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The Future is Connection:

Collaboration, Creativity and Compassion in a Digital Society

Compassionate technology in teacher education: Advancing connection, care, and digital wellbeing in a digital society

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The rapid integration of artificial intelligence (AI) and digital technologies into teacher education has transformed teaching, learning, and professional preparation worldwide. While these innovations have enhanced accessibility, personalisation, collaboration, and instructional efficiency, they have also intensified concerns regarding techno-stress, digital fatigue, emotional disengagement, ethical dilemmas, and diminished human connection. These challenges highlight the need for educational approaches that balance technological advancement with compassion, inclusion, and digital wellbeing. This conceptual paper proposes a Human-Centred Framework for Digital Wellbeing in Teacher Education, developed through a critical synthesis of contemporary literature on compassionate pedagogy, ethical AI, digital wellbeing, inclusive education, and human-centred learning. The framework comprises five interconnected dimensions: Human-Centred AI Integration, Emotional and Psychological Wellbeing, Compassionate Pedagogical Practices, Inclusive and Equitable Digital Learning, and Ethical and Mindful Technology Engagement. Collectively, these dimensions position technology as a means of strengthening empathy, meaningful relationships, equity, and sustainable learning rather than merely improving efficiency. The paper discusses implications for teacher education curricula, digital pedagogy, institutional policy, and professional learning. It argues that preparing future teachers for AI-enabled classrooms requires not only digital competence but also the capacity to create ethical, inclusive, and compassionate learning environments that promote human flourishing in an increasingly digital society.

Keywords: Compassionate technology, digital wellbeing, teacher education, human-centred learning, AI in education, compassionate pedagogy, conceptual paper

Introduction

The rapid advancement of digital technologies and artificial intelligence (AI) has fundamentally transformed teacher education by reshaping how future teachers learn, collaborate, communicate, and develop professional competencies. AI-powered learning systems, adaptive learning platforms, learning analytics, virtual classrooms, and generative AI applications have expanded opportunities for personalised learning, timely feedback, and flexible access to educational resources (Holmes et al., 2019; UNESCO, 2023). These developments have accelerated the digital transformation of teacher education institutions, requiring future educators to develop not only digital competence but also the ability to use emerging technologies responsibly, ethically, and inclusively (Chan & Tsi, 2023).

Despite these opportunities, the increasing reliance on digital technologies has generated new educational and human challenges. Studies have reported that excessive technology use can contribute to techno-stress, cognitive overload, digital fatigue, emotional exhaustion, and reduced work-life balance among educators and students (Ayyagari et al., 2011; Tarafdar et al., 2015). Furthermore, AI-enabled educational systems raise important concerns regarding algorithmic bias, transparency, data privacy, academic integrity, and the preservation of human agency in educational decision-making (UNESCO, 2023; Williamson & Eynon, 2020). These concerns indicate that technological innovation, while valuable, must be accompanied by approaches that preserve empathy, trust, meaningful relationships, and learner wellbeing.

Within teacher education, these issues are particularly significant because teachers are expected to integrate technology while simultaneously fostering inclusive classrooms, ethical decision-making, emotional support, and collaborative learning. Consequently, teacher preparation programmes should move beyond developing technical proficiency to cultivating educators who can balance innovation with compassion and human-

centred pedagogical practices. Recent scholarship argues that effective AI integration in education should augment, rather than replace, the relational and ethical dimensions of teaching that remain uniquely human (Knaus, 2025).

The concept of digital wellbeing has therefore emerged as an important dimension of educational technology. Digital wellbeing refers to the optimal state in which individuals engage with digital technologies in ways that support their psychological health, meaningful participation, safety, and overall quality of life (Vanden Abeele, 2021). In educational settings, digital wellbeing extends beyond managing screen time to include emotional resilience, healthy technology habits, inclusive participation, and supportive learning relationships. Closely related is the notion of compassionate technology, which emphasises the design and use of digital technologies that promote empathy, care, accessibility, inclusion, and human flourishing rather than merely improving efficiency or automation (Knaus, 2025).

Although previous studies have examined digital wellbeing, ethical AI, inclusive education, and compassionate pedagogy as separate areas of inquiry, there remains limited conceptual work that integrates these perspectives into a comprehensive framework specifically for teacher education. Addressing this gap, the present paper proposes a Human-Centred Framework for Digital Wellbeing in Teacher Education that synthesises contemporary theoretical perspectives to guide the ethical, inclusive, and compassionate integration of digital technologies in teacher preparation. By positioning human connection and wellbeing at the centre of technological innovation, the framework contributes to ongoing discussions regarding the future of teacher education in increasingly AI-mediated learning environments.

Conceptual foundations of compassionate technology

The proposed Human-Centred Framework for Digital Wellbeing is grounded in complementary theoretical perspectives that collectively emphasise human flourishing, ethical responsibility, learner autonomy, inclusion, and sustainable technology use. Rather than viewing technology as an end in itself, these perspectives position digital technologies as tools that should enhance human capabilities, strengthen relationships, and support meaningful learning experiences.

Humanistic Learning Theory provides the philosophical foundation for compassionate technology by recognising learners as whole individuals whose cognitive, emotional, and social development are interconnected. Rogers (1969) argued that meaningful learning occurs in environments characterised by empathy, trust, authenticity, and respect for learner autonomy. Within digitally mediated learning environments, these principles suggest that technology should facilitate dialogue, reflection, creativity, and learner agency rather than merely delivering instructional content. Contemporary scholarship similarly argues that digital transformation in education should prioritise human-centred learning experiences that preserve meaningful teacher–student relationships alongside technological innovation (Knaus, 2025).

Complementing this perspective, the Ethics of Care proposed by Noddings (2013) positions care, responsiveness, and relational engagement as fundamental principles of education. In technology-rich learning environments, caring extends beyond interpersonal interactions to include the ethical design and implementation of digital systems that respect learners' dignity, diversity, and wellbeing. Compassionate technology therefore seeks to create learning environments where AI and digital tools strengthen rather than diminish empathy, inclusion, and meaningful human connection. Recent UNESCO (2023) guidance similarly emphasises that AI should be implemented in ways that uphold human rights, transparency, equity, and teacher agency.

The framework is further informed by Self-determination Theory, which identifies autonomy, competence, and relatedness as the three basic psychological needs underlying motivation and wellbeing (Deci & Ryan, 2000). Digital technologies that support learner choice, provide constructive feedback, and encourage collaboration are more likely to promote intrinsic motivation and sustained engagement. Conversely, excessive automation, algorithmic control, or dependence on AI systems may reduce learners' sense of autonomy and limit opportunities for authentic interaction. Human-centred AI therefore aims to augment professional judgement and collaborative learning rather than replace human decision-making (Chan & Tsi, 2023).

Another important theoretical perspective is Technostress Theory, which explains how excessive technological demands, information overload, continuous connectivity, and digital complexity may negatively influence users' psychological wellbeing (Tarafdar et al., 2015). Teacher educators and student teachers increasingly experience challenges associated with digital fatigue, emotional exhaustion, and blurred professional boundaries in technology-intensive learning environments. Addressing these concerns requires institutional practices that encourage mindful technology use, balanced digital engagement, and supportive learning cultures that prioritise wellbeing alongside productivity (Vanden Abeele, 2021).

The framework also draws upon Universal Design for Learning (UDL), which advocates designing learning environments that provide multiple means of engagement, representation, and expression to accommodate learner diversity (CAST, 2018). Compassionate technology extends these principles by ensuring that digital learning environments remain accessible, inclusive, and equitable for learners with diverse abilities, linguistic backgrounds, and socio-cultural contexts. Such an approach supports not only access to technology but also meaningful participation, belonging, and educational justice.

Collectively, these theoretical perspectives converge around a common principle: educational technologies should be designed and implemented to enhance human wellbeing, ethical responsibility, learner agency, and inclusive participation. Building upon these shared principles, the proposed Human-Centred Framework for Digital Wellbeing conceptualises compassionate technology as an approach that integrates AI and digital innovation with empathy, care, inclusion, and responsible educational practice, thereby supporting sustainable and relationship-rich teacher education for the digital age.

Need for compassionate technology in teacher education

The rapid digitalisation of education has created an urgent need to prepare future teachers who can integrate technology in ways that enhance learning while safeguarding human wellbeing. Although digital technologies have improved access to knowledge, collaboration, and instructional flexibility, they have also increased concerns regarding techno-stress, emotional disengagement, ethical decision-making, and digital inequality (Ayyagari et al., 2011; Tarafdar et al., 2015). Teacher education programmes must therefore move beyond developing technical competence to cultivating educators who can use technology responsibly, compassionately, and inclusively.

First, compassionate technology is essential for promoting digital wellbeing among teacher educators and student teachers. Sustained engagement with digital platforms can contribute to stress, burnout, and diminished work-life balance, whereas technology designed with human wellbeing in mind can support healthier and more sustainable learning environments (Vanden Abeele, 2021). Second, the growing use of AI in education requires future teachers to critically evaluate issues related to algorithmic bias, transparency, data privacy, and academic integrity while maintaining professional judgement and ethical responsibility (UNESCO, 2023; Williamson & Eynon, 2020).

Third, technology should strengthen rather than replace meaningful human relationships. Positive teacher–student relationships remain central to learner motivation, engagement, and academic success, even within digitally mediated environments (Cornelius-White, 2007). Compassionate technology therefore supports pedagogical practices that encourage empathy, dialogue, collaboration, and personalised support. Finally, equitable access to digital learning remains a critical concern. Inclusive technologies designed according to UDL principles can reduce barriers for learners from diverse socio-economic, cultural, and ability backgrounds, thereby promoting participation, belonging, and educational justice (CAST, 2018).

These considerations highlight the need for a human-centred approach in teacher education that balances technological innovation with compassion, ethics, inclusion, and learner wellbeing.

Methodological approach

This paper adopts a conceptual, theory-informed approach to framework development. The proposed Human-Centred Framework for Digital Wellbeing was developed through a critical synthesis of interdisciplinary

literature on digital wellbeing, compassionate pedagogy, ethical AI, inclusive education, and human-centred learning in teacher education. Foundational theories, including Humanistic Learning Theory, Ethics of Care, Self-Determination Theory, Technostress Theory, and UDL, were analysed to identify shared principles that inform compassionate technology integration (CAST, 2018; Deci & Ryan, 2000; Noddings, 2013; Rogers, 1969; Tarafdar et al., 2015). The resulting framework integrates these complementary perspectives into a holistic model that supports ethical, inclusive, emotionally sustainable, and human-centred digital learning environments. By synthesising contemporary scholarship with established educational theories, the framework offers a conceptual foundation for guiding future research, policy development, and pedagogical innovation in teacher education.

A Human-Centred Framework for Digital Wellbeing in Teacher Education

Drawing upon the theoretical perspectives discussed above, this paper proposes a Human-Centred Framework for Digital Wellbeing in Teacher Education (Figure 1). The framework conceptualises compassionate technology as the intentional design, adoption, and use of digital technologies and AI to promote human wellbeing, ethical responsibility, meaningful relationships, and inclusive participation within teacher education. Rather than viewing technology as a substitute for educators, the framework positions AI as a complementary resource that enhances teaching while preserving professional judgement, empathy, and learner agency (Chan & Tsi, 2023; UNESCO, 2023).

The framework comprises five interconnected dimensions that collectively support compassionate, sustainable, and human-centred digital learning environments. Although each dimension represents a distinct aspect of technology integration, they function synergistically to strengthen digital wellbeing and prepare future teachers for increasingly AI-mediated educational contexts (Figure 1).

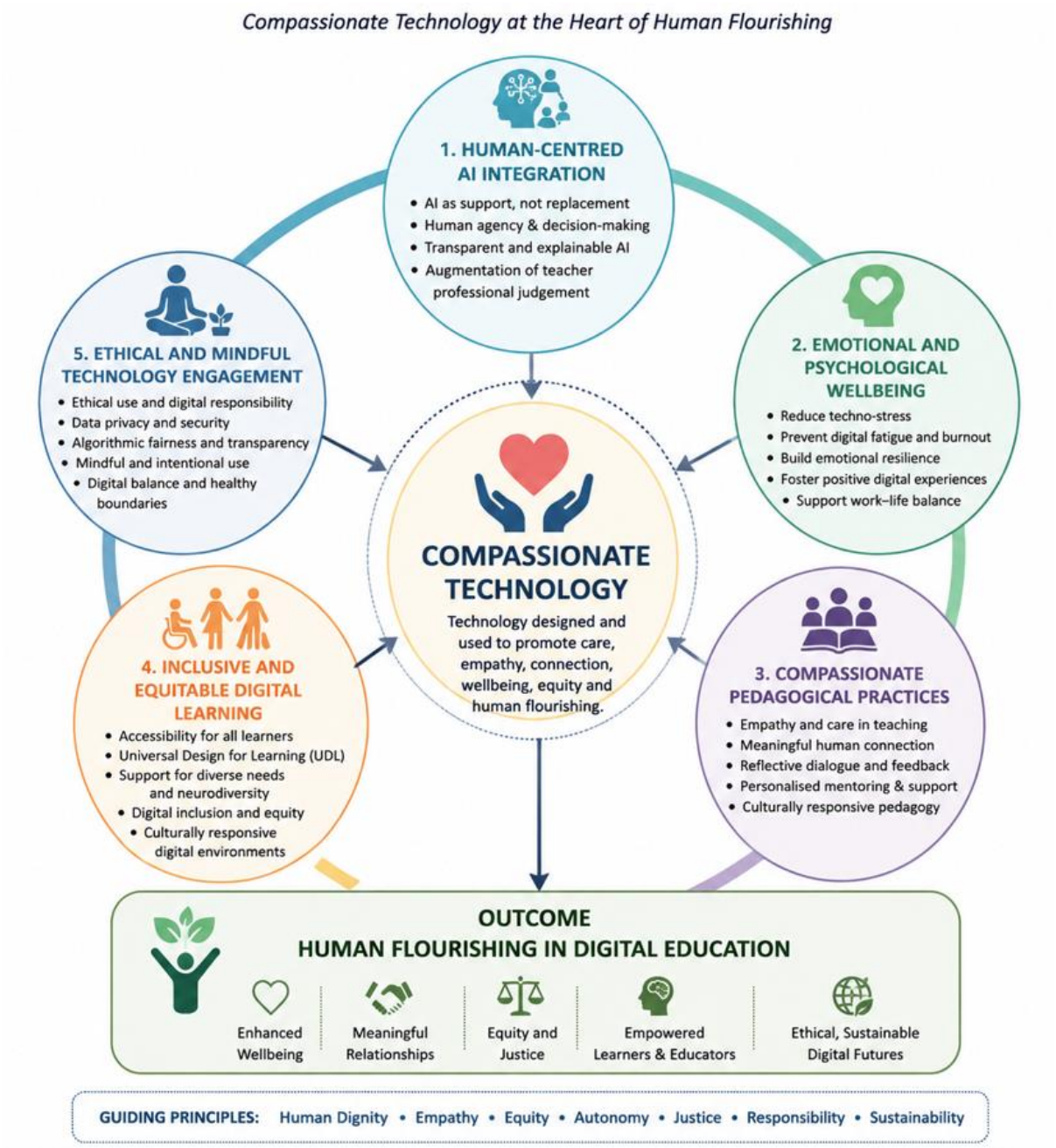


Figure 1. Human-Centred Framework for Digital Wellbeing in Teacher Education

Human-centred AI integration

The first dimension emphasises that AI should enhance rather than replace the professional expertise of teachers. Human-centred AI integration recognises educators as the primary decision-makers while positioning AI as a tool that supports instructional planning, assessment, feedback, and personalised learning. Effective AI integration therefore requires teacher education programmes to develop AI literacy, critical evaluation skills, and ethical awareness alongside technological competence (Chan & Tsi, 2023; UNESCO, 2023). Future teachers should be equipped to interpret AI-generated outputs critically, recognise algorithmic limitations, and ensure that pedagogical decisions remain informed by contextual understanding, professional ethics, and learner needs. In this framework, AI functions as a partner in teaching rather than an autonomous replacement for human judgement.

Emotional and psychological wellbeing

Digital wellbeing extends beyond technological proficiency to include emotional resilience, psychological safety, and healthy patterns of technology use. Increasing dependence on digital platforms has intensified concerns regarding techno-stress, cognitive overload, digital fatigue, and emotional exhaustion among both educators and learners (Tarafdar et al., 2015; Vanden Abeele, 2021). Consequently, compassionate technology should support sustainable engagement through balanced digital practices, manageable workloads, opportunities for reflection, and institutional cultures that prioritise wellbeing alongside academic achievement. Teacher education programmes should also prepare future teachers to recognise signs of digital stress and adopt strategies that promote resilience, mindfulness, and healthy technology habits.

Compassionate pedagogical practices

Compassionate pedagogy places empathy, care, dialogue, and relational engagement at the centre of teaching and learning. Although digital technologies facilitate communication and collaboration, they cannot substitute for the trust, encouragement, and emotional support that characterise meaningful educational relationships. Research consistently demonstrates that positive teacher–student relationships enhance learner engagement, motivation, and academic success (Cornelius-White, 2007). Within AI-enabled learning environments, compassionate pedagogical practices include empathetic communication, timely and constructive feedback, collaborative learning opportunities, personalised mentoring, and responsiveness to learners' emotional and academic needs. Such practices ensure that digital innovation strengthens rather than weakens the relational foundations of education.

Inclusive and equitable digital learning

Equity and inclusion constitute essential principles of compassionate technology. Despite significant advances in educational technologies, many learners continue to encounter barriers related to accessibility, disability, socio-economic disadvantage, language, and digital infrastructure. Guided by the principles of UDL (CAST, 2018), this dimension advocates the design of flexible and accessible learning environments that accommodate diverse learner characteristics and promote equitable participation. Compassionate technology therefore extends beyond providing access to digital resources by ensuring that all learners experience belonging, dignity, meaningful participation, and opportunities for success within technology-enhanced educational settings.

Ethical and mindful technology engagement

The final dimension focuses on the ethical, responsible, and reflective use of digital technologies. As AI becomes increasingly integrated into educational practice, future teachers require competencies related to academic integrity, responsible AI use, data privacy, digital citizenship, and ethical decision-making (UNESCO, 2023). Mindful technology engagement encourages educators and learners to use digital tools intentionally rather than habitually, recognising both the opportunities and limitations associated with AI-supported learning. Developing ethical awareness enables teachers to critically evaluate technological innovations while ensuring that educational decisions remain aligned with principles of fairness, transparency, accountability, and human dignity.

Taken together, these five dimensions position compassionate technology as a holistic approach to digital transformation in teacher education. The framework moves beyond technology-centred models by integrating pedagogical, psychological, ethical, and inclusive perspectives that collectively promote learner wellbeing and professional responsibility. It further responds to contemporary calls for educational systems that balance technological innovation with empathy, collaboration, and social responsibility, thereby contributing to the development of digitally competent yet compassionately oriented teachers capable of leading human-centred learning in the age of AI.

Educational implications

The proposed Human-Centred Framework for Digital Wellbeing has important implications for teacher education, educational policy, and professional practice. As digital technologies and AI become integral to educational systems, teacher preparation programmes must extend beyond developing technical proficiency to fostering ethical judgement, empathy, digital wellbeing, and inclusive pedagogical competence. The framework offers a holistic perspective that can guide curriculum design, institutional policy, and professional learning in preparing teachers for technology-rich educational environments.

Implications for the teacher education curriculum

Teacher education curricula should integrate digital wellbeing, compassionate pedagogy, AI literacy, and ethical technology use as core components of professional preparation rather than treating them as supplementary topics. Future teachers should be equipped not only to use AI tools effectively but also to evaluate their pedagogical value, ethical implications, and potential impact on learner wellbeing. Embedding these competencies across teacher education programmes can support the development of reflective practitioners capable of balancing technological innovation with human-centred educational values (UNESCO, 2023).

Implications for pedagogical practice

Teacher educators play a critical role in modelling compassionate technology use. Digital learning environments should encourage collaboration, dialogue, personalised feedback, and learner participation rather than focusing solely on efficiency or content delivery. AI-supported instructional practices should complement teachers' professional judgement while preserving empathy, creativity, and meaningful teacher–student relationships. Such approaches contribute to learning environments where technology enhances, rather than diminishes, human interaction (Chan & Tsi, 2023).

Implications for institutional policy

Higher education institutions should develop policies that promote responsible AI adoption alongside digital wellbeing. Institutional initiatives may include AI governance frameworks, digital wellbeing guidelines, professional development programmes, accessibility standards, and ethical data management practices. Equally important is the creation of organisational cultures that recognise wellbeing, inclusion, and sustainable technology use as essential indicators of educational quality rather than focusing exclusively on technological innovation or productivity (UNESCO, 2023).

Implications for inclusive education

Compassionate technology has particular relevance for inclusive teacher education. Digital platforms designed according to UDL principles can improve accessibility and participation for learners with diverse abilities, languages, and socio-cultural backgrounds (CAST, 2018). By encouraging equitable access, learner agency, and flexible pedagogical approaches, the framework supports educational environments in which all learners can participate meaningfully and experience a sense of belonging.

Future research

The proposed framework provides several directions for future research. First, empirical studies are required to validate the framework across different teacher education contexts and cultural settings. Future researchers may develop and validate instruments to measure the five dimensions of compassionate technology and examine their relationships with teacher wellbeing, AI readiness, digital competence, and professional identity.

Longitudinal and cross-cultural studies could investigate how compassionate technology influences learner engagement, resilience, ethical decision-making, and inclusive teaching practices over time. In addition,

intervention-based research may evaluate the effectiveness of digital wellbeing programmes, AI literacy initiatives, and compassionate pedagogical practices in improving educational outcomes. As AI technologies continue to evolve, further research should also examine how emerging tools can be integrated responsibly while maintaining transparency, equity, and meaningful human relationships within educational settings.

Conclusion

The rapid expansion of AI and digital technologies is transforming teacher education in unprecedented ways, creating opportunities for innovation while simultaneously raising concerns related to digital wellbeing, ethical responsibility, inclusion, and the preservation of meaningful human relationships. These developments require a shift from technology-centred approaches towards educational models that place human values at the core of digital transformation.

This paper proposed a Human-Centred Framework for Digital Wellbeing that conceptualises compassionate technology as the ethical and intentional integration of digital technologies to strengthen empathy, learner wellbeing, inclusion, and professional responsibility within teacher education. Grounded in Humanistic Learning Theory, Ethics of Care, Self-Determination Theory, Technostress Theory, and UDL, the framework integrates five interrelated dimensions: Human-Centred AI Integration, Emotional and Psychological Wellbeing, Compassionate Pedagogical Practices, Inclusive and Equitable Digital Learning, and Ethical and Mindful Technology Engagement. Collectively, these dimensions provide a holistic perspective for designing technology-enhanced learning environments that support both educational innovation and human flourishing.

The originality of the framework lies in its integration of pedagogical, psychological, ethical, and inclusive perspectives into a single conceptual model for teacher education. Rather than positioning AI as a replacement for teachers, it advocates a collaborative relationship in which technology augments professional expertise while preserving empathy, critical judgement, and authentic human connection. In doing so, the framework responds directly to contemporary calls for responsible and human-centred AI in education.

As educational systems continue to evolve in increasingly AI-mediated contexts, the future of teacher education will depend not only on preparing digitally competent educators but also on developing professionals who can lead with compassion, ethical responsibility, and a commitment to inclusive and sustainable learning. Compassionate technology therefore represents not simply a technological innovation but a guiding educational philosophy for ensuring that digital transformation remains firmly grounded in humanity.

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