REBS Review of Economic & Business Studies

Volume 18, Issue 2/Dec. 2025, pp. 109 of 120
ISSN-1843-763X
DOI: 10.47743/rebs-2025-2-0005

GENERATIVE AI AND PHD SUPERVISION – PERSONALISATION AND ALIENATION, BENEFITS AND RISKS

ADRIANA ZAIT[i], RÚBEN CASTRO[II]

Presented at EDEN Annual Conference PhD Symposium, Bologna 2025

Abstract: *Doctoral supervision is a primary factor when analysing the doctoral process completion and success. We expect more and more from doctoral graduates – good research, societal impact, policy advocacy and above all multidimensional, interdisciplinary and highly adaptive specialists. All these require an excellent supervision. In time, the doctoral mentoring evolved from having a unique supervisor to multiple possible structures – one supervisor and a guiding committee, two supervisors – cotutelles, more than two supervisors in joint programs with several institutions, one academic supervisor and one industry supervisor, etc. Lately, a very "special" PhD mentor joined the doctoral team – Generative Artificial Intelligence (AI). Friend or foe, for the doctoral student or the supervisor, or for both (the team), AI tools and models become more and more the new normal in doctoral research. Is this good for PhD supervision, can it add to the so much necessary personalisation of doctoral supervision, or is it just another factor contributing to the lack of real socialisation, leading to supplementary alienation? The present essay is an attempt to analyse the benefits and risks of using AI in doctoral supervision, based on the extant literature – still very scarce, due to the novelty of the subject. Our results will be presented based on the structure of a classical awareness-understanding matrix, with three sections – what we know, known unknowns and unknown unknowns. Findings could help reflect upon and design better policies in the field, answering to ethical dilemmas, to support and protect, at the same time, both doctoral researchers and their supervisors.*

Keywords: *doctoral supervision, generative artificial intelligence, personalized mentoring, higher education policy*

JEL Classification: *I23, I21, O33*

[i] University Alexandru Ioan Cuza Iași, azait@uaic.ro
[ii] Policy and Advocacy Officer, Coimbra Group Universities

1. WHAT WE KNOW ABOUT AI AND PHD SUPERVISION

1.1 Classical supervision

Doctoral education and research represents the most advanced mission of universities and societies, and doctoral students' success is strongly influenced by the quality of doctoral supervision. Models of doctoral education evolved in time, and the challenges of the present, especially our living in a poly-crisis world, require quick adjustments and the most efficient use of all available resources for research – including those offered by the exponential development of generative AI technologies. We move towards the so-called transformative education models, which "envision discipline-specific knowledge coupled with a broader interdisciplinary perspective and addresses the transferable skills necessary to successfully navigate an ever-changing workforce and global landscape. The overarching goal of TDEM is to transform the doctoral student into a multi-dimensional and adaptive scholar, so the students of today can effectively and meaningfully solve the problems of tomorrow." (Patterson et al, 2019).

Personalized doctoral supervision is seen as a necessity, and involves providing multiple types of support for PhD students, developing new core supervisor competencies, ensuring supportive institutional conditions, and measuring outcomes through established indicators. Extant literature (Antilla et al, 2023) describes distinct types of support – informational (advice on research problems, methodology, interpretation, planning etc.), emotional (encouragement, constructive feedback, care for PhDs' well-being), instrumental (research facilities, recommendations, access to networks) and co-constructional (brainstorming together, co-creating ideas, methods, solutions etc.) - with additional emphasis on autonomy, structure, and involvement (Devos et al, 2015).

Devos et al. (2015) and Kumar and Kaur (2019) stress that satisfying basic psychological needs through tailored approaches can boost students' intrinsic motivation and research self-efficacy, while Seeber and Horta (2021) observe that frequent, aligned meetings strengthen student satisfaction and motivation for research. The mentioned studies further indicate that supervisors' personalization ability is connected with a whole blend of core competencies.

Haley et al. (2024) and Kreber et al. (2021) point to the importance of five supervisor's competencies: domain knowledge, methodological expertise, pedagogical skills, relational skills, and reflective practice/functional aspects. Kahl et al. (2015) state that matching supervision styles to individual candidates and maintaining clear communication are central to effective personalization of doctoral supervision.

Institutional factors are also very important - such as optimized supervisor workload, diverse supervision teams, and structured selection processes – these also highly influence personalization outcomes. Proposed indicators for measuring supervisors' personalization ability include research self-efficacy (Overall et al. 2011) and convergent assessments of supervisory quality, including tools like a Graduate Supervision Inventory and models of completion mind-sets.

Synthesizing, the core supervisors' competencies related to personalization refer to:

Support types and their personalization

- Multiple support dimensions:
  - Anttila et al. (2023) identified four key types of support: informational, emotional, instrumental, and co-constructional.
  - Devos et al. (2015) emphasized autonomy support, structure, and involvement in supervision.
- Theoretical framing:
  - Kumar and Kaur (2019) used Self-Determination Theory, focusing on satisfying basic psychological needs for autonomy, competence, and relatedness in supervision.
- Balancing support types:
- Overall et al. (2011) found that combining high levels of autonomy and academic support leads to the highest research self-efficacy among doctoral students.

Supervisor needed competencies for personalization

- Key competencies:
  - Haley et al. (2024) identified five aspects of supervisors' competences:
    1. Domain knowledge
    2. Research methodology
    3. Pedagogical component
    4. Relationships
    5. Functional aspects
- Conceptual framework for supervision:
  - Kreber et al. (2021) identified six distinct areas of supervisors' roles:
    1. 'Enculturation'
    2. 'Functional'
    3. 'Emancipation'

4. 'Critical Thinking'
5. 'Care/relationship building'
6. 'Preparation for career/life'

Student-specific adaptation strategies

- Ongoing adaptation necessary to match styles and needs on stages:
  - Kahl et al. (2015) emphasized matching PhD candidates with supervisors and tailoring supervision styles to individual needs and phases of the PhD trajectory.
- Alignment and interaction :
  - Seeber and Horta (2021) highlighted the importance of aligning research interests between students and supervisors and the fact that frequent meetings (at least once per week) were associated with higher doctoral student satisfaction.

How can we train PhD supervisors to be better in terms of personalization? We need to consider first the enabling factors for personalization, followed by increased institutional support and resources:

- Reflective Practice: Kreber et al. (2021) emphasized the role of reflective practice in enabling supervisors to adapt their approach to individual student needs.
- Knowledge and Competency Development: Haley et al. (2024) recommended focusing more on developing supervisors' domain and methodological knowledge and providing professional support for working with marginalized groups.
- Structural institutional support and resources: Kahl et al. (2015) suggested the formation of diverse supervision teams, while Seeber and Horta (2021) found that a high number of PhD students per supervisor negatively impacted satisfaction, so workloads need to be carefully considered.

Apart from these, important influences exist inside national cultures and professional fields – differences related to countries, disciplinary variations, differences STEM-SSHA. Seeber and Horta (2021) found differences in satisfaction across disciplines, suggesting potential disciplinary influences on personalization strategies. Kreber et al. (2021) compared supervisors' understandings of doctoral supervision in Canadian and UK institutions and although they found more commonalities than variations across these contexts, differences still exist.

In order to assess supervisors' competencies for a better, personalized supervision, several studies suggested the following:

- Quality indicators: Overall et al. (2011) suggested research self-efficacy as an indicator of effective supervision, while Anttila et al. (2023) emphasized the alignment of perceptions between supervisors and supervisees regarding the quality and quantity of supervision.
- Evaluation frameworks/models: Kreber et al. (2021) suggested developing a Graduate Supervision Inventory, and Green and Bowden (2012) developed a model of completion mindset.
- Feedback mechanisms: Kumar and Kaur (2019) emphasized the role of constructive, positive, and timely feedback in supporting students' sense of competence, amd Seeber and Horta (2021) found that frequent meetings, which presumably involve regular feedback, were associated with higher student satisfaction.

1.2 AI assisted doctoral supervision

Studies show that AI tools can improve doctoral supervision, especially during the first steps of the doctoral journey, by handling routine tasks, helping with literature review, enhancing feedback quality, supporting specialized training, and balancing supervisory roles. GenAI will not replace the human supervisor. As Jensen et al (2025) found out, AI dialogues can support students, but the significant role belongs to the supervisor in doctoral supervision. "*A chatbot affords great agency for the student but it cannot replace supervision. However, the sector must emphasise further what supervisors – and educators more broadly – should be doing in feedback: contextual, relational interactions that adjust appropriately over time*." (Jensen et al, 2025).

Caillaud and Skec (2024) revealed the primary advantages of utilising GenAI tools for speeding up the discovery of pertinent literature, the extraction of its core concepts, and the acquisition of feedback, providing a strong basis for further improvement of technology-enabled supervision and potentially changing the interaction between supervisors and doctoral students. They also argue that "*rather than seeking to prevent PhD students from utilising such tools, supervisors should equip them with the knowledge to utilise these new GenAI resources effectively and ethically. However, as a prerequisite, supervisors themselves must become familiar with the diverse functionalities offered by GenAI research tools and attain proficiency in their application. This knowledge is essential for critically assessing the outputs generated by these tools and ensuring their responsible and ethical utilisation in research.*" (Caillaud and Skec, 2025).

Harding and Boyd (2024) note that sometimes GenAI is kept at a distance in the doctoral student – supervisor relationship, through fear, because "*supervisors worry*

about its detection, misuse and abuse, and PhD researcher fear the ramifications of being caught using the technology."

1.2.1 AI-Enhanced Supervision Efficiency

Extant studies highlight the potential of generative AI tools to enhance doctoral supervision efficiency:

- Dai et al. (2023) report that ChatGPT facilitated accelerated research progress and enhanced research quality.
- Mormul et al. (2024) note that AI tools can assist PhD candidates with various research tasks, including writing, proofreading, data visualization, simulating peer reviews, and preparing diagrams.

These findings relate to the challenge of time constraints affecting regular supervision meetings and reflective practice, as identified in the research question.

The broad range of AI applications suggests potential for alleviating some workload pressures on supervisors, allowing them to focus more on higher-level guidance and support.

1.2.2 Transformation of Supervisory Roles and Relationships

The previous studies suggest AI could transform roles in the doctoral supervision process. Dai et al. (2023) report a shift towards more autonomous student roles and more strategic supervisors.

This transformation could address challenges related to supervision quality, such as balancing different types of support and maintaining professional boundaries while providing emotional support.

Mormul et al. (2024) findings on deep penetration of AI tools into research workflows suggest similar potential for changing supervision dynamics.

These changes could potentially help address the challenge of high student-to-supervisor ratios by enabling more independent student work on certain tasks.

1.1.1. Quality Enhancement through AI Integration in PhD supervision

AI tools have the potential to enhance doctoral research and supervision quality:

- Dai et al. (2023) report improved scholarly development and enhanced research quality as outcomes of ChatGPT use. This suggests AI could help address the challenge of ensuring feedback is both constructive and timely.

- Mormul et al. (2024) highlight AI tools' capability to assist with various aspects of research, including technical computing and scripting.

These findings indicate AI could potentially help address challenges related to limited resources for specialized training, particularly in technical fields.

1.2.3 Ethical Considerations and Limitations

Previous studies acknowledge potential ethical concerns and limitations of AI use in doctoral supervision:

- Dai et al. (2023) mention the risk of over-reliance on AI and the need to balance AI use with traditional research methods.
- Mormul et al. (2024) note both opportunities and threats posed by AI in doctoral education.
- Subaveerapandiyan et al (2025) indicate that while AI tools enhance clarity, flow, and efficiency, they raise concerns about over-reliance, originality, and ethical transparency.

2. KNOWN UNKNOWNS (WHAT WE KNOW THAT WE DON'T KNOW)

There are many unintended and not enough studied yet consequences of using AI in doctoral education, in general, and for the personalization of supervision, in particular:

- Erosion of the supervisor-student relationship – overreliance on AI, weaken personal bonds, reduced mutual engagement, lost respect due to ethical dilemmas
- Lack of socialization and intellectual community engagement, supplementary intellectual isolation in an already tribal and silos based academic world
- Excessive dependence on AI at the expense of critical thinking, decreased ability for doctoral students to think independently and analyse critically, risk of reinforcing confirmation biases in research, especially in SSHA
- Ethical and academic integrity concerns, blurred lines between original work and AI generated content, difficulties in establishing comparable academic standards
- Psychological and emotional alienation, increased feelings of loneliness, frustration and disengagement
- Biases and inaccuracies in AI Guidance, due to hallucination, manipulations, myopic simplified views, and even when correct, excessive standardization
- Unequal access and heavy technological barriers, leading to uneven adoption and benefits, discrimination and putting students at a disadvantage

- Long-term devaluation of human expertise in doctoral education, reduced incentives for universities to invest in training and human mentorship, increased risk for the development of the future supervisors needed.

From all these, many other aspects arise, that need reflection, future research to find the appropriate answers, followed by the development of the necessary policies. A list of such reflections and questions, by no means exhaustive, includes the following:

- The impact of policy frameworks on personalization was not extensively discussed in the reviewed studies, suggesting a potential area for future research.
- How can we train supervisors (especially how do we motivate them to engage into this type of training) to offer better emotional support to PhD students, besides the classical scientific one?
- We want autonomous doctoral students, but should PhD be a lonely road? How can we better develop autonomy together with socialization and collaboration?
- For the mental health of PhDs, supplementary issues arise from the use of AI, in a long list of already documented challenges for PhD research. PhD is already an almost "solo" travel. Is AI fit to be an emotional supporter? Will this create new silos?
- The lack of socialisation could be aggravated by the use of AI, because of both supervisors' and PhD students' preference/ease of use.
- Significant biases can arise from generative AI – critical thinking is needed for protection.
- There are already hints that people start to develop emotional relationships with AI, even if we don't yet have studies on doctoral students – how can we balance this?
- Lack of university guidelines on how to use AI is an important issue – will we have common approaches quick enough, to keep the pace with developments in generative AI and prepare for the future agentic AI?
- Harmonisation is necessary – but how and how quick will we obtain it?
- How will we ensure that EU universities, and around the world, use the same approach into these AI generated challenges?
- How will we minimise the discrepancies between Higher education institutions?
- How can we develop policies quick enough so that we don't lag so much behind the AI developments?
- AI is the first technology capable to decide and generate ideas autonomously, which means that it can also create new realities. How and who needs to correct generative AI? Who has this capability (PhD student or the Supervisor should be the responsible?) What about cultural biases in this generated reality?
- The primary driver for the use of AI is efficiency, particularly in text generation for reports and articles, but there are different weights in the use of AI by

disciplines (Social Sciences and Humanities probably will focus more on generative AI, while STEM disciplines will look more at AI models and computational resources). Will this create supplementary biases, as well?

- Who and how will develop necessary guidelines and a review of an authorship definition in the AI era? AI's role in proposing new research questions and hypotheses raises the issue of due credit for discoveries (Hans Selye: "*The essence of scientific discovery is not in seeing something for the first time, but in establishing solid relationships between what was previously known and what we don't know yet. This process of creating connections leads to real understanding and progress*" If the researcher stops at the identification of new connections, with the help of AI, the credit belongs to AI; if he goes further and analyses those new connections and brings new data, than the credit goes to the researcher/the team doctoral student/supervisor, but with acknowledgment for the AI intervention.
- Creativity can be defined by the ability to identify patterns and then to break them. Human ingenuity is crucial. What happens if everything starts to look the same? Differences exist between STEM and SSHA, due to the different balance between positivism and constructivism/interpretivism, between rationality and emotion, objectivity and subjectivity etc.
- Should Universities/Countries (or the European Union) develop their own tools to be used by Higher Education institutions? Who should finance this? The EU? If so, how do we ensure consistent ethical and regulatory standards for AI use across disciplines?
- How many universities have already guidelines for supervisors and PhD students, concerning AI use? How many supervisors and students are able to use AI fully and correctly?
- What quick changes do we need for the Digital Basic Skills Plan or Eurobarometers on values?
- What new competencies do we need (supervisors, students, examinators, journal reviewers) and how should present guides and regulations change?
- Could the future agentic or agent type AI change the whole game in doctoral research and personalized supervision?

3. UNKNOWN UNKNOWNS (WHAT WE DON'T KNOW THAT WE DON'T KNOW)

These are the most complicated issues to address – because we don't know them, they cannot be estimated from previous data through prediction, we cannot address

them with a linear thinking approach, and we need a strong anticipation, systemic perspective and creative power. The list here could be really long, or short, with just a few capital, game changing and mind blowing issues. How can we deal with the unknown unknowns in doctoral education? By getting better (both supervisors and doctoral students) at:

- working interdisciplinary, with diverse people, disciplines and methods
- increase sharing of data, open science, free circulation of research results (5th freedom)
- challenging ourselves, our thinking, developing a stronger critical thinking competency
- increase our active listening and observation abilities
- developing non-linear thinking anilities, agility and fluidity in thinking
- prepare more for anticipation instead of prediction, adopt scenario planning approaches similar to those from economic and political intelligence
- permanently scrutinize GenAI and AI models' evolution, because patterns could change unexpectedly and without any signal, not even the weak signals type of hint
- learn how to focus more on questions, not answers, and learn how to ask really important questions.

REFERENCES

1. Anttila, H., Pyhältö, K., & Tikkanen, L. (2023). Doctoral supervisors' and supervisees' perceptions on supervisory support and frequency of supervision – Do they match? *Innovations in Education and Teaching International*, 61(2), 288–302. https://doi.org/10.1080/14703297.2023.2238673
2. Caillaud, E., & Skec, S. (2024). Supervision of Design PhD Students in an Era of Generative Artificial Intelligence. *E&PDE*, 420–425. https://doi.org/10.35199/epde.2024.71
3. Dai, Y., Lai, S., Lim, C. P., & Liu, A. (2023). ChatGPT and its impact on research supervision: Insights from Australian postgraduate research students. *Australasian Journal of Educational Technology*, 39(4), 74–88. https://doi.org/10.14742/ajet.8843.
4. Devos, C., Boudrenghien, G., Linden, N.V., Frenay, M., Azzi, A., Galand, B., & Klein, O. (2016). Misfits between doctoral students and their supervisors: (How) are they regulated? *International Journal of Doctoral Studies*, 11, 467-486.
5. Devos, C., Van der Linden, N., Boudrenghien, G., Azzi, A., Frenay, M., Galand, B., & Klein, O. (2015). Doctoral supervision in the light of the three types of support promoted in self-determination theory. *International Journal of Doctoral Studies*, 10, 438-464. Retrieved from http://ijds.org/Volume10/IJDSv10p439-464Devos1858.pdf

6. Friesen, Jay, and Polziehn, Renee (2024). AI, Higher Education and the Future of Academic Supervision, *University Affairs*, https://universityaffairs.ca/career-advice/ai-higher-education-and-the-future-of-academic-supervision/
7. Green, P. and Bowden, J. (2012), "Completion mindsets and contexts in doctoral supervision", *Quality Assurance in Education*, Vol. 20 No. 1, pp. 66-80. https://doi.org/10.1108/09684881211198257.
8. Haley, A., Holmqvist, M., & Johansson, K. (2024). Supervisors' competences from doctoral students' perspectives – a systematic review. *Educational Review*, 1–20. https://doi.org/10.1080/00131911.2024.2306938.
9. Harding, Debs and Boyd, Philippa (2024) *Generative AI and PhD supervision: A covert third wheel or a seat at the table*? In: ARCOM Conference 2024: Looking Back to Move Forward 40th Conference, 2-4 September 2024, London, https://ucem.repository.guildhe.ac.uk/id/eprint/125/
10. Jensen, L. X., Bearman, M., Boud, D., & Konradsen, F. (2025). Feedback encounters in doctoral supervision: the role of generative AI chatbots. *Assessment & Evaluation in Higher Education*, 1–14. https://doi.org/10.1080/02602938.2025.2478155
11. Kálmán, O., Horváth, L., Kardos, D., Kozma, B., Feyisa, M. B., & Rónay, Z. (2022). Review of benefits and challenges of co-supervision in doctoral education. *European Journal of Education*, 57, 452–468. https://doi.org/10.1111/ejed.12518
12. Kreber, C., Wealer, C., & Kanuka, H. (2021). Similarities and differences in how supervisors at Canadian and UK institutions understand doctoral supervision. *International Journal of Doctoral Studies*, 16, 657-688. https://doi.org/10.28945/4870
13. Kumar, V., & Kaur, A. (2019). Supervisory practices for intrinsic motivation of doctoral students: A self-determination theory perspective. International Journal of Doctoral Studies, 14, 581-595. https://doi.org/10.28945/4415.
14. Masek, Bin Alias, Maizam Alias, (2020). A Review of Effective Doctoral Supervision: What Is It and How Can We Achieve It?. *Universal Journal of Educational Research*, 8(6), 2493 - 2500. https://doi.org/10.13189/ujer.2020.080633
15. Mormul, Yevhenii; Przybyszewski, Jan; Nakoud, Andrew; Cuffe, Paul (2024). Conference paper: "Reliance on Artificial Intelligence Tools May Displace Research Skills Acquisition within Engineering Doctoral Programmes: Examples and Implications". figshare. Conference contribution. https://doi.org/10.6084/m9.figshare.27636564.v1
16. Overall, N. C., Deane, K. L., & Peterson, E. R. (2011). Promoting doctoral students' research self-efficacy: combining academic guidance with autonomy support. Higher Education Research & Development, 30(6), 791–805. https://doi.org/10.1080/07294360.2010.535508
17. Parker, J.L., Richard, V.M., Acabá, A. et al. Negotiating Meaning with Machines: AI's Role in Doctoral Writing Pedagogy. *Int J Artif Intell Educ* (2024). https://doi.org/10.1007/s40593-024-00425-x.
18. Patterson, C.A., Chang, C.N., Lavadia, C.N., Pardo, M.L., Fowler, D.A., and Butler-Purry, K. 34 (2019). Transforming doctoral education: Preparing multidimensional and adaptive scholars. 35 *Studies in Graduate and Postdoctoral Education*. Doi: 10.1108/SGPE-03-2019-0029.

19. Seeber, M. and Horta, H. (2021), "No road is long with good company. What factors affect Ph.D. student's satisfaction with their supervisor?", *Higher Education Evaluation and Development*, Vol. 15 No. 1, pp. 2-18. https://doi.org/10.1108/HEED-10-2020-0044
20. Spronken-Smith, R. (2023). The Possibilities of Personalised Pathways and Portfolios for Enhancing PhD Programmes, *Journal for New Generation Sciences* 21(1):1-13, http://dx.doi.org/10.47588/jngs.2023.21.01.a1
21. Subaveerapandiyan, A., Kalbande, D., & Ahmad, N. (2025). Perceptions of effectiveness and ethical use of AI tools in academic writing: A study Among PhD scholars in India. *Information Development*. https://doi.org/10.1177/02666669251314840
22. Thong, Chee Ling, Atallah, Zainab,Islam, Shayla, Lim, WeiLee, and Cherukuri, Aswani Kumar (2023). AI-powered Tools for Doctoral Supervision in Higher Education: A Systematic Review, *Journal of Information & Knowledge Management*, https://doi.org/10.1142/S0219649225300013.
23. Van der Linden, N., Devos, C., Boudrenghien, G., Frenay, M., Azzi, A., Klein, O., & Galand, B. (2018). Gaining insight into doctoral persistence: Development and validation of Doctorate-related Need Support and Need Satisfaction short scales. *Learning and Individual Differences*.
24. Woolderink, M., Putnik, K., van der Boom, H., & Klabbers, G. (2015). The voice of PhD candidates and PhDsupervisors. A qualitative exploratory study amongst PhD candidates and supervisors to evaluate the relational aspectsof PhD supervision in the Netherlands. *International Journal of Doctoral Studies*, 10, 217-235, https://www.researchgate.net/publication/280096349
25. Zou M, Huang L. (2023). To use or not to use? Understanding doctoral students' acceptance of ChatGPT in writing through technology acceptance model, Frontiers in Psychology, 26;14, https://doi.org/10.3389/fpsyg.2023.1259531.
26. *** Kings college of London: https://www.kcl.ac.uk/about/strategy/learning-and-teaching/ai-guidance/doctoral-assessment
27. *** Leeds university: https://generative-ai.leeds.ac.uk/ai-use-in-research/supervisor-guidance-for-research-degrees/
28. *** Ultster university workshops on the use of AI for research: https://www.ulster.ac.uk/doctoralcollege/supervisors/training-and-events/events/ai-and-the-phd
29. *** Elicit and ChatGPT were used for the structuring of the discussion points and as a mean of exemplifying the AI use in academia (*classic literature review was performed, documents uploaded, classical content analysis uploaded and AI tools asked to organize and structure the results*).