (Hall, 1996) as the epitome of a divided society where culture defines positions and grades of freedom of different groups – the »others« (ibid., pp. 205ff.) are the marginalized and low-powered groups of those who are addressed as culturally different. According to Hall, discrimination and culture work hand in hand: Where »others« are performed in cultural practices, pushed to the margins, and get less power, they are discriminated. As previously shown, language plays a significant role in »othering« the »othered« – by marking their differences with signifiers that assign them to specific structures of the field and map out for them a distinct and differently equipped position within it.

Following Hall further, we can use his signifying approach to deconstruct the terminological othering that is taking place in this context. He delineates a number of common strategies:

> »1 idealization;
> 2 the projection of fantasies of desire and degradation;
> 3 the failure to recognize and respect difference;
> 4 the tendency to impose European categories and norms, to see difference through the modes of perception and representation of the West.« (Hall, 1996, p. 215)

This first amounts to a hegemonial request by a colonialistic region of the world (»the West«[5]) that essentially does not reflect on colonialist practices. As a result, the colonialistic approach leads to discriminating practices in

5 This term is used by Hall not to describe a topographic region or continent, but to mark cultural-historic practices and policies. In recent developments such as the Russian war on Ukraine, colonialist attitudes in politics and culture are obviously not located in a topographic sense in »the West«.

the everyday lives of many people.[6] Therefore, cultural discrimination is not only an active hazard but also a subversive everyday experience and societal practice. Hence discriminating significations do not only mean disrespectful behavior on the part of the »discriminators« and offended self-esteem among those who are culturally othered. In addition, discriminating significations occur systematically in many everyday situations and fields – including that of education.

How these discriminations occur in the »new normal«[7] field of digitalization after »the COVID-19 pandemic and the resulting suspension of face-to-face activities in schools and universities across the world« (Willat & Flores, 2022, p. 22), will be explained in the following paragraph.

3. Digitality

The term digitality marks a cultural shift and expresses an essential social and subjective signifier relating to recent changes in societal structures. This term will be defined here and used to reflect on culturalized addressing as a specific phenomenon in education.

3.1 Digitalization and Digitality

The term »digitalization« describes the process of transferring an analogical medium into a digital one, like scanning a book and transforming it into an e-book (Stalder, 2021, p. 3). This is a change not only in the presentational nature of the medium (from physical to electronic presence) but also in its quality, usage, and educational consequences: »Other notions characterize Digitality: non-linearity; associative links; parallelism and simultaneity; feedback that merges cause and effect; a thing can be in multiple places at once; each position is always context- and time-dependent, etc.« (Stalder, 2021, p. 4; transl. A.B.) As a consequence, digitalization changes the social appearance of individuals and their knowledge, the opportunities for interaction among participants, and the given medium. Digitalization also opens up various possibilities for connecting, monitoring processes by using their inherent data in time and

6 One might refer here to the German use of the term »migration background,« a signifier that marginalizes many people by addressing them as the »others«.

7 For this term see Bolaji's article in this volume.

tracking activities. Thus, compared to physical, analogical media, a very different environment emerges, and very different opportunities and threats in learning and education occur.

This emergence of digitality as a dominant cultural constellation occurred in Germany around the year 2000 (Stalder, 2016, p. 11). It changed the everyday life of individuals (Hauck-Thum & Noller, 2021, p. V) and the possibilities of interaction and labor (Böhmer, 2016).[8]

Through these developments, the need for a new literacy has arisen to enable those involved to become competent citizens of the digitalized world, and to deal with its transformed infrastructure and its educational challenges. These challenges occur from the technical quality of digital media and the new possibilities of presentation, interaction, and evaluation by digitality. Competencies are therefore needed in technical application, methodical usage, understanding of the changing relation between transparency and opacity of behavior, as well as a mindset of usage and acritical attitude regarding digital tools, the settings they offer, and the individual's position in those settings.

Keeping these conceptualizations in mind, we can define *digitality as a paradigm that represents any given thing in a digital form*. More exactly, digitality transfers material and immaterial elements into binary codes, represented in electronic data. Digitality transforms presenting, relating to, interacting with, and the (critical) analyzing of the given elements, such as media, data, or communication, and thus creates a new kind of reality. This has various consequences for learning, education, teaching methodology, and social as well as cultural processes. Digital media, therefore, are never neutral instruments (Krommer, 2021, pp. 57f.), but constitute elements and platforms of a specific environment that challenge learning, and also shape its particular forms and outcomes. Thus, a sense is created (cf. 2.2), but again, in a different form from that conditioned by a non-digital environment (Bettinger, 2022, pp. 9).

Three aspects of digital culture are mentioned regularly in discussions about it: referentiality, communality, and algorithmicity (Stalder, 2021, pp. 5ff.). These terms relate to reference selection, the creation of a common worldview, and algorithmic sorting of perceivables. To these factors, a fourth should be added: mediality. The latter is connected with the other three because mediation is always necessary in order to bridge physical and digital realities. Indeed, not every medium is digital, but every digital presentation needs a »bridge of meaning« into the experienced physical world to function

8 This is one of the main goals in the projects this paper refers to; cf. note 1.

there. For example, the digitalized image of physical structures in a navigator's map needs to be transferred into the physical perspective of a driver, so that the user can be led to a targeted destination. The image needs to be »translated« into potential bodily experiences; digitality is related to the *carnal materialization of human existence.*[9] Hence digitality as a core element of modern »Western« culture is associated with the embodiment of the users and their environment; this is an aspect that will require reflection later in more detail.

The temporal aspect of digitality in learning environments should not be overlooked. It is not only the evolution from content management systems (CMS) via learning management systems (LMS) to learning content management systems (LCMS) that has opened the doors for private companies and changed the field of education in recent years (Espejo Villar et al., 2021, p. 114). The COVID-19 pandemic has been a further agency of radical change: »we are witness to a process of ›commercialisation and privatisation of public education through edtech during the emergency of global school closures and home-based learning‹« (ibid., p. 115; citing Williamson & Hogan). Thus, the digitality of learning environments is not only a question of media, infrastructure, and selection processes for the individual. Digitality is also about educational governance that determines a culture of »supply and demand«, and also shapes the possible supply and the experienced demand that are now more intensely pushing in the direction of market-targeted »educational products.« The demand thus arises that »public administrations, as leading agents in a desired democratic educational governance focused on the common good, must assume debates and regulate and control access by these private political agents to the digital education stage.« (Espejo Villar et al., 2021, p. 121)

On the one hand, this intervention seems to be all the more important, as a specific »learning outcome« might be affected by a growing economic perspective in the market-driven educational field: the threat of a curtailment of educational creativity if learning does not relate to creative learning outcomes but only to innovations that are useful for economic markets. On the other hand, with its »massive connectivity and the creation of virtual environments

9 Regarding the »incarnation« of experience in general in Merleau-Ponty (1968). In contrast to his conception of *incarnation*, I here use the term *carnal materialization* to make clear that no mind, perception, imagination, or anything else mental moves *into* the flesh of the body, but that this perception *is* the body itself, and that is the sum total of the material »world« (cf. for further details paragraph 3.1).

with new possibilities for learning« (Henriksen et al., 2021, p. 2093), digitality opens up many opportunities to create new learning results, environments, and also new triggers and instigating stimuli because of its multi-perspective and non-linear, associative links (see above).[10] Therefore, new combinations or findings might occur in digitalized learning settings that allow more creativity. But if learning outcomes are only measured in terms of economic data and profitability, new outcomes beyond and outside the interests of the economic sector might be neglected, thwarted, or blocked completely. The reason for this is that »there are no clear-cut guidelines about how to recognize creativity or assess its worth, or even to determine who are the appropriate gate-keepers for its evaluation, or what evaluative measures to use.« (Henriksen et al., 2021, p. 2103) But as this »transformation« of creativity into economic assets has not been fully studied or finally researched, it could become a task for critical educational theory to reassert the importance of creativity and (not only economically assessable) innovation in general, and in digitalized learning environments in particular. Here again, it becomes evident that digitality in learning environments and its methods are neither neutral nor instrumental, but in a certain way, political and critical.

This insight leads to the last aspect of digitality to be discussed: the relevance of embodiment in a digital environment. Many studies refer to »body gestures, movements and learning« (Xu et al., 2022, p. 1), »based not so much on symbols and their manipulation, but on perceptual processes and the actions afforded in learning environments« (Johnson-Glenberg et al., 2016, p. 3; see also Georgiou & Ioannou, 2019; Ioannou & Ioannou, 2020). Digitality and the embodiment of learners therefore are interconnected, and the significance of the digital environment for embodied learning is thus not only an addition to educational practices, but shapes and changes it profoundly. However, the virtuality of the body in digital learning environments and the consequences for learning and teaching are seldom in focus (see exceptions in Brinkmann et al., 2019; to some extent also: Pischetola & Dirckinck-Holmfeld, 2021). This will be examined here in more detail.

The reason for this change in educational practices is the relatedness of digitality and the ways of everyday living as well as the results of digital forms of research (Choi & Chun, 2022, pp. 36f.). Especially those platforms using Augmented Reality offer »embodied experiences shared among users that allow them to imagine and relive the spatiotemporal depths […] by actively dwelling

10 For the conceptualization of responsive virtuality, cf. footnote 2.

and participating in them« (Choi & Chun, 2022, p. 49). The authors reflect on an example of a historic city and state on which the digital learning platform offers learning material that marks the use of embodied experiences *in* digital learning environments. The above-mentioned navigator's map was another example of connecting digital and physical spaces. Both show that a dichotomy of the physical vs. the digital environment is not plausible, either for navigating bodily relevant structures such as streets, or for the pertinent digital data such as augmented reality. In both cases, the connection between the digital and bodily environment is evident. This leads to the following consideration: digital environments are given in a virtual sense, but bring bodily consequences into the learning process. This is in many ways similar to any physically perceived environment.

Virtuality, however, needs further conceptualization. As classical concepts often follow a dichotomous perspective that distinguishes between bodily and virtual experiences, some recent philosophical approaches point up the entanglement of corporeality and virtuality (Willat & Flores, 2022; but cf. already Merleau-Ponty, 2002, published in 1945). Here, digitality is only »one of the possible modes of the virtual« (Willat & Flores, 2022, p. 34); others, such as olfactory or acoustic, are also possible. Hence, »we should not allow the digital to be the only expression of virtuality that we can experience.« (Ibid.)

Assuming that there is no actual dichotomy between embodied and virtual experiences, but a connection in their *objective* relation to the everyday life of the individual (with its physical and virtual reality) and also in their *subjective* relation to the perception of the individual, learning cannot only be comprehended as a process within the individual and influenced by the environment. Learning within the perspective of interrelated embodied and virtual experiences is in accordance with the structure of the individual, who is embedded within the particular environment and in permanent exchange with it.

In illustration of this position, a statement by Merleau-Ponty might convey further insight: »Truth does not inhabit only the inner man, or more accurately, there is no inner man, man is in the world, and only in the world does he know himself.« (Merleau-Ponty, 2002, p. xii)[11] As this author claims perception and the perceiving subject within its world, this paper follows so far – and marks the relevance of the bodily experience of the subject in its world. Merleau-Ponty defines the embodied presence in the world as follows: »we are – as bodies – fully ›intertwined‹ with the materiality of the world and of others«

11 The same certainly applies to every further gender group.

(Vlieghe, 2019, p. 61). Hence, for Merleau-Ponty, the human body and its surrounding world are interwoven and the relationship between them is indissoluble.

This register of perception is not only a physical one (as it is physically given). It can also be a virtual one, as it also operates with the variations of virtuality:

> »For example, the sense of sight is stimulated when we see a cup of coffee on our desk. If we pick up the cup and drink the coffee, other senses such as touch, smell and taste are also stimulated. However, tactile, olfactory or gustatory experiences are not exhausted in what we are actually touching, smelling or tasting, in some way like regular coffee drinkers can already ›touch‹, ›smell‹ or even ›taste‹ the cup of coffee with their gaze and feel the tension it produces in their body, especially when they are sleepy and thirsty. In this case, just looking at the cup arouses virtual movements towards it that may or may not be actualized in concrete actions.« (Willat & Flores, 2022, p. 28)

Thus, virtuality is a bodily function that forms perception itself, and through this also understanding and learning. Virtuality is not opposed to bodily reality but is a part of it. In this view, digitality is not an outcome of technical devices alone, or in the first instance (ibid., p. 22). Rather, it is also a bodily possibility and a form of reality that marks the importance of the bodily presence of the individual, especially when learning in a digital environment: »the experience of the virtual is inherently embodied and fully real« (ibid., p. 23). Following Merleau-Ponty (2002) and the interpretation of Willat & Flores (2022), I argue that the body is a source of »virtuality« in itself and, through this, the co-actor of non-bodily virtuality as given in digital environments. This perspective seems convincing because digital data need to be responded to by the »carnal« individual with the ability to activate virtual practices and de-code virtual elements encountered in the media environment. It is a quality of the body to connect to the environment (called »world« by Merleau-Ponty) and the virtual due to its own »virtuality« and the ability to decode digitality. In other words, different sensory perceptions can be experienced by a single person as interacting with the social or physical environment, e.g. an image activates a particular smell or a theoretical conversation, for instance, in school classes or at university, or stimulates certain other bodily perceptions, further sensations, and

answers resulting from them.[12] This means: The »new normal« is not the hybridity of virtual learning – this has been given as long as learning has been a bodily practice – but the digitality of learning as an embodied experience of the single person, embedded into their (learning) environment.

This leads to specific forms of identities. They become more dynamic (Bernal-Guerrero, 2021, p. 15) as the environment they relate to is also dynamic, especially regarding social media (Alonso-Sainz, 2021, p. 54). This »is completely related to the need for otherness that all human beings have to build our identity« (ibid., p. 58). In this view, learning environments are structurally not only cultural but also social. Moreover, as the technological aspects of the digital learning environments develop from the particular cultural settings (Möller et al., 2021, p. 135), they implement these cultural norms and practices – and with them, the social order of the given habitus as embodied culture (Bourdieu, 1984) as well.

To summarize, the aspects reflected in this sub-paragraph can be seen as this: digitality has been a part of Western societies for many years. But it seems that it has not been correctly understood in its bodily aspects, as the body also creates virtuality, and the body's virtuality corresponds with the digitality in the media-technological environment. Hence, to better understand what digitality in learning environments means, one has to reflect on the cultural and social aspects of the embodied individuals taking part, together with the technological elements that import cultural and social norms. Thus, the outcome of digital learning is not only »situated knowledge« (following Haraway, 1988) but also »situated identity«, as far as an embodiment of knowledge and social structure are involved. This can be conceptualized as the »digitalized subjectivation« that occurs in digital learning environments.

3.2 Culture in a Digital Environment

After these more extended reflections on digitality and its cultural characteristics of embodiment, it should have become evident that culture is a concept

12 It also seems relevant to note: »it is necessary to examine the spatial-temporal differences that emerge from the media in which corporeal virtuality unfolds. From an analytical point of view, a fundamental difference is to be found between embodied and virtual presence. Whereas the body as an actual physical presence can be here *or* there, the virtual body can be here *and* there.« (Willat & Flores, 2022, p. 32).

of practice, and through this a concept of signification. Culture provides categories describing positions in the field that one can call identities. Culture furthermore provides patterns of interpretation for individuals, groups, and environments. Culture also structures social life and learning contexts. Keeping all this in mind, we can see culture as an instrument of power, subjectivation, positioning, and marginalization in all societies, although particularly in Western ones, especially when it comes to cultural embodiment. Through this, culture is a core path of othering – also in learning environments, as they are social fields for the performance and assessment of embodied learning.

Regarding virtuality, bodily and digital experiences now come into view and show the connection between virtual, digital, social, and cultural aspects. These are not the same. Nevertheless, they interconnect with each other in several ways. This means that neither digital nor virtual media or technical devices are »pure« and neutral. They are always embedded in the given structures and fields, transporting norms, affiliations, positionings, and power endowments.

This is relevant not only for cultural and social relations in general but also for cultural aspects of teaching (cf. paragraph 2.2) and especially for digital teaching, as recent developments during the pandemic have shown (cf. paragraph 3.1).

Some examples will serve to explain this intersection of cultural and social scenarios in digital learning: digital learning environments, for example, provide opportunities to track students' behavior. In a research project on university student-to-student interaction within online learning platforms (Wut et al., 2022), a certain group of students was reluctant to use a discussion forum in Moodle. »They preferred to discuss among their peer group so that they would not lose their ›face.‹ Keeping face is a very important consideration in Chinese people's culture.« (Ibid., p. 8) If there had been reference to »the« culture of »the« Chinese people this would have merited separate discussion in its own right, but it is evident that the cultural practice relevant in this specific course led to specific responses in behavior and thus in learning practices.

But it is not only a question of social practices following a certain cultural normativity. Also, the conditions facilitating digital infrastructure contribute to the formation of the social-cultural intersection of learning practices (ibid., p. 11). »Social influence«, this study found, »is one of the mediators between the Facilitating Conditions and the student-to-student interaction behavior of online learning platforms« (ibid.). Following the paragraph above, this finding explains the specific concept of social behavior in a culturally defined field – and therefore, all three aspects of digital learning need to be kept in mind: social

norms, cultural practices, and digital facilities that arrange these practices in allowing or preventing culturally formed social interactions of the students in their bodily performance in the digital environment.

Consequently, digital environments are not only »learning ecologies […] as decentralized self-learning environments which follow varying curatorial principles and agencies involving human and machine entities.« (Möller et al., 2021, p. 132) They also bring about a social-cultural intersection with learning and form it in a particular way. Here again, »situated knowledges« (Haraway, 1988) occur – now not only as epistemological entities but also as social and cultural practices that belong to the given time and place.

To sum up this paragraph: Digitality is a concept of social and cultural practices that opens up different options for learning, interacting, and practicing social relations while generating identities, knowledges, belongings, and exclusions. These generated concepts all relate – in different ways – to the embodied experiences of the learners, also in digital environments. Digital learning platforms thus instantiate the socializing process of individuals learning in a specific environment and lead to culturally structured fields of power. Such aspects of embodiment occur here continually. Therefore, learning in digital environments is not only a question of techniques and methods but, more important, of embodied, social, and cultural identities as well as of the struggle for equity and equality.

Insofar culturality, learning, and social meaning are realized in digital teaching in terms of significations. These significations occur within the particular field, platform, and normativity that refer to the bodies and minds of the learners altogether. What this means will be explained in the next paragraph.

4. Learning as Creation of Social Meaning

So far, it should have become clear that virtuality, digitality, and embodiment interrelate in various forms and thus affect the learning processes in digital environments. Although the question of embodied learning in digital environments has been discussed in several ways, the question of the body as a digital signifier in virtual learning environments needs to be given more attention to calibrate teaching in digital environments. Here, the body is not only understood as an instrument for developing the learner's mind (cf. paragraph 3.1) or a carrier of environmental elements (Medina & Stahl, 2021, p. 206), but as part

of the learning environment itself. Following Merleau-Ponty (2002), I emphasize that the body is not distanced from the learning environment or even the opposite of it, but constitutes the learning field together with the social partners and the environment (cf. again paragraph 3.1).

> »All the elements of an environment—student, teacher, interactions, technical objects, climate, place, historical moment, emotions, brain, body, disciplines, events, society, community, relationships, connections—are part of a complex network that characterizes the unique context for learning« (Pischetola & Dirckinck-Holmfeld, 2021, p. 199).

Although the latter authors still espouse the juxtaposition of body and environment by constructing a dichotomy of subject and world (cf. ibid.), they can be agreed with because they list the elements that affect learning – and thus do so also for digital environments. As mentioned above (cf. paragraph 1), learning means signification, understanding, and identification. Signification creates meaning in particular situations and specific cultural and social circumstances that also occur in digital learning environments. Here, signification and decoding happen in a virtual space that differs from the physical in that it is non-linear, associative, parallel, simultaneous, multiply located, and dependent on the context (cf. paragraph 3.1). Thus, new qualities of signification occur. This has consequences for learning as a socio-semiotic concept – for the process and the relation to the content – and needs to be taken account of in the teaching arrangements, for instance in the learning environment. Particularly the body of the learners in their environment is essential (as shown above) as it impacts perception, subjectivation, and (sometimes critical) positioning – not only as physically given but also by emotions, reflections, locomotion, etc. Even more important, perhaps, the body of the learner becomes a digitalized image that shapes the learning process in terms of social differences and cultural discrimination. This has various consequences for the digital teaching of embodied learners, as will be explained immediately.

4.1 The Social Meaning of the Subjectivated Bodies

As shown in the introduction (cf. paragraph 1), signification is meaning-making in addressing, positioning, and subjectivizing individuals and groups. When such signification occurs in digital environments, the specific conditions of the latter need to be considered. The bodily performance is *multi-*

perspective, as it might be seen from various camera angles. However, it is only *two-dimensional* on the screen. It is associated with random individuals in a learning setting and is *parallelized* with all who participate in this digital meeting. It can occur *simultaneously* with that of others (when in synchronous sessions), or *separated* from that of many or even all others (when in asynchronous sessions). This bodily performance can be seen *wherever* learning devices are used. Finally, this bodily performance appears in different ways depending on the given *environmental context*, especially when an avatar is used. But the most relevant aspect this paper intends to bring to the fore is that the embodiment of learning takes place as *part of the environment*, not in opposition to it. This means that a learning environment depends strongly on the participants who use it; a teacher cannot design it alone, but depends on the – visible, audible, etc. – manner in which the learners perform in the digital setting. It is only with the help of factors like this, that the whole learning environment can be created.

This shows the following with regard to digital learning during the pandemic: the pandemic shifted learning settings, bodily performances (in vivo, in digital environments, etc.), social relations and support, and last but not least, the learning arrangements (presence – hybrid – online – blended – inverted – etc.). But what does embodied learning in digital environments mean when the cultural or social framing changes? If it is true that »there is *no meaning without framing*« (Kress, 2010, p. 10), the cultural or social aspects affect the learning environment beyond its digital programming and applications. Once more, it is evident that embodied and technical aspects of the learning environment intersect.

To give an example from my own digital teaching: It makes a difference whether or not students turn their video on and provide in*sight into* their bodily appearance, their bodily behavior, etc. But it also makes a difference whether the students are welcomed with just a general greeting (»Hi everybody! Welcome to today's lecture …«) or whether they are *hearing* their own individual names so that everybody can feel personally addressed (as could be seen by two of our collaboration partners from abroad when we attended their courses). Hence, the embodied performance, with its bodily addressing, shapes the atmosphere of collaboration and the learning process in the digital environment right from the beginning.

To summarize these suggestions: Ever since the period of the COVID pandemic, the culture of learning has been changing, with perhaps the most significant changes actually taking place during the pandemic period itself.

Not simply the culture, but also the social structure of learning has been profoundly affected. Both factors are related to the learners, their embodied presence in the digital learning environment, and through this their »learning mode«. Learning as embodied reality has changed its settings and thus its culture; therefore the social responses to these changes are also of importance.

4.2 Mind the Social Gap

This leads to the next and final reflection, which focuses on social gaps for learners, especially in digital learning environments. Although one might think that these environments offer everyone the same learning opportunities and potential educational outcomes, various studies show huge differences between the learners, depending on their social status.

Very generally, it is claimed: »There is ample evidence that the pandemic has widened social gaps in societies. Students with restricted housing conditions, limited internet access and poor digital equipment have been impaired by the pandemic more drastically.« (Kerres & Buchner, 2022, p. 4) Recent research on adolescent Germans shows that digital learning during the pandemic troubled many but in different phases of the pandemic and with varying intensities (Andresen et al., 2022, pp. 9ff.). More specifically, these young people most often missed contact with professional counselors (22.9%), emotional support from their families (16.5%), and a person of trust (13.4%) (ibid., p. 11). Those from poorer families feel more depressed (ibid., p. 16). These and many more findings show how social status and social recognition affect the emotional situation of young people and demonstrate how necessary it is for them to be able to participate – in everyday life and learning environments.

On the other hand, digital learning following the pandemic is in academic fields still controversial. As some universities celebrate the »new normal,« others want a »return to normal«. However, neither side is consolidated yet (Kerres & Buchner, 2022, p. 5). The same attitudes can be found among students: »At universities, students might have changed their routines, some have moved their domicile farther away or have picked up a job not easily compatible with fixed appointments in a lecture hall.« (Ibid.). Social gaps also lead to different expectations for the education system and its learning environments. But through this social difference, cultural divergence is also growing: »it becomes all the more important to take digitalization and digital phenomena in educational contexts seriously as structural components in culture, as (not so) new

cultural techniques.« (Möller et al., 2021, p. 136) Here, education is both a social challenge and a source of cultural transformation.

Finally, the social and cultural differences need to be considered in their institutional, organizational, and individual aspects, so that the effects of these differences regarding students' identities, learning outcomes, and employment opportunities (Brown et al., 2022, p. 5) can be taken account of. The issue of embodiment for digital teaching in learning environments, therefore, is a multi-layered challenge. It is a challenge of meaning for the individual and their learning processes, issues, and outcomes. It is a challenge for teachers to conceptualize a learning environment that is not only set up for rather different learners but also one constructed together with them and upon their differences. Also, it is a challenge for educational theory and its general reflection on social, cultural, and subjectivated differences that affect the learning processes and, at the same time, change the »world« – to use Merleau-Ponty's term for describing environmental structures the individual is intertwined with. This all means that different meanings occur in situated learning and teaching settings – and create different meanings as a consequence.

4.3 From Social Meaning to Embodied Sense?

This paper has made a very long journey – from questions on socio-semiotic signification (1) via cultural reflection on Western hegemony (2) to digitality as an issue of embodiment to the layers of meaning in digital learning concepts (3). Following Mason's (2014) approach to meaning- and sense-making for understanding basic information or complex contents, we might here ask as to whether the meaning of the digital environments leads to an understanding of »an activity conceived […] as recognizing and postulating connections or relationships between data and frame« (ibid., p. 209). Bearing in mind the relevance of social and cultural categories and their importance for the signification of embodied identities, it seems plausible that the creation of sense in the digital environment is essential. But the data of a single stage in the learning progression (such as activities on the platform, submission of assignments, etc.) cannot fully explain the progress in learning and the quality of education a learner experiences. Furthermore, the connection between these data and the contextual frame (of the learner, the teacher, the organization, the socio-cultural field, etc.) needs to be considered to better understand the intertwined conception of the embodied learner and the whole framework around them.

In a digital environment, the body is not transparent or even ever the same object that learning refers to. The body is rather both a visible *and* opaque element of the individual and their learning process. This is not only for the physical data concerning the material body but is also the case for the embodied self of the learner as seen by themselves and others, and despite the fact that the learner is still unable to understand every single motion of their bodily presence. Therefore not only the *embodied constitution of the individual* is opaque, but actually also the *individual themselves*.

The core aspect of learning cannot be understood in its completeness and thus may lead to a different form of sense-making. The sense of learning of the opaque individual then is not a finalized concept of instruction and assessment. This version of *opaque learning* is the unforeseeable, situated, and tentative process of understanding the digital field as defined by the reflection of the self that is expressed by the body and, at the same time, challenged by it. So the question remains: are those *digital bodies, learning and teaching*, ever so clear and distinct that their meanings become accessible?

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