The inclusive signification of work experience in the era of the fourth industrial revolution

*Fabrizio d'Aniello**

Abstract

New technologies applied to work (digital, A.I., smart machines, robots) are rapidly revolutionising the way work is produced and organised. This transformation seems to open up new spaces for human initiative, especially within a collaborative dimension (with the machines themselves and intersubjectively). Work pedagogy is called upon to face the challenge of the change taking place, promoting the conditions of educability of human potential and the centrality of the value of the person. This article, in particular, focuses on the opportunity to support the competence to act together, ethically based on mutual recognition, in order to achieve an inclusive and responsible signification of the work experience, capable of satisfying instances of meaning and fulfilment without precluding benefits for companies.

Key words: pedagogy of work; fourth industrial revolution; competence to act together; inclusive signification; mutual recognition.

1. Introduction: the new work between humanisation and techno-economic reductionism

Digital, artificial intelligence, smart machines. The new technologies applied to work are rapidly revolutionising the way work is produced and organised. The paradigm of the human as the machine's appendage (Fordism), or as its simple overseer («computerised neo-Taylorism», Bonazzi, 1997, p. 188), is being replaced by that of human-machine collaboration. And this

---

* University of Macerata, Department of Education, Cultural Heritage and Tourism. E-mail: fabrizio.daniello@unimc.it.

«opens up [...] new spaces for human initiative». Indeed, if machines, in addition to considerably reducing fatigue, «have less need to be anchored to rigid, predetermined behaviours, the purposes, i.e. humans, are also freed» (Rullani and Rullani, 2018, p. 23). This assertion would seems to leave no doubt, but the change that is taking place is still a challenge to be addressed, rather than a definitively liberating reality.

It is true that the premises and promises of liberation are there. For example, compared to the immaterial post-Fordism of the knowledge economy, greater design and operationally proactive «freedom and autonomy» are on the horizon in this collaboration. Provided, however, that they are understood as a «*social* fact and internalisation of the need to respect rules (in the definition of which one must be asked to participate)» actively and that there is a «*sharing* of the enterprise's values, culture and productive goals». Greater «creativity» is on the horizon. Provided, however, that it is also authentically shared within a «social and collective dimension» that fosters the «habit of [mutual] recognition» (especially when the work has a high rate of human interaction). And greater «responsibility» is on the horizon. Provided, however, that it is «immediately social» (Mari, 2019, pp. 120-122), and therefore that the entrepreneurial mentality related to it does not fall into a mere responsibility to competitively capitalise oneself for others' use (Foucault, 2005).

In short, the premises and promises are there, but we must not forget the risk of an instrumental techno-economic reductionism, which is capable of marginalising ethical issues, disregarding the protagonism of people at work and thwarting the possibilities of their realisation through work. As Malavasi (2019, p. 128) warns in the face of stereotyped and prematurely exalted narratives, «the primacy and supremacy of the human cannot be confused or exchanged "with the magnificent and progressive fate" of economic growth».

Therefore, the challenge to be addressed assigns a crucial role to work pedagogy, which is called upon to promote the conditions of educability of human potential in order to affirm the centrality of the value of the person in productive contexts. Specifically, drawing on Mari's (2019, p. 124) considerations on the absolute relevance of the «sociality» factor within the new configuration of work, the focus of this contribution will be on the promotion of an inclusive signification of work experience.

2. Formativity in action

Going into detail, work in today's smart factories and, more broadly, in digital and robotic ecosystems is a work densely populated by the acronym V.U.C.A., as are, moreover, the economic system in general and the entire

world system, characterised by globalisation and digital interconnection. It follows that actions that are ineluctably non-linear, insofar as they are connected with volatility, uncertainty, complexity and ambiguity, are associated with feedbacks of various origins that are equally unpredictable and retrain action.

Furthermore, remodelling and corrective inputs continuously emerge from the algorithmic operations of selection/recombination of options generated by the AI, and continuously retroact on the choices/actions of the worker (Floridi and Cabitza, 2021).

The latter therefore finds him/herself in a situation of indeterminacy that requires an adaptive and creative recursiveness of learning and a rapid deconstruction/reconstruction of situated mental habits (Costa, 2019).

As Rivoltella and Rossi (2019) point out, it should be added that the artefact no longer stands between the human (in production) and the product: the very homeostatic nature of the digital ensures that the interpretation and reworking of the outputs received in the production stages are followed by other feedbacks even after the product has left the company.

Moreover, in this relentless circularity that drives a continuous learning dynamic, further complicated by the interpretation subject to three different «linguistic communities» (human-human, machine-machine and human-machine) (Mari, 2019, p. 62), the co-generation of an ever-evolving knowledge does not only take place at the mental level, whether it is inter-human or human-machine co-generation. It also takes place at the level of bodily experience. Or rather, it takes place on the basis of a constant relationship between perception and action that involves the body in a particular environment, giving rise to a multisensory experience capable of stimulating embodied knowledge. One actually speaks of embodied cognition or enactive learning.

In other words, corporeality should not be underestimated in the interactions between acting subjects and contextual productive reality. It is equally indispensable in knowledge construction processes (Maturana and Varela, 1985, 1992; Varela, Rosch and Thompson, 2024). And enactive learning can improve work activities in terms of physical relationships, receiving feedback, collaborative learning, effective use of technology and cognitive-emotional flexibility. The same is true for interactions with humans, and even more so with robots (and technological tools) (Baldassarre and Mirolli, 2013; Semeraro, Griffiths and Cangelosi, 2023).

The formativity that emerges from this scenario is clear and assumes multi-perspectival morphologies, involving multiple individual potentials and enucleable resources, and is articulated through the co-presence of praxis and *poiesis*, where «praxis refers to action in itself, to intentional and conscious action that leads to a desired result», and «*poiesis* [...] refers to the creative or

productive action traditionally associated with the act of doing something or creating something tangible» (Costa, 2023, p. 60).

However, the availability of various learnings that contribute to solving complex problems and tend towards creative innovation and continuous improvement is not enough to decree true educability, free from functionalising performance logics (Chicchi and Simone, 2017). So, as Costa (2023, pp. 60-61) argues in the wake of Ciappei (2003), it is necessary to insert between praxis and *poiesis* a «*pragma*» imbued with «*metis*» («the virtue that guides action») that harmonises the teleological orientation of praxis and the technical rules of poietic efficiency, composing and ordering them towards a higher purpose that is able to embrace the technological and socio-relational challenges of the work under discussion, going beyond the effectiveness of performance.

In the undersigned's vision, *pragma*, understood as a «practice» that bridges the gap between praxis and *poiesis* and «facilitates [...] the coordination of actions» (Costa, 2023, p. 60), rises to an ethical-educational practice of mutual recognition (recovering the responsible sociality and «the habit of recognition» of Mari, 2019, p. 122) that grounds the competence to act together. A competence aimed at inscribing action within a horizon of human meaning. Thus, leading to an inclusive signification of the work experience, generating inclusive knowledge and growth in humanity that do not exclude positive productive implications. This signification and the resulting knowledge/growth represent the higher purpose from a pedagogical point of view. On the other hand, Costa himself states that *pragma*/*metis* is propaedeutic to indispensable sensemaking.

3. Competence to act together and inclusive signification

According to Sen (2001), agency freedom coincides with the unconditioned power (primarily free by purely economic interference) to influence one's own choices/decisions/actions and serves to achieve goals which one considers meritorious from the resources and means at one's disposal.

Pedagogically interpreting the economist's thought, such resources and means can correspond to personal potentialities and can be extended and enhanced by actively participating/interacting within socio-collaborative frameworks, just as, in the same way, the range of information, knowledge and evaluation that shapes choices and decisions of action can be expanded.

The word "evaluation" has its own importance, because Sen argues that agency freedom should not only remove economic interference, but also selfish outcomes (one's own advantage, one's own well-being, the maximisation of one's own utility, in short) linked to the subjective arbitrariness of

choices/decisions/actions. Since our faculty to act is enriched in the meaningfulness of the encounter/confrontation with others, and since our action falls on others, the merit of the goals and the values that drive action do not refer to self-referential criteria, but depend on the awareness of the interconnectedness of the freedoms at stake, consequently taking into account the careful consideration of priorities, purposes and the very concept of the good (Sen, 2010).

The personal potentialities/actual possibilities (capabilities) that enable action to achieve functionings identifiable with evolutionary states of human development are nurtured in healthy interdependence. Likewise, the meaning and purpose of acting are delineated in respect for the "presence" of the other and healthy interdependence. This is why agency freedom is not detached from «commitment» (Sen, 2001, p. 269) or ethical «obligation» (Sen, 2006, p. 61).

In short, agency freedom is the substantive freedom to develop oneself in the sign of an anthropological prosperity and its exercise in the workplace can become a competence to act together. That is to say, a competence averse to the possible persistence of a productive totalisation of the self that competitively excludes the other from the neoliberalist self-entrepreneurial project of one's own affirmation (Han, 2017). Hence, acting together with conscious mastery of mutual respect/recognition, weaving useful relationships for work that also serves people and their increase in being.

Said otherwise, it is the competence to act for purposes that transcend the strictly technical-professional sphere, co-generating learnings whose educational relevance for growth in humanity is inseparable from the relevance that the relationship with otherness assumes. Indeed, the task of responsibly signifying these learnings and the interaction itself (between people and with machines) takes place in it, producing inclusive knowledge: similarly, Donati (2021, p. 23) calls it «sapiential knowledge».

In order to understand and refine his/her work, the subject is called upon to to engage in the action-reflexivity-action cycle in the situation, to give performative meaning to the complexity in progress. This meaning, in turn, is necessarily shared with the co-agents. The extra step that work pedagogy requires is a collegial reflexivity on the whole action (including its objects, context and established relationships) that is also able to respond ("respons-ability") to the sensory, bodily, emotional-affective, moral, symbolic, value, meta-learning and relational questions that arise from action in relation in a specific environment. Answers that expand learning and the capacity to learn beyond the economic-productive enclosure and include the experience of each person, for the humanisation of each person and of the entire organisation. The result is theoretical-practical and productive-improductive knowledge that is indefinitely integrable: inclusive knowledge.

Ultimately, those educationally meaningful relationships that begin with an ethically connoted cooperation, aimed at making people "more human" through work, are fully realised in the reflexive conversation, unravelling human issues while resolving technical issues related to the processuality of action.

This is the inclusive signification to which the competence to act together leads, transforming the awareness of interdependence into a disinterested, oblatively collaborative and supported by a co-educating responsibility interaction, aimed at restoring a properly human meaning to work.

However, unless the value of interdependence is first perceived by promoting meaningful relationships, such competence cannot occur. And this is where *pragma* comes into play as a practice of mutual recognition, which has to focus eminently on training activities devoted to the ethicality of communication and the emotional dimension.

4. Practice of mutual recognition

It has been said that the theoretical-practical knowledge just described (inclusive knowledge) does not exclude benefits for enterprises. Indeed, it creates a positive climate, personal and organisational well-being, personal and organisational empowerment. Moreover, it is a knowledge that cannot be reproduced by the A.I., because it can only semanticise words, gestures and actions with an imitative, uncritical and non-relational semantics (Donati, 2021).

In this respect, Laneve's thought (1987, pp. 70, 96, 109-110) is still relevant when he observes that the person remains the only «agent of semanticisation» and the «*dynamic centre of signification*», and that before signification there is «*discursive competence*» oriented towards dialectical confrontation with others and, before that, to democratic participation «*with* and *through* others».

Given that a practice of mutual recognition aims to promote the progressive discovery of the common essence, equal human meaningfulness in terms of value and purpose, common instances of fulfilment, imposing itself as the basis of co-educational gift and the construction of a "us" at work, and given that it can flourish with a humanistic approach to management (Minghetti and Cutrano, 2004), for the attention it pays to individual expressiveness, inter-subjectivity and ethical commitment, communication is the first ground of its taking root. We are not referring here to the technical effectiveness of communication, but precisely to the democratic participation that opens up relational potential.

It is therefore a return to the etymology of the term, that is, to make participants, to pool, to share (Broccoli, 2008). It is not by chance that Mari

(2019, p. 62) speaks of a «*complex communication*» (from the Latin *complector*: I comprehend, I embrace) necessary to the work of the fourth industrial revolution, invoking an applied ethics that allows: to place the aims of capital and labour on the same level and, from there, to participate fully, *inter pares*, in the organisational discourse; to exercise freedom of speech and the right to express one's own point of view; to express one's own way of seeing things and being, welcoming that of others according to a constant tension to recognise each other within a gradually growing relational dimension. Consistently, this freedom can only occur if subjects are placed in a position to clearly understand the languages and information flows of the linguistic communities mentioned above.

Related to the first, the other side that needs to be pursued for a practice of mutual recognition is the emotional side. Not only because «emotions influence our sense of self-efficacy on a daily basis», or because they have gone from being a disruptive element in the past to being «an inspiring force for action», or allow us, if well managed, to become resilient in the face of stressful events. But because emotional training is an essential activator of reciprocity of recognition and «one of the main predictors of success in relationships [...] at work» (Buccolo, 2022, 129, 133-134).

Emotional training allows one to explore and direct the inner traffic with greater mastery, responding to one's own and others' affective states with a deep and wise feeling. It makes empathy possible without losing one's own centre at the expense of emotional fusion and contagion. It feeds an emotional intelligence that leads to the authenticity of the gift relationship.

Getting to know oneself, recognising each other and feeling together are the key words of an affective competence as a means of an «individual and organisational adult relationality», where conviviality is affirmed over solitude and «hierarchical differences are replaced by equal differences, vertical solutions give way to shared solutions, individualism is expelled in favour of communicative solidarity» (Rossi, 2012, p. 155).

We believe that these two dimensions (communicative and emotional), characterised by the virtue of ontological openness and dedicated to reducing contextual heterodetermination, can best coordinate and direct praxis and *poiesis* towards inclusive signification, extending the circumscribed purposes of the former and giving a human face to the rules of the latter.

Finally, we believe that the primary task of the pedagogue in the company or of pedagogical knowledge in the company, apart from facilitating reflexive conversation, is to prepare these practices of mutual recognition. In particular, relying on playful, recreational, socio-educational animation activities (and not formal training) that fluidise the dynamics of communication, support its ethical and democratic configuration and strengthen emotional understanding,

transforming work into a microcosm of care for the benefit of people themselves, work motivation and organisational maturity.

On the other hand, with regard to the process of signification, we refer to the Schön's (2006) *artistry* of reflection: to the adoption of alternative viewpoints that make use of artistic intelligence; to the use of metaphor and imagination for the synergistic encounter between dialogical confrontation and consensual reflection (Mezirow, 2003); and to the first two phases (analysing and questioning) of Engeström's (2004) expansive learning cycle.

5. Concluding remarks

To close the circle, the premises and promises of the liberation of human potential also require pedagogical reflection and intervention in order to be successful and fulfilled. What has been presented does not claim to be exhaustive with regard to the topic under discussion and cannot be a decisive contribution to the stated purpose. It does, however, propose useful considerations for the implementation of a co-educating sociality in which a non-reductive conception of humanity can find space at work, revising above all the concepts of freedom and responsibility to stem the anthropophagic demands of functionalist rationalities.

Throughout its centuries-long history, pedagogy has always considered work as an opportunity for educational and training relationships, in which the human beings can further manifest their ontological qualities and realise themselves in their wholeness. Today, after the lean and immaterial post-Fordism, the relational factor is regaining importance. But it has to be taken care of. Pedagogically, but not only. Especially when technological progress is truly overwhelming.

All this to reiterate an obvious but often ignored point: work is (still) an expression of people, so it should honour them.

References

Baldassarre G. and Mirolli M. (Eds.). (2013). *Computational and robotic models of the hierarchical organization of behavior*. Springer-Verlag: Berlin Heidelberg.

Bonazzi G. (1997). *Storia del pensiero organizzativo*. Milan: FrancoAngeli.

Broccoli A. (2008). *Educazione e comunicazione*. Brescia: La Scuola.

Buccolo M. (2022). Resilienza, agilità emotiva e lavoro ibrido: nuovi scenari nella formazione nelle organizzazioni. In: Galimberti A. e Muschitiello A., Eds., *Pedagogia e lavoro: le sfide tecnologiche*. Fano: Aras.

Ciappei C. (2003). *Il governo imprenditoriale. La governance politica di impresa. Consenso, identità, interessi e potere nel governo imprenditoriale* (Vol. 2/1). Florence: Firenze University Press.

Chicchi F. and Simone A. (2017). *La società della prestazione*. Rome: Ediesse.

Costa M. (2019). *Formatività e lavoro nella società delle macchine intelligenti. Il talento tra robot, I.A. ed ecosistemi digitali del lavoro*. Milan: FrancoAngeli.

Costa M. (2023). *Formazione e lavoro negli ecosistemi digitali, robotici e delle macchine intelligenti*. Lecce: Pensa MultiMedia.

Donati P. (2021). L'unità del sapere: la conoscenza come bene comune relazionale. In: Donati P., Alici L. e Gabrielli G., *Beni relazionali. La conoscenza che accomuna*. Milan: FrancoAngeli.

Engeström Y. (2004). The new generation of expertise: seven theses. In: Rainbird H., Fuller A. e Munro A., Eds., *Workplace learning in context*. London-New York: Routledge.

Floridi L. and Cabitza F. (2021). *Intelligenza Artificiale. L'uso delle nuove macchine*. Milan: Bompiani.

Foucault M. (2005). *Nascita della biopolitica. Corso al Collège de France (1978-1979)*. Milan: Feltrinelli.

Han B.-C. (2017). *L'espulsione dell'altro*. Milan: Nottetempo.

Laneve C. (1987). *Lingua e persona*. Brescia: La Scuola.

Malavasi P. (2019). *Educare Robot? Pedagogia dell'intelligenza artificiale*. Milan: Vita e Pensiero.

Mari G. (2019). *Libertà nel lavoro. La sfida della rivoluzione digitale*. Bologna: il Mulino.

Maturana H.R. and Varela F.J. (1985). *Autopoiesi e cognizione. La realizzazione del vivente*. Venice: Marsilio.

Maturana H.R. and Varela F.J. (1992). *Macchine ed esseri viventi. L'autopoiesi e l'organizzazione biologica*. Rome: Astrolabio.

Mezirow J. (2003). *Apprendimento e trasformazione. Il significato dell'esperienza e il valore della riflessione nell'apprendimento degli adulti*. Milan: Raffaello Cortina.

Minghetti M. and Cutrano F., Eds. (2004). *Le nuove frontiere della cultura d'impresa. Manifesto dello humanistic management*. Milan: Etas.

Rivoltella P.C. and Rossi P.G. (2019). *Il corpo e la macchina. Tecnologia, cultura, educazione*. Brescia: Scholé.

Rossi B. (2012). *Il lavoro felice. Formazione e benessere organizzativo*. Brescia: La Scuola.

Rullani F. and Rullani E. (2018). *Dentro la rivoluzione digitale. Per una nuova cultura dell'impresa e del magement*. Turin: Giappichelli.

Schön D.A. (2006). *Formare il professionista riflessivo. Per una nuova prospettiva della formazione e dell'apprendimento nelle professioni*. Milan: FrancoAngeli.

Semeraro F., Griffiths A. and Cangelosi A. (2023). Human–robot collaboration and machine learning: A systematic review of recent research. *Robotics and Computer-Integrated Manufacturing,* 79. -- Testo disponibile al sito: https://www.sciencedirect.com/science/article/pii/S0736584522001156 (10/03/2025).

Sen A.K. (2001). *Lo sviluppo è libertà. Perché non c'è crescita senza democrazia*. Milan: Oscar Mondadori.
Sen A.K. (2006). *Scelta, benessere, equità*. Bologna: il Mulino.
Sen A.K. (2010). *Etica ed economia*. Rome-Bari: Laterza.
Varela F.J., Rosch E. and Thompson E. (2024). *La mente nel corpo. Scienze cognitive ed esperienza umana*. Rome: Astrolabio.