Opinion Paper

Organizing workers and machine learning tools for a less oppressive workplace

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ABSTRACT

Machine learning tools are increasingly infiltrating everyday work life with implications for workers. By looking at machine learning tools as part of a sociotechnical system, we explore how machine learning tools enforce oppression of workers. We theorize, normatively, that with reorganizing processes in place, oppressive characteristics could be converted to emancipatory characteristics. Drawing on Paulo Freire's critical theory of emancipatory pedagogy, we outline similarities between the characteristics Freire saw in oppressive societies and the characteristics of currently designed partnerships between humans and machine learning tools. Freire's theory offers a way forward in reorganizing humans and machine learning tools in the workplace. Rather than advocating human control or the decoupling of workers and machines, we follow Freire's theory in proposing four processes for emancipatory organizing of human and machine learning partnership: 1) awakening of a critical consciousness, 2) enabling role freedom, 3) instituting incentives and sanctions for accountability, and 4) identifying alternative emancipatory futures. Theoretical and practical implications of this emancipatory organizing theory are drawn.

1. Introduction

The societal challenge of human oppression in the workplace is of concern to managers and researchers worldwide. Though oppression is not new, new technologies such as artificial intelligence [AI] systems have the potential to enforce oppressive dynamics with greater effectiveness, efficiency, and ubiquity than ever before. Yet, information systems scholars offer hope that AI systems may also hold the key to emancipatory outcomes, i.e., "the overcoming of constraints in such a way that individuals may control their own destinies and generally go from a worse to a better state" (Young, Zhu, & Venkatesh, 2021, pp. 6360). Kane, Young, Majchrzak, & Ransbotham (2021) warn that certain features of machine learning [ML], a specific class of AI, systems are inherently oppressive to humans and call on information management researchers and practitioners to develop emancipatory solutions.

One could argue that workers are most emancipated when they are not entangled with technology. Another view is that technology can emancipate workers from undue cognitive and physical constraints. As technologies become more sophisticated and autonomous, both the emancipatory and oppressive potentials grow. On social media where

ML tools are common, oppressive outcomes for users are well documented. Economic and innovation incentives are driving an increased reliance on ML tools beyond social media. Machine learning tools have penetrated everyday work life through virtual scheduling assistants, airplane autopilots, self-driving transport vehicles and financial fraud monitoring systems to name a few.

Ethical concerns raised by the introduction of ML in the workplace have prompted efforts to exert human monitoring and control of ML tools. Though optimists suggest both high levels of human control and high levels of automation can be attained simultaneously (Shneiderman, 2020a), other researchers suggest high levels of control may not be possible as intelligent systems grow increasingly complex (Kane, Young, Majchrzak, & Ransbotham, 2021). When complete control is not possible or not desirable, workers and ML tools may be organized to partner in synergistic ways (Jarrahi, 2018; Wilson & Daugherty, 2018). Though not all applications of ML in the workplace involve human partnership, it is particularly important to organize such partnerships ethically to protect those working closely with ML tools as part of a human-ML partnership [HMLP]. The objective of this research is to describe how, together, humans and ML tools can partner to promote

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and protect worker emancipation while allowing the potential of each partner type to be realized. In this research, we focus on ML tools that are integral to work processes such as stock trading bots, medical treatment recommendation systems, loan approval systems, and GPS-linked systems that draw data from wearable devices.

For guidance on how to achieve gradients of emancipation in a sociotechnical system, we follow prior IS research (Kane et al., 2021; Young, 2018) and use Paulo Freire's critical theory of emancipatory pedagogy. We find similarities between the oppressive societies described by Freire and the power dynamics increasingly documented in workplaces where ML tools are used. We build on Freire's theory of how oppressive societies come into being and what is needed to convert oppression to gradients of emancipation. We theorize how humans and ML tools can organize in partnership for more emancipatory, rather than oppressive, future outcomes. The contributions of this critical theory are normative organizing processes for a new type of work in which HMLPs are less oppressive [referred to as "emancipatory" HMLPs or eHMLPs for short].

The structure of this paper is as follows. First, we discuss ML tools and the future of human-ML organizing in the workplace. We then describe Freire's theory of emancipation and explain how his ideas for promoting emancipation in a social system can be augmented to apply to a sociotechnical system also. Next, we outline four organizing processes for promoting gradients of emancipation in an HMLP. Implications of each organizing process for the study of workers and organizations are discussed.

2. Machine learning tools and the future of work

Kane et al. (2021) theorize that there are four features of ML that make ML tools inherently oppressive. First, ML tools optimize on outcomes for large sample sizes at the expense of individuals. For example, an ML tool that determines which customers experience rolling blackouts during a power shortage may reduce the overall number of households affected without considering the life-supporting medical equipment one household needs to keep an individual alive. Second, input data describe the past, making ML backward facing in a way that limits future possibilities. Third, obscure model weights and parameters make ML tools difficult to understand and complicate informating. Fourth, specialists often train and update ML tools with little feedback from the users working with the ML tool. Based on their theory that dominant designs for ML tools are inherently oppressive, Kane and colleagues warn that the current trajectory of ML adoption is heading toward a future dystopian state that they refer to as Informania, "where ubiquitous data collection feeds ML systems that users do not understand, that lack user feedback, and result in behavioral control of humans" (Kane et al., 2021, pp. 2-3). Extending the concept of Informania to envision a workplace where workers have lost agency and are dominated by ML tools allows us to reflect on how worker-ML organizing can go wrong and what is needed to prevent such a dystopian outcome.

Kane and colleagues use Informania as a foil against which to design an emancipatory assistant technology to engage in adversarial negotiation with an oppressive ML infrastructure. Building on that work, we propose a design for a sociotechnical system – a human-ML partnership in the workplace – that can counter oppressive trends and promote emancipatory outcomes for workers. While modern examples of worker oppression by ML may seem innocuous in today's workplace, it is important to address the potential of widespread worker oppression before it expands on a greater scale. Such an approach which focuses on extreme risks is valuable because extreme risks are best mitigated through foresight and timely response, yet are often unaddressed by market forces (Dafoe, 2018). Thus, for the purposes of this research, we evoke a dystopian future where ML tools shape workers' consciousness, make team and task assignments, surveil and enforce compliance to organizational policies, impugn human dignity, and undercut worker

agency. It is this future we seek to avoid.

Just as there is potential for a dark future, there is the possibility for a brighter future if HMLPs are managed ethically. For instance, individuals can engage in more meaningful and fulfilling tasks when the dull aspects of their work are automated by ML tools (Danaher, 2019). Multiagent competitive gaming platforms use an electricity broker ML tool, in combination with workers, to lower electricity usage (Ketter, Peters, Collins, & Gupta, 2016). We aim to shed light on how outcomes such as these can be promoted. Thus, we argue for a set of sociotechnical processes for countering oppression in HMLPs and develop a new type of theory that we refer to as an emancipatory organizing theory.

3. Critical social theories of emancipation

There is a rich tradition of emancipatory research in the information management field. Researchers have used emancipatory theories to theorize how information communication technology for development projects should be managed (Lin, Kuo, & Myers, 2015; Young, 2018), how information systems shape user cognition and communication (Miranda, Young, & Yetgin, 2016; Ngwenyama, 1991), and how technology can be used to promote social inclusion (George, George, & Moquin, 2021; Lyytinen & Klein et al., 1985; Young & Wigdor, 2021). Research on emancipatory information systems can be classified into four main lineages: Habermas, Bourdieu, Foucault, and Freire (Kane et al., 2021). The Bourdieu lineage focuses on "discriminatory social stratification between the 'haves' and the 'have-nots'" (Myers & Klein, 2011, p. 21). The Foucault lineage describes tools for self-emancipation and explains how to liberate one's mind to recognize power dynamics (Kane et al., 2021). The Habermas lineage is concerned with emancipating individuals such that they are better off in one way or another (Brocklesby & Cummings, 1996). The theories of Habermas and Freire overlap and complement each other in many ways (Morrow & Torres, 2002). Uniquely, Freire's theory of emancipatory pedagogy goes beyond explanatory theorizing to prescribe normative processes for acting out emancipation in the real world. Though each of the four lineages provides important insights into the phenomenon of emancipation, we selected Freire's work as the foundation for this research because it is less abstract and is prescriptive in nature. Similar thought exercises building on alternative perspectives would also be valuable and can use this research as an example for how to apply a critical social theory toward the development of emancipatory organizing theories.

4. Theory of emancipatory pedagogy

According to Freire, oppression occurs when individuals are restricted from developing robust consciousness such that they cannot perceive oppression and therefore cannot process information about oppression or act to address it (Freire, 2005). Though all tools both enable and constrain users in some ways, we adopt Kane et al.'s (2021) view that it is the dose of ML control that determines oppression. If an ML tool limits the information available to a worker in a way that constrains the worker from developing a robust understanding of their work context and the ways they are oppressed, the ML tool has oppressed the worker. Likewise, ML tools can experience something resembling oppression. For instance, if a worker manipulates ML tool outputs by intentionally falsifying input data, the ML tool's "thinking" becomes constrained and distorted. Gradients of emancipation are achieved through the development of more robust ways of thinking. Thus, we build on Freire's (2005) pedagogical theory to envision a better way for workers and ML tools to improve their mental models.

For Freire, emancipation is acted out through emancipatory pedagogy, which he contrasts with traditional pedagogical approaches. He describes traditional pedagogy using a banking metaphor for learning in which there is a powerful actor (the teacher) "depositing" facts or mental models into an oppressed actor as though the oppressed is a "receptacle to be filled" (Freire, 2005, pp. 72). The role of the oppressed

student in this traditional approach is to "receive, memorize, and repeat" (Freire, 2005, pp. 72). Freire theorizes how actors can be freed from constraints on consciousness by learning from one another. Freire's (2005) theory of emancipatory pedagogy reveals four processes for promoting gradients of emancipation; we apply these to the organizing of an HMLP.

Notably, not all options for countering oppression are emancipatory. Freire warns against countering oppression by segregating the oppressed from the oppressor or fighting for a reversal of roles so that the oppressed may dominate and become the oppressor. An emancipatory struggle seeks not to decouple the oppressed and oppressor, but to unite them in synergistic ways. While autonomy may be optimal for some tasks, this theory is designed to address partnerships where the goal is to leverage the capabilities of each partner to promote mutual learning. There are four synergistic processes for promoting robust consciousness as shown in the center column of Table 1: 1) awakening of critical consciousness, 2) enabling role freedom, 3) instituting incentives and sanctions for accountability, and 4) identifying alternative emancipatory futures. Each process converts characteristics of oppressive societies, shown on the left, to emancipatory characteristics, shown on the right.

5. Organizing human-ML partnerships

In the following sections, we describe each of the four processes, the oppressive characteristics being converted, and the result of implementing the emancipatory organizing process. There are reviews of the literature on AI and intelligent automation in the workplace (e.g., Coombs, 2020; Coombs, Hislop, Taneva, & Barnard, 2020; Coombs, Hislop, Taneva, & Barnard, 2020; Duan, Edwards, & Dwivedi, 2019; Dwivedi et al., 2021; Schuetz & Venkatesh, 2020). Our intent here is not to replace those reviews but to build on them to provide examples of how HMLPs can go wrong. Having set the stage for how HMLPs may exhibit the oppressive characteristics, we then explain how the emancipatory organizing processes bring about gradients of emancipation.

6. Organizing process 1: awakening critical consciousness - from biased, constrained thought to data accuracy and robust worldviews

Freire offers a process for converting biased and constrained thought to factual accuracy and robust worldviews. First, we explain this process in the context of human learning. The first step is critical consciousness

Table 1

Emancipatory Pedagogy Organizing Processes for Converting Oppression to Emancipation.

Oppressive Characteristics Needing to be Converted	Organizing Process for Promoting Emancipation	Result of Conversions to Emancipatory Characteristics
Bias Constrained thought	Awakening critical consciousness	Truth exposure Robust worldviews
Stereotype-driven role assignments Strict role adherence Rigid social structures	Enabling role freedom	Individual and collective self-determination Role experimentation Social mobility
Tendency toward oppression	Instituting incentives and sanctions for accountability	Struggle for emancipation
Ambivalence Fear		Ownership of the struggle Empowerment
Stuck in the past or present Reactive to the future that comes	Identifying alternative emancipatory futures	Engagement in future-based scenario-planning Building a desired future

of oppression (Freire, 2005). The oppressed and oppressors are both constrained by their participation in an oppressive society and intertwined in their biases and constraints. As consciousness grows, learners can begin to identify when and how the constraints and biases imposed on each other limit their own thinking. At this point, gradients of emancipation can be achieved if the ability emerges to explore each other's worldviews and to recognize the difference between truth (or facts) and interpretation of the facts. The facts should not vary, but one's interpretation of those facts will reflect each learner's experiences or access to information. Understanding differences in experiences and consequent information asymmetries leads to more robust, multifaceted interpretations. To progress through the stages of consciousness, Freire suggests making the facts visible through storytelling about what each perceives as the facts and their interpretations. As they process the facts provided by the other, they develop more robust consciousness and resolve the problems of bias and constrained thought.

The problems of bias and constrained thought exist in HLMPs today (Shaiken, 1985; Zuboff, 1988, 2019). Human resource officers at Amazon hired primarily men after their recruitment ML taught itself not to recommend candidates with the word "Women" (e.g., Women in IT) on their resumes (BBC, 2018). A similar process led to only white females being selected as nursing candidates (Nelson, 2019). In practice, consultants warn that fairness in predictive policing cannot be achieved solely by addressing data bias in decision making HMLPs, but through "careful consideration of the wider operational, organizational and legal context, as well as the overall decision-making process informed by the analytics" (Babuta & Oswald, 2020, pp. 2). That is, both the human and the ML tool must overcome bias and develop more robust consciousness to achieve eHMLP.

Extending and augmenting broad themes and strategies from Freire's theory to the HMLP context allows us to think about HMLPs in a novel way. Applying an augmented version of Freire's notion of critical consciousness to organizing HMLPs requires significant changes to the way HMLPs are organized today. First, workers must realize how they are constrained by the ML tool, as well as how their actions constrain the ML tool. The worker and ML tool can engage in a version of storytelling by sharing data to reduce information asymmetries about the experiences of and data available to the other. Workers can express the emotions evoked by ML actions to develop consciousness of what ML actions leave them feeling trapped or powerless. An ML tool can prompt the user with surveys to gather data about the worker's experiences. Likewise, workers should be given examples of how data entry failures constrain the ML tool's ability to develop robust models of 'thinking'. The ML tool should be designed to accept inputs from workers that allow it to change, and for the worker to see how it changes. This will allow workers to draw their own conclusions on the nature of their mutual constraint. ML tools should also engage in "storytelling" by informating about real events. The ML tool can informate to explain what data a recommendation or warning is based on and bring relevant events and data to the worker's attention. For example, an ML tool partnering with a cybersecurity expert may alert the worker of a potential cyberattack. If the ML tool simply identifies a potential threat without explaining how the threat was identified, the worker misses the opportunity to learn about warning signs of a potential attack or points of vulnerability. Instead, the ML tool can bring up examples of times when similar red flags were identified and help the worker understand patterns in the outcomes. By drawing on data about past events, the ML tool can help contextualize the worker's understanding.

Organizing an eHMLP requires acknowledgment of the potential for oppression and decisions about how to respond. One option is to ignore the oppression. This will lead to continued oppressive outcomes, e.g., depositing of consciousness into workers as "receptacles". Another option is for workers to gain power in the partnership by circumventing, replacing, or ignoring the oppressive ML tool. This would effectively terminate, rather than emancipate, the partnership, sacrificing the potential gains the partnership promises. Alternatively, an emancipatory

struggle can ensue wherein workers and ML tools share data and learn from multiple perspectives. For workers, this means the ML tool will present data as information. For example, the ML tool can quantify risks and probabilities the worker might not otherwise comprehend. For an ML tool, this learning may involve the introduction of bias-correcting algorithms (Horev, 2019) and should result in the ML tool optimizing on more complex, multifaceted outcome metrics. Emancipation can only be achieved if all types of actors/actants develop critical consciousness and change in response to learning. It is seen in existing HMLPs that workers learn from ML (Kayande, De Bruyn, Lilien, Rangaswamy, & Van Bruggen, 2009). If ML tools cannot learn and change in response to worker insights, nothing comes of the emancipatory process.

7. Organizing process 2: enabling role freedom - from rigid to dynamic role opportunities

Freire (2005) offers a process for converting strict adherence to stereotype-driven roles in rigid social systems to role freedom. He explains how role freedom enables actors to expand their understanding. As actors gain experience and perspective from diverse roles, understanding of the roles, social networks, and processes grows. In traditional pedagogy, there is a rigid structure involving a teacher who leads and a student who follows. Traditional pedagogical approaches eschew role experimentation and promote strict role adherence. In contrast, the teacher and learner roles are fluid and intertwined in emancipatory pedagogy, solving the problem of rigidity.

Rigidity is also a problem in HMLPs. Normative roles for workers and machines have been theorized for decades. Existing theories of human and machine functions (e.g., Fitts, 1951; Salovaara, Lyytinen, & Penttinen, 2019) outline distinct tasks and roles for humans versus machines. Such typologies are outdated in the age of ML. Creating art and composing music were once considered human endeavors, but now generative adversarial network ML tools create popular art and music (Jones, 2017). The benefits of role experimentation may be unexpected. An ML tool may excel at a task previously reserved for humans. Likewise, humans may gain critical process insights and identify business opportunities as they struggle through primarily ML tasks. For instance, natural language ML tools are increasingly used to review bank statements and reports (Alba, 2015). While ML tools typically review the reports, having a human duplicate the task might reveal that the ML tool was interpreting "outstanding" as good in both social and banking contexts, when "outstanding" is bad in a banking context. Such oversights may only be discovered when a worker walks through the role typically filled by the ML tool.

Extending Freire's notion of role freedom to organizing HMLPs suggests several significant changes to the way HMLPs are organized today. In traditional HMLPs, ML tools use data to profile workers according to quantifiable dimensions, e.g., intelligence quotient, conscientiousness score, or education level. These profiles are used to place workers in certain roles and restrict workers from other roles. Workers are rarely informed how the ML tool profiles them. To promote role freedom, there must be a process through which workers and ML tools can experiment with different roles over time. The benefits of ML profiles will be optimized when workers understand how they are profiled but encouraged to grow into new roles and experiment with alternative roles. Reduced role constraints will facilitate feedback about challenges associated with each role. After all, it is precisely those who are not predisposed to excel in a role who will be able to understand flaws in the on-boarding and training processes for that role.

As diverse role exposure contributes to greater insights, workers can make more informed decisions about which roles they are good at and what they enjoy. If a role is overly tedious and workers want to benefit from exposure to the role without completing tedious tasks, workers can review logs of ML tool actions for process exposure. For instance, if editors do not want to spell check, they can review logs of spell-checking ML tools and logs of instances where spell-checking ML tools' edits are

reverted. Review of ML tool logs can promote quality control while exposing editors to the ML process and providing insights into which types of edits the ML tool is not able to handle.

Organizing an eHMLP for role freedom requires that ML tools be able to experiment and transition across roles. This may mean that the ML tool is assigned to work on a task for which it was not created. When workers apply ingenuity and creativity, they may find ways that ML tools designed for one role can be applied in a different role.

8. Organizing process 3: instituting Incentives and sanctions for accountability - from a timid, ambivalent trend toward oppression to an empowered struggle for emancipation

Freire (2005) offers a process for converting an ambivalent, fearful tendency toward oppression to empowerment in a society where the oppressed take ownership of the struggle for emancipation. He describes the process of balancing freedom and authority to prevent hypertrophy of either, which would lead to atrophy of the other. In contrast to traditional pedagogy, emancipatory pedagogy moves from a banking metaphor characterized by authoritarianism to a struggle metaphor as actors become empowered to balance authority and freedom (Macedo, 2005). Freire (2005, pp. 178) explains, "There is no freedom without authority, but there is also no authority without freedom." Authoritarianism denies freedom. The denial of any authority leads to licentiousness. Thus, balance is needed. Because not all workers will act in good faith, and ML tools are not capable of acting in good faith, freedoms without accountability will be abused.

This challenge of balancing freedom and accountability is seen in HMLPs. Flawed attempts to promote authority may involve complex and interconnected technologies that surveil and monitor to control workers. The data from wearable devices feed ML systems that make recommendations for productivity, efficiency, and worker safety (Warner, 2020). For instance, city workers in Punjab, India are required to wear GPS watches to monitor their location and work habits with no options for turning the watches off (Teiss, 2020). These watches provide some freedoms, e.g., workers can check-in to work virtually without having to drive to the headquarters to report to work before driving to a worksite. Yet, the way these watches are currently being used has left some workers feeling oppressed. On the other hand, allowing workers to override watch data would compromise the ML systems that feed on the watch data.

Extending Freire's notion of balance to apply to HMLP propounds reorganizing of HMLPs in today's workplace, which often exemplify ML authoritarianism. Freire cautions against confusing a struggle for emancipation with a struggle for domination. Building on Freire, we suggest that no actor/actant type should dominate in emancipatory partnership. Human authority is enforced primarily through reactive measures such as shut off buttons for rogue and noncompliant ML tools and honeypots which mimic likely targets to lure in and trap malicious ML applications (e.g., malware) in firewalls (Thomas & Jyoti, 2007). Complete human control is only possible when ML tools and all the bright possibilities ML brings are excluded in favor of code-based systems. In this age of ubiquitous AI, elimination of ML is neither desirable nor possible. Rather than dominate ML tools, or be dominated by ML tools, workers can develop guidelines for eHMLP governance to ensure equitable participation is incentivized.

Emancipatory governance processes that establish worker protections and bounded use of ML tools can enforce the balance of freedom and authority. Workers who take the lead in developing governance policies for eHMLP must scrutinize their own motives and consider both what is emancipatory for both partners, and what is realistic. Freire (2005, pp. 182) warns that activist leaders, when making demands for the oppressed, may over-reach rather than representing the "popular aspiration" of the people they represent. Such ambition may result in no solutions being enacted. Thus, to combat an oppressive reality, the oppressed must develop an achievable "theory of their liberating action"

to outline incentives and sanctions for accountability (Freire, 2005, pp. 183). Because the tendency toward oppression is an ever-looming threat, a governance process to counter this tendency through structured, systematic action is needed.

9. Organizing process 4: identifying alternative emancipatory futures together - from reactive and past-oriented to proactive planning and building a desired future

Freire explains how the imagining of alternative emancipatory futures can convert fearful acceptance of an oppressive future to the active building of a more emancipatory future. Freire offers hope that if those in the struggle dare to imagine a better world, they can build a future "that is less ugly, more beautiful, less discriminatory, more democratic, less dehumanizing, and more humane," than the conditions that exist today (Macedo, 2005, pp. 25). To build a better future people must consider many possible futures and work to make the most emancipatory outcomes a reality. In choosing to "struggle together to build the future" people run "the risks involved in this very construction" (Freire, 2005, pp. 38). Namely, the risk that they will build the wrong future. But which future should be built? Constrained, timid imaginations that replicate existing structures of power will settle for suboptimal futures. Instead, Freire calls for radical imagination. "Radicalization, nourished by a critical spirit, is always creative" (Freire, 2005, pp. 37). This creativity can be pursued to "transform concrete, objective reality" (Freire, 2005, pp. 37).

The need to pursue transformation is evident in existing HMLPs. Given the increasingly global impact of HMLPs and the rapid digitization of so many aspects of life, HMLPs that go wrong can go very wrong, with severe consequences. It is no longer safe to fail to foresee oppressive outcomes of HMLPs. For example, a pedestrian was killed when struck by a vehicle operated in autonomous mode by an Uber driver (Griggs & Wakabayashi, 2018). In the UK, a worker wired €200,000 to a supplier after scammers created a deepfake of the company's chief executive demanding the worker do so (Statt, 2019). These illustrations demonstrate the potential for ML tools to contribute to oppressive outcomes.

Freire offers a process for converting a reactive, backward-facing orientation to a proactive engagement that builds a more emancipatory future. By imagining worst case scenarios and working against them, expounding on the various risks, and analyzing those risks, workers engaged in emancipatory pedagogy can hedge against oppression. This requires that workers look to the future and perceive reality as a process, a "transformation, rather than as a static entity" (Freire, 2005, pp. 92). Emancipatory thinking rejects fatalism and views time as "filled with possibility" (Macedo, 2005, pp. 13). Freire "demonstrates the power of thought to negate accepted limits and open the way to a new future" (Macedo, 2005, pp. 32). For instance, oil companies can use ML to determine where to place new oil wells (Merchant, 2019), e.g., by projecting future environmental conditions and simulating effects of weather changes and rises in sea level to plan for long-term worker safety. Through partnership with ML tools, workers can simulate futures and act to build the emancipatory future they choose. There is an important role for the ML tool to play in this imagining process due to its unique forecasting and simulation capabilities.

Appropriating Freire's notion of identifying possible emancipatory futures requires significant changes to HMLP organizing. Because ML tools operate on models informed by past data, ML tools must be trained to ignore or abandon outdated data in some cases. More emphasis on forecasting and scenario planning is needed. Building an emancipatory future is a proactive endeavor which involves searching for alternative courses of action and evaluating possible outcomes. Search processes for detecting threats and opportunities are needed. By partnering with ML tools, workers can identify threats and opportunities based on subtle trends and patterns not readily apparent to workers without ML assistance. ML tools for combating threats, like deepfake fraud, can be developed to protect workers' abilities to perceive reality in digital interactions.

Emancipatory HMLPs are built systematically, not born of chance. Workers will not accidentally stumble upon emancipation without plans and concerted action. Having an initial assessment of possible futures is not enough given the dynamism of ML systems and industries that sponsor HMLPs. Methodical, ongoing effort is required. See Fig. 1 for a depiction of HMLPs if current trends continue, and Fig. 2 for a depiction of how eHMLPs can play out in the future workplace.

10. Implications for theory and future research

We adopt an "envision" approach to theorizing to develop a "new theory that opens up a new world" by imagining how we can build a more emancipatory future of work (Burton-Jones, Butler, Scott, & Xu, 2021, p. 4). This theory describes four organizing processes for emancipatory pedagogy in human-ML work partnerships. Given the importance of protecting workers, and the risks associated with machine domination of the workplace, there is value in thought exercises that expand our thinking about emancipation related to this new type of work organizing. We contribute to the ongoing discussion about how humans and AI can coexist (Demetis & Lee, 2018; Kane et al., 2021; Shneiderman, 2020b). Notions of synergy and partnership have been championed by IS researchers for some time (Jarrahi, 2018; Wang & Siau, 2019). Recently, IS researchers cautioned against thinking of ML tools as passive, subordinate instruments and presented a theory of delegation to explain dynamics of the human-agentic IS artifact relationship (Baird & Maruping, 2021). We move this conversation forward by providing practical, normative theory for organizing HMLP for emancipatory outcomes in contexts where ML tools act as agents.

We contribute to theories of ethics and technology by answering the call to move beyond human-centric ethical frameworks to consider how ethics and emancipation can be pursued in networks of human actors and non-human actants (Introna, 2009; Latour, 2002). In doing so, we take the provocative stance that ethics extends beyond how one human treats another and relates also to how humans are treated by technologies and how humans treat technologies. Latour posits an intimate connection between technology and morality (Introna, 2009). Recently, researchers questioned whether humans have an obligation to treat technologies in an ethical way (Leidner & Tona, 2021; Ryland, 2021). We contribute to this ongoing debate by asserting that technologies can be oppressive. This stance differs from the view that humans can oppress other humans using technologies, but technologies cannot be inherently oppressive. Rather, given advances in technology that have limited human control over it, we suggest that machines can have obligations to workers, and workers can have obligations to partnerships involving machines. These obligations must be honored for emancipatory outcomes to be achieved. It follows then that we do not advocate human domination in eHMLPs. ML tools have an important role to play in building an emancipatory future. Thus, we call for organizing of partnerships to allow humans and ML tools to live up to the unique potential of each. We outline what eHMLP organizing processes should look like at a high level. Future research should provide specific examples of how the emancipatory process can be acted out in specific industry contexts. Such examples will have practical value and provide clarity to the theoretical conceptualization of these processes.

Recognizing that the assumptions underlying this theory are controversial, we invite others to respond to the positioning of this paper and present alternative ways of thinking about oppression and technology. Future research should explicate the various positions researchers could take in theorizing the role of humans and technologies in enacting and enforcing oppression. Such a debate about the role of humans and technology in oppressive systems will benefit from reliance on critical theory. Critical theory frees us from our constrained understandings and provides a different way of thinking about organizing, which can lead to a different type of organizing. Though much emancipation research focuses exclusively on human actors, there is debate
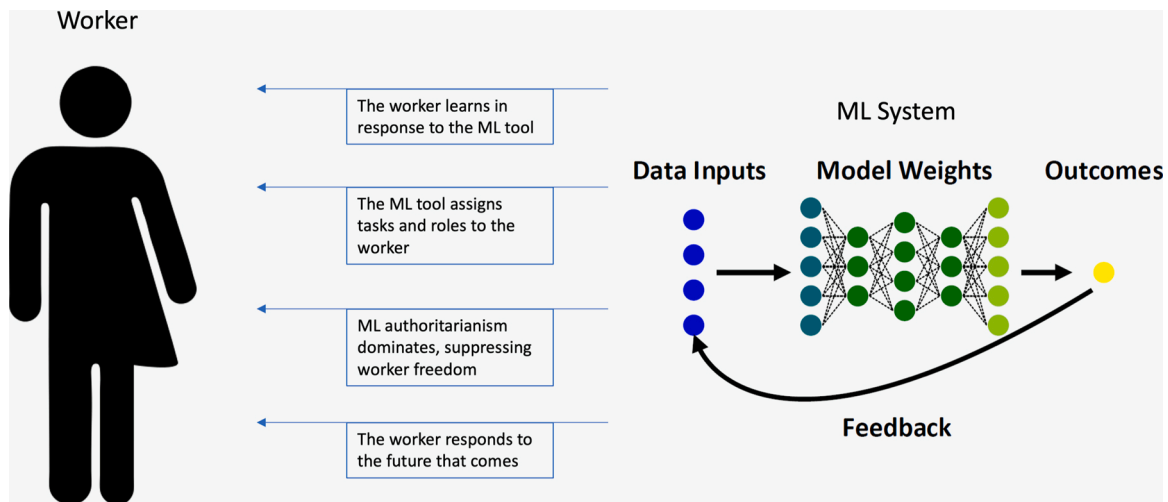
Fig. 1. The future of HMLP in the workplace without emancipatory organizing processes.
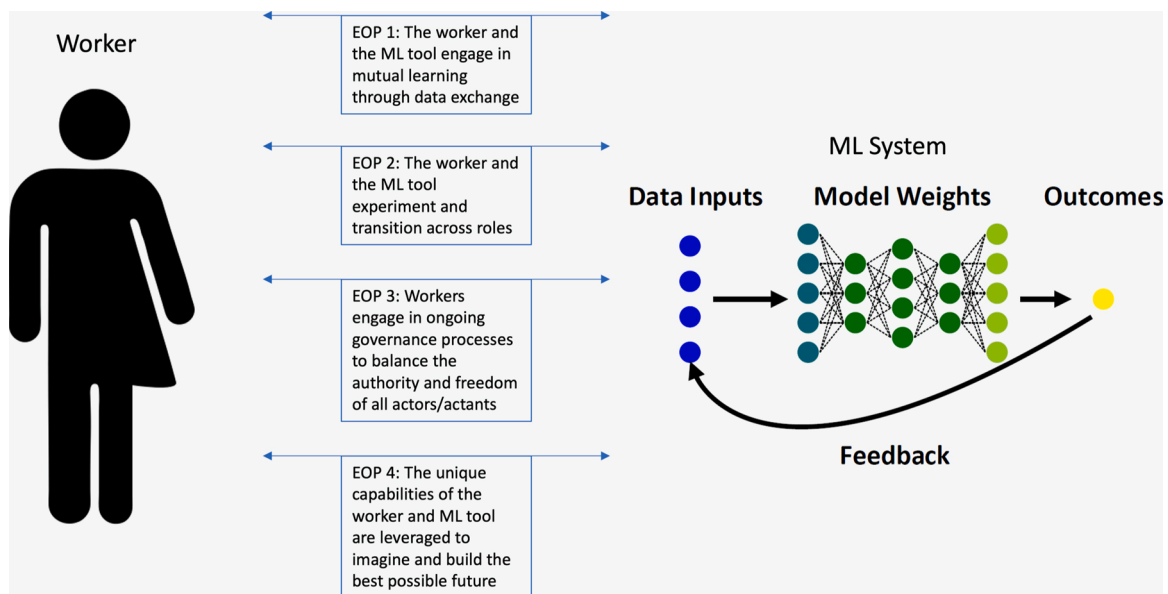

Fig. 2. The future of HMLP in the workplace if the 4 emancipatory organizing processes (EOPs) are adopted.

among researchers whether emancipation is strictly a human phenomenon or whether technologies also can be emancipated (Young et al., 2021). For instance, Hellman (1989) suggested that emancipatory design can emancipate both users and a technology. As human-technology entanglement increases (Orlikowski & Scott, 2015) and workers begin to resemble cyborgs (Young, Selander, & Vaast, 2019) it may not be possible to decouple effects on humans and technologies enough to study their emancipation separately. While ML tools cannot achieve human consciousness, there is value in applying the concept of emancipation to describe how ML tools can become less constrained in their "thinking." Moreover, there is value in understanding how ML tools can partner with workers in ways that promote mutual learning. We propose that an ML tool can engage in emancipatory pedagogy as it develops more robust "consciousness" in terms of its neural networks or algorithms and learns to facilitate the consciousness process for the worker it partners with.

Many perspectives on emancipation exist. Applying emancipatory theory in a way that contributes both philosophical and practical insights is a challenging endeavor (Johansson & Lindhult, 2008) that is likely to "raise some eyebrows" (Shalin, 1992, pp. 238). Yet, Freire

marries philosophical ideals and practical strategies into a theory of emancipatory pedagogy that has been widely adopted by scholars and practitioners seeking to move toward emancipation in contexts such as website design (Young, 2018), ML tool design (Kane et al., 2021), social media design and management (Young & Young, 2019), counseling (Steele, 2008), comedy (Rossing, 2016), and arbitration (Hedeen, 2005). The emancipatory organizing processes described in this paper are intended to provide a framework for thinking about organizing and emancipation as overlapping and interdependent processes. While this theory answers some questions about oppression and emancipation in HMLP, many more are raised. Thus, this theory should not be a conclusion to the eHMLP discussion, but a starting point.

This theory contributes to academic knowledge by articulating a vision for eHMLP and a roadmap to achieve gradients of emancipation. Notably, many business initiatives aimed at promoting worker emancipation fail. How and in what contexts the processes proposed herein lead to emancipatory outcomes (e.g., those listed in Table 1) is a question that should be answered by an agenda of systematic, empirical investigation. There is a dearth of understanding about paradoxical effects of systems that lead to both emancipatory and oppressive outcomes

(Miranda et al., 2016). Future research should investigate how emancipation for one group can contribute to marginalization of another. As this theory is tested and refined, workers will benefit with each step closer to understanding how to achieve eHMLP. Research that designs emancipatory systems and explores the emancipatory and oppressive effects of technologies is needed.

Kane et al. (2021) demonstrate how a critical social theory can be used as kernel theory to develop an emancipatory design theory with actionable design principles. We used a similar approach to develop this emancipatory organizing theory that outlines normative organizing processes. Much design and organizing theorizing builds on management and psychology kernel theories. We call for future research to apply macro-level theories of emancipation, dignity, and empowerment to develop a body of emancipatory design and organizing theories that can serve as roadmaps for how to achieve social good through the design and implementation of information technologies.

11. Implications for practice

Freire (2005) explains that those in power have a vested interest in thwarting emancipatory processes by lulling the oppressed in complacency. It is easier to train workers not to question ML tools than to train workers and ML tools for emancipatory partnership. However, oppressive organizing is not sustainable, nor desirable. Beyond fiduciary duties, organizations have a social responsibility to seek sustained HMLP emancipation. Organizations should accept responsibility and partner with workers, ML developers, and regulators to promote gradients of emancipation in the workplace. For workers, the practical takeaway of this research is that it is not enough to be "not a slave" or "a well-fed cog in the machine" (Fromm, 1966, pp. 53). Workers must struggle for emancipation if it is to be achieved.

This theory has implications for workers and organizations seeking to foster the **awakening of critical consciousness** in eHMLPs. First, workers should question how an ML tool develops insights and provides recommendations. Workers should also be aware that biases of the ML tool may come to shape their own mental models. The influence of an ML tool may be difficult to detect or understand. Workers should be vigilant in questioning the biases of an ML tool, as well as their own biases, to prevent mutually reinforcing patterns of bias. ML tools can help by revealing patterns of bias the worker cannot otherwise perceive. As eHMLPs promote data accuracy and robust worldviews, workers will gain confidence in their insights and actions.

Organizations can support data accuracy and robust worldviews in eHMLPs by providing ML tools that have been trained on data with few or no biases. As biases are identified, action should be taken to help the ML tool and the worker overcome bias. Organizations can consistently seek feedback from all stakeholders affected by the HMLP. Organizations should consider long-term needs for eHMLP success. Short-term metrics of success should not be optimized without consideration of long-term detriment. This theory calls for organizational leaders to look beyond bottom lines to consider interests of multiple stakeholders. Emancipation requires cooperation and collaboration between those without power (e.g., workers) and those with the power to enact change (e.g., organizations). Unlike the roles that organizations are accustomed to, the role of the privileged in emancipatory pedagogy is one of humility.

This theory has practical implications for workers and organizations seeking to **enable role freedom** in eHMLPs. Workers should be empowered to experiment with roles to understand themselves and their work contexts more fully. If workers challenge themselves to experiment with roles, they will reap the benefits associated with broad experience. Workers can act as both learner and teacher, training and providing feedback to the ML tool so that it can learn to protect human dignity. Workers should be able to expect a certain degree of autonomy in determining which roles to fill, such as having the right to accept or reject role assignments. Before accepting role assignments, workers should know what they are getting into and the consequences of opting out of an assignment. Workers should beware that ML tools may not be able to distinguish between tasks which require emotional labor and tasks which do not. Thus, accepting role assignments from ML tools without complete information may result in workers becoming entangled in situations they would not have consented to if they had been given full information. Workers can also remember that labels assigned by ML tools do not define them. Role recommendations made by ML tools need not override workers' desires, passions, and callings.

No doubt, forcing workers into roles and optimizing efficiency promote positive economic outcomes short-term. Economic outcomes should not be the sole organizing concern for HMLPs, even in for-profit corporations. Notably, some goals of emancipation may compliment economic goals as emancipation reveals ineffective processes and fosters creative experimentation that can lead to innovation. Organizations should not value ML characteristics such as efficiency over worker characteristics such as humanity, creativity, and contextual insights. Organizations should make the goals of the eHMLP transparent to workers. For example, organizations that do not disclose military applications to workers cross an ethical line (Schneider & Sydell, 2019). Organizations should reject the practice of using ML tools to divide work into unrecognizable pieces to conceal outcomes from workers.

The process of **instituting incentives and sanctions for accountability** has implications for workers and organizations. Even after policies are implemented, the policies will not be completely effective, nor will these policies deter all oppressive actions. Thus, workers will still need to apply sound judgement and think critically. Through dialogue workers can converge upon common critiques that are context-specific. To understand context-specific needs, workers require context-specific data about processes and actors/actants. If this information is proprietary, it can be protected by a monitoring system that manages oversight. Workers are diverse and likely view HMLPs differently, but individual workers are not likely to succeed in emancipatory praxis unless they are able to converge upon a shared direction. Workers can identify who has or who should be granted the authority to govern the eHMLP, e.g., a grassroots collective of workers or federal regulators. Together workers and eHMLP governors can develop strategies for eHMLP monitoring that do not invade privacy or expose proprietary information, e.g., ML data sources or the identities of anonymous whistle blowers. Governance processes may involve bounded use of ML tools. While limiting ML tools is not ideal, it is realistic and manageable for organizations seeking to protect workers in the short-term until better governance strategies are developed. Governing for emancipation is challenging because a hands-off approach lacks the struggle that is needed for emancipation while a heavy-handed approach is oppressive. Thus, governance processes should use inducements sparingly and only when not using inducements would result in a greater oppression.

Organizations may benefit from external governance of eHMLPs by a neutral third party. Emancipatory organizing is likely to require new organizational roles such as an emancipation expert. Organizations can conduct oppression audits and use eHMLPs to monitor for trends toward oppression. As monitoring occurs, it is critical that governing organizations inform workers what information is being collected and how that information is being used. Governing organizations can prompt workers for reports on their feelings, perceptions, and experiences to determine antecedents of emancipatory outcomes.

Finally, the process of **identifying alternative emancipatory futures** has practical implications for workers and organizations. Through the emancipatory pedagogical processes, workers can develop confidence in their ability to affect change. Workers should engage in the threat and opportunity identification process, contributing in ways only humans can, e.g., creative imagining of uses for eHMLPs for social good. Workers should also think critically, imagining what could go wrong based on their unique access to a myriad of contextual information sources. By partnering with ML tools in risk analyses and opportunity forecasting, workers can contribute contextual information to

compliment the ML tool's analyses (Salovaara et al., 2019). Workers can also report concerns ML tools cannot detect and provide information about ethics and morality. Workers can identify threats and opportunities but also plans of action. These plans should be carried out with vigilance lest oppressive tendencies creep in. Systematic revisiting of plans and possible futures is needed to deal with dynamic environments, advances in technology, and other variable conditions.

Organizations should encourage eHMLP engagement with threat and opportunity identification processes. Based on their concerns about oppressive partnerships with autonomous technologies, Markus and Mentzer (2014) identify 11 types of future-oriented analysis that can play a role in preventing oppressive HMLP outcomes. Analyses for detecting opportunities are needed also. Given the seriousness of oppressive threats, organizations should not wait for something to go wrong. Proactive, ongoing oppression audits and risk analyses should be planned for regular intervals. Processes should be in place to receive anonymous tips from workers and those tips should be taken seriously to preemptively avoid oppressive outcomes. Organizations should take an active role in building an emancipatory future for eHMLPs. This will require real resources, not just lip service. Building an emancipatory future will require organizational culture shifts in terms of how to think about workers and ML tools, as well as other types of AI tools.

12. Conclusion

The problem of worker oppression is not new, but the technologies enacting and enforcing oppression are. Thus, new ways of organizing are needed to ensure workers are not subservient to machines in future workplaces. Questions about oppression versus emancipation have always existed and the conversation will continue, shaped by each generation. These questions have been addressed by philosophers and sociologists. At the same time, technical questions about what is possible have been addressed by computer scientists and industrial engineers. In this theory, we bring an information management perspective to address fundamental questions raised by ML tools. We argue that HMLPs, an important new type of organizing, is not adequately served by existing organizing processes and associated theories of organizing. This normative, critical theory signals that new eHMLP organizing is needed and provides concrete ways to promote emancipation.

Author statement

Amber Young: conceptualization, writing, visualization, project administration.

Ann Majchrzak: conceptualization, supervision.

Jerry Kane: conceptualization.

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