
The Impact of Generative AI on the *Creativity and Practice of Knowledge Work*

Based on paper at ACM
CHIWORK 2023. Available at:
<https://advait.org/publications>



What is *knowledge work*?

- Knowledge work focuses on *applying mental faculties* and knowledge acquired through systematic education (Drucker, 1959)
- Knowledge work requires the *private transformation* of the individual doing work as an outcome of information processing (Kidd, 1994)
- This lecture: focus on those knowledge workflows which produce *material artefacts*: documents, textual communication, images, presentations, etc.
 - Cultural or corporate *expectation* of creativity



A photograph of two vibrant parrots, likely macaws, flying through a dense, lush green forest. The parrots are in flight, with their wings spread, showing bright blue, red, and yellow feathers. The background is a thick wall of green foliage and trees, creating a sense of depth and natural habitat.

Current perspectives on AI and creativity

- A creative idea must be surprising, novel, and valuable (Boden, 2007)
- “Surprise” can be defined in information-theoretic terms (Blackwell, 2022)
- AI has no intention, thus cannot be creative (Blackwell, 2020)
- AI is a “stochastic parrot”, it randomly reuses training data without attribution (Bender et al., 2021)
- To determine whether AI is being creative, we must judge the *information content of its output*, relative to its training data and other current knowledge.

Alternative perspectives of creativity

- *Process* as creativity
- *Authorial intent and discourse* as creativity
- *Interpretation* as creativity
- *Reuse* as creativity
- *Randomness* as creativity



Process as creativity

- Conceptual art & conceptual writing:
 - “*The idea becomes a machine that makes the art*” (LeWitt, 1967)
 - Writing with constraints, OuLiPo (James, 2009)
- Algorithms are creative; output is secondary
 - E.g., Quicksort vs Bubblesort
- Difficult to pinpoint a “*locus of creativity*” in the “*art system*” (Boden & Edmonds, 2009)
- Can’t be answered universally: continuously *negotiated by communities* of consumers and producers
 - → For AI: consider just output? Or algorithm? Or human-AI-data complex?

Authorial *intent and discourse* as creativity



- Found art / “readymades”
 - “an ordinary object [can be] elevated to the dignity of a work of art by the mere choice of an artist” (Duchamp)
 - Obscure? But the internet is full of readymades, consider retweeting/reposting (Goldsmith, 2011; Bush, 1945)
- Author *intent needed to interpret* metaphors, references
 - New information about an author can revise our understanding (Foucault, 1969; Musto, 2010)
- Creative objects are not isolated information, but exist in a *reactive and shifting network* of interpretive resources
 - → Meaning of AI-generated text, its status as creative, is *not static*
- Author “entities” are *separable from personhood*
 - Foucault’s criteria (1969): conceptual coherence, stylistic uniformity, historicity
 - Consider “early and late” Wittgenstein, “young Marx” (Musto, 2015), Picasso’s “blue period”
 - Legal authorship can be held by capital investments and administrative organisation (Bently, 1994)
 - Science journals ban ChatGPT as author, need accountability
- → For AI: output may even be “readymade” from the training data. A creativity judgment considers: who is presenting this output, in what context, with what intent, with what discourse?

Interpretation as creativity

- “A work of art has no existence or function apart from its effects on human observers.” (McLuhan, 1964)
- “In the multiplicity of writing, everything is to be disentangled [...] writing ceaselessly posits meaning [...] but there is one place where this multiplicity is focused and that place is the reader” (Barthes, 1967)
- Perspective: we should *ignore the author*
 - “Intentional fallacy”, reader-response criticism, American New Critics (Wimsatt and Beardsley, 1946)
- Reader communities can influence and *reclaim creativity* over a work (c.f. Rowling/Harry Potter).
- Consumer communities will significantly shape perception of creativity for any art, literature, or knowledge made with AI

Reuse as creativity, and attribution

- “text is a tissue of quotations drawn from the innumerable centres of culture [...] [the writer’s] only power is to mix writings” (Barthes, 1967)
- All poets suffer from the “*anxiety of influence*”, but “strong” poets respond in such a way to create an original poetic vision (Bloom, 1973)
- Cognitive capitalism depends on “*general intellect*” (Moulier-Boutang, 2011)
- Out of an infinite set of influences, we choose a *finite set* for attribution.
- *Attributional norms* for reuse vary by community. E.g., jazz “quotation”, rap referencing as *self-contained* units of reference and citation.
- Numerous *art forms* based on reuse: collage, decoupage, montage, erasures, subvertising, détournement, culture jamming. Note attributional norms.
- Attribution often *subverted*: pen-names, pseudonyms, heteronyms, forgeries. “Improper” attribution has *no bearing* on deemed creativity here.
- Thus, cannot deny AI creativity, or allege plagiarism, purely on the basis of re-use and non-attributive nature. Ask: what are *appropriate standards* of attribution? What types of reuse are we (*in*)*visibilising*? Do the authors desire attribution?



Form-content distinction


- Q: What is the “*unique form*” of a text?
 - Letters, bits, pixels? Are two printed copies *different* forms?
 - A: *relevant and irrelevant* differences.
- *No universal notion* of textual form (consider line breaks and typography in poems, school homework, magazine advertisement).
- If AI output is copied, or printed, is it different? Even the processes of *copying and distribution* might introduce relevant formal (potentially creative differences).
- How much does form determine content?
 - Consider poetry vs. academic writing.
- Form-content distinction *exploited* by knockoff brands, political protest (Chinese/Soviet blank placards), sarcasm. Entire subfield of linguistics (Grice, 1975; Yule and Widdowson, 1996)
- In AI, influence of an idea in training data may appear as the same idea in content but not form. Is this creative or not? Depends on how we read the output: is it a poem or a scientific paper?



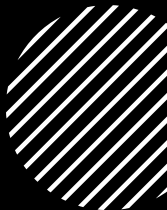

Form, content and *mechanisation*

- If something can be easily reproduced, it is not seen as distinct from the original; the *labour of replication* imbues copies with an original “aura” (Benjamin, 1935)
- Today we are less likely to consider a hand-copied text to be different from the original than our medieval ancestors: our cultural *attitudes to the value chain* of text production have been conditioned by centuries of the *mechanisation of print*
- *Mechanisation* turns relevant differences in form, which arise or can be manipulated through the mechanical process, into irrelevant differences
- If a workflow is partly mechanised, creativity is attributed to the portions with a greater share of human labour.





Norms for
creativity,
attribution, and
authorship are
*community-
produced*



Journals ban crediting ChatGPT because it is not *accountable* (thus it cannot be an author).



In research-through-design, the creativity of an artefact does not stand on its own, additional *discourse* is needed.



Reader communities can influence and *reclaim creativity* over a work.



Jazz musicians “quote” as a *self-contained unit* of reference and citation.



But, form-content distinctions are affected by mechanization:

If something can be easily reproduced, it is not seen as distinct from the original; the *labour of replication* imbues copies with an original aura

If a workflow is partly mechanized, creativity is attributed to the portions with a greater share of human labour.

Challenges of intellectual “*property*”

- Sorting out the creativity of AI: is it a job for *lawyers* (copyrights, trademarks, patents etc.?) → *No*
- IP law has never been in the interest of individuals
 - “[The first copyright law] [...] developed by and for publishers, was clearly a publisher’s right, not an author’s right” (Patterson, 1965)
 - “copyright is one of the strategic evolutions of rent to expropriate the cultural commons and reintroduce artificial scarcity [...] forcing artificial costs on cognitive goods that can paradoxically be reproduced [...] virtually for free” (Pasquinelli, 2009)
- IP’s *dual agenda*: regulate and define innovation
 - IP laws can both boost and hinder innovation. Thus functions as a *regulatory lever* (Gangopadhyay and Mondal, 2012; Neves et al., 2021)
 - But has hopelessly entangled itself in the quest to legally define creativity and ownership. Rejects Locke’s “sweat of the brow” doctrine (Day, 1966), as labour seems neither necessary nor sufficient for having novel ideas (Ginsburg, 1992).
- Thus an emphasis on *notation*, for ideas to be judged as equivalent or nonequivalent by the legal apparatus (c.f. relevant and irrelevant differences in form)
 - Any notation highlights some aspects of an idea, and hides others. E.g., staff notation for music
 - Many other *compromises*: lay listener tests, time limits, regional jurisdictions. Vulnerable to absurd attacks, such as “all the music” (Riehl, 2020)

Harms of “legal” creativity

- Copyright *extracts value* from the creativity of minorities, and deprives them of credit, compensation, and control (Lester, 2013).
- Challenges to the *notationally-privileged* elite usually emerges from *marginalised communities*: DJ-ing/turndabbling, Jazz, Indian pharmaceuticals, Chinese “IP theft”
- Right to “derivative works” encourages *rent-seeking*, patent/copyright trolling (e.g., Blurred Lines / Stay with Me), and results in pre-emptive citational practices (Break My Soul / Show Me Love).
 - Exerts *chilling effects* on creativity: “I shouldn’t be thinking about legal precedent when I am trying to write a chorus” (Sisario, 2019)
- Plagiarism or market-making? Both solve a *failure* of the information “market”
- Legal efforts to establish universal, fair, and logically consistent criteria for originality have *failed* → the same jumbled mess of notations and tests will continue to provide *non-answers for AI*, pressurize creative communities, and further the private interests of powerful actors.
- For designers of socio-technical systems, the law is the wrong place to look for answers about the creativity and originality of AI.

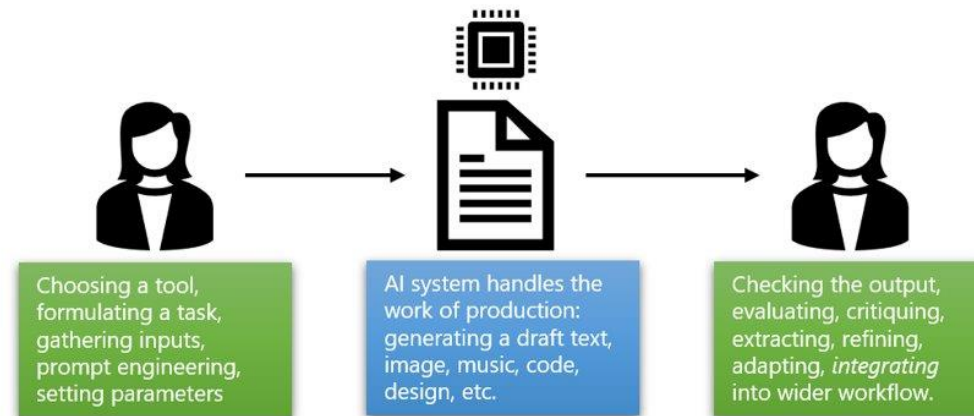
AI shifts
knowledge work
from material
production to
*critical
integration*

As the labour of *material production* decreases...

... critical integration becomes a new form of creative labour:

Deciding *where and how* to use AI in a
workflow

Critically assessing AI output and
adjusting it to fit the workflow



The critical integration “sandwich”: when **AI handles production**, **human critical thinking is applied at either end of the process** to complete knowledge workflows.

Examples of critical integration

- Creative writers with AI suggestions make “*integrative leaps*” which lie on indirect-direct and exploratory-confirmatory continua (Singh et al., 2022)
 - Participants attributed creativity to AI
- Visual artists engage in studying AI, selecting and combining models, building datasets, curating outputs (Ploin et al., 2022)
 - AI is its own intrinsic source of creativity, though “*creativity is an easier target than art*”
- Programmers using AI assistance shift from manually typing code to designing prompts and evaluating output (Sarkar et al., 2022)
 - “developers need to learn new craft practices” for prompting, automation, and debugging
- Many other studies of contemporary generative AI provide support for shift towards critical integration and away from production



Issues of critical integration

- Capitalism destroys craftsmanship and worsens work (Braverman, 1998)
- Automation, if done uncritically, can enable the transition to precarious and harder work (Greenbaum, 1996)
- How will AI affect the *class identity* of knowledge workers?
- The situation is still changing:

*“Typography was no more an addition to the scribal art than the motorcar was an addition to the horse. **Printing** had its ‘horseless carriage’ phase of being misconceived and misapplied during its first decades, when it was not uncommon for the purchaser of a printed book to take it to a scribe to have it copied and illustrated.” (McLuhan)*

Cultural *reversal*

- Automation of routine tasks, but not failure cases, makes jobs harder and performance *worse* (Bainbridge, 1983)
- Mechanisation encourages *convergence of form*
- Studies show that predictive writing AI makes writers *more predictable*, less original, and more biased (Arnold et al., 2020; Jakesch et al., 2023)
- Huawei's "Moon Mode" backlash is an example of *cultural reversal* against this trend



Recap

- The current discourse around AI creativity focuses mainly on the *information content* of its output
- *Alternative* views of creativity include process, authorial intent and discourse, interpretation, reuse, and randomness
- Creative norms are *community-produced*
- *Form-content distinctions* are affected by mechanization
- AI shifts knowledge work from material production to *critical integration*
- Critical integration has unknown implications for *labour process*
- Cultural *reversal* may resist convergences