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SHUTTLE
Sharing future learning enviroments

SHUTTLE Multidimensional Inclusive Pedagogical Learning Framework

Transnational Report:
Part One

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Title: Multidimensional Inclusive Pedagogical Learning Framework. SHUTTLE Transnational Report: Part One

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Project: SHUTTLE - Sharing Future Learning Environments in Higher Education and Lifelong Learning

Erasmus+ Cooperation Partnerships (Key Action 2)
Grant Agreement: 2024-1-PL01-KA220-HED-000256359

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1 The SHUTTLE Framework

According to the SYDLE website https://www.sydle.com/blog/education-5-0-61e71a99edf3b9259714e25a "Education 5.0 is the use of new technologies to provide more humanized teaching, with a focus on students' social and emotional development and solutions that improve life in society". Allegedly this is achieved through the development of collaborative skills, critical thinking, interdisciplinary problem-solving skills, interpersonal relations, empathy, tolerance of diversity, creativity, emotionally intelligent conflict management and fluid communication. Education 5.0 is also linked to the developments of AI-assisted teaching and learning, its opportunities, limitations, and political, social, cultural, philosophical and ethical risks.

The engagement of computing systems, such as AI, in human-like processes such as learning, adapting, predicting, summarising, self-correcting, and automating tasks will have a profound impact in Higher Education (HE) at the administrative, teaching, learning and research levels. The highest risk seems to be that of concentrating on education as a technological development rather than a human one and to just integrate a-critically Industry 4.0 technologies into learning, such as the Internet of Things (IoT), artificial intelligence, machine learning, or gamification.

SHUTTLE aims to explore how AI-powered computing systems can extend or augment possibilities of teaching, learning, and research and do so ethically, responsibly and humanely. Education 5.0 is about fostering deep learning (cognitive skills, emotional intelligence, social responsibility and ethical sustainable behaviour) and human thinking. It focuses on promoting the necessary skills development of educators, learners and stakeholders to collaboratively ask questions, critique and identify problems and risks in AI-assisted teaching and learning.

The ultimate end of Education 5.0 is to enhance the socio-emotional humane development of all HE stakeholders (Popenici and Kerr, 2017) and to respond to societal challenges. By collaborating with multiple stakeholder groups in and out of academia, the SHUTTLE project aims to develop solutions for both higher education and lifelong learning across sectoral, disciplinary, and cultural agendas, contributing to fair and equal society, sustainable development, and global citizenship.

1.1 The framework

The SHUTTLE framework provides structured guidelines for designing generative AI-assisted learning scenarios that foster skills development in transformational leadership, a core element of Education 5.0. By addressing the demands of digital transformation, the framework emphasizes innovative teaching practices and skill-building to equip Higher Education Institutions (HEIs) for their evolving societal roles. Furthermore, the SHUTTLE framework promotes inclusive and shareable learning environments, adaptable across various scientific disciplines and relevant societal stakeholders, most importantly employers.

Transformational leadership encompasses five key dimensions:

- **Self-leadership**
- **Collaborative leadership**
- **Business leadership**
- **Intercultural leadership**
- **Digital leadership**

Each dimension is grounded in diverse concepts that HE educators and students must understand and engage with to cultivate the skills necessary for thriving in a transformed HE landscape.

There are four parts to the SHUTTLE framework:

1. **A pedagogical framework (Part 1)** that describes in detail all the dimensions, topics and learning objectives described in the infographic. The concepts are clearly defined, providing educators and students with guidance to explore, understand, and effectively apply them in practice.

2. **A visual representation (Part 2)** of the pedagogical framework that outlines the key dimensions and concepts that must be considered when designing future learning scenarios aligned with the SHUTTLE vision

3. **A toolbox (Part 3)** of approximately 50 Open Educational Resources (OERs) has been curated to support the planning of learning scenarios using generative AI-assisted tools. This collection includes examples of lesson plans, pedagogical practices, and applied pedagogical research. Each OER has been carefully selected for its relevance and ability to facilitate skills development within the context of Education 5.0 learning scenarios.

4. **Guidelines for trainers (Part 4)** on each of the SHUTTLE framework dimensions that helps trainers navigate and apply the insights from the previous parts

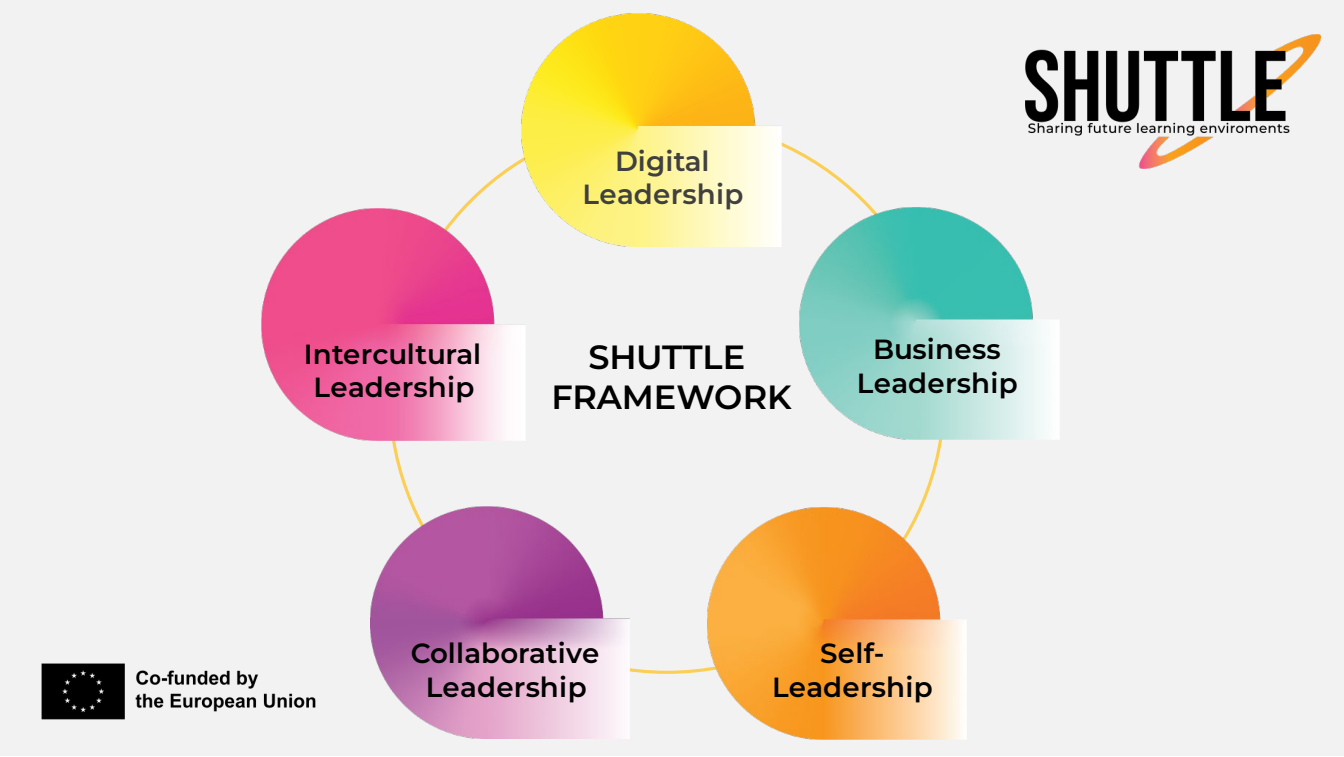

Fig. 1. SHUTTLE framework

1.2 Applications

The SHUTTLE framework offers Higher Education (HE) educators a valuable tool for planning future learning scenarios and advancing digital and collaborative pedagogies (with a particular emphasis on generative AI). See SHUTTLE Guidelines for Trainers.

It supports HE educators in designing pedagogical tasks and courses on transformational leadership, specifically by combining the dimensions of self-leadership, collaborative leadership, business leadership, intercultural leadership and digital leadership. By focusing on these leadership dimensions and their key concepts, SHUTTLE helps course designers, educators and learners develop educational activities, learning scenarios and tasks.

Educational activities and learning scenarios designed with the help of the SHUTTLE leadership dimensions and concepts help create a collaborative learning environment where HE educators and learners work in teams to

enhance their learning experiences and develop work-ready skills. By leveraging generative AI assisted digital technologies responsibly, creatively, and ethically, they also learn to address evolving digital, human and social challenges in education and lifelong learning collaboratively.

According to the UNESCO Institute of Lifelong Learning (UIL), lifelong learning integrates learning and living. In the context of the SHUTTLE project and higher education, we create learning environments that are shareable to learners interested in self-motivated formal, non-formal, and informal learning in diverse contexts in and out of academia, including personal learning contexts, communities, and the world of work. According to UIL, promoting lifelong learning is based on collaboration among multiple stakeholders, seeking to provide learners with opportunities "for their personal development and for the sustainable economic, social, cultural and environmental development of society." (UNESCO Institute for Lifelong Learning, 2025)

2 The Dimensions of the SHUTTLE Framework

2.1. Transformational leadership in the context of Education 5.0

The Fourth Industrial Revolution has triggered powerful changes in society and concomitantly in education. Education 5.0 should empower educators, learners, and stakeholders to innovate and collaborate for holistic education outcomes by integrating technology, sustainability, and human centric learning.

Teachers require tools, resources, and professional development opportunities to adapt to the rapid pace of educational innovation. They also need time and opportunities for several types of collaboration and experimentation with new pedagogies.

SHUTTLE envisages 5 powerful dimensions of transformational leadership that need to be addressed through education, namely: self-leadership, collaborative leadership, business leadership, intercultural leadership and digital leadership.

Self-leadership

What it is: Self-leadership is a self-influence process for achieving self-direction and motivation (Neck et al., 2019).

What it prepares learners to do: Self-leadership develops behaviour-focused strategies, such as self-discipline, accountability, and goal setting. It also develops natural reward strategies, such as intrinsic motivation and finding meaning in tasks. It further develops constructive thought patterns, such as self-talk, mental imagery and positive thinking. Self-leadership also prepares students to improve time management, study habits, and goal setting.

What it requires from HE educators and stakeholders: Self-leadership requires curricula and environments that balance academic, social, and emotional learning. Some examples of this are guiding learners in self-awareness, stress management, and decision-making while integrating AI as a supportive tool to enhance personalized learning, critical thinking, and feedback. Self-leadership emphasises continuous growth, reflection, and the practical application of self-leadership techniques through collaborative, adaptive, and real-world learning experiences.

Collaborative leadership

What it is: A modus operandi for highly networked, team-based, and partnership-oriented global business environments that can be translated into educational settings through non-hierarchical relations, knowledge sharing in teams, the co-creation of novel ideas, and the inclusion of diverse mindsets.

What it prepares learners to do: Collaborative leadership prepares learners to respect each other's points of view, positions, and mindsets; to negotiate values; to appreciate interdependence; to communicate effectively; to appreciate others' diverse ideas; and to strengthen an inclusive attitude.

What it requires from HE educators and stakeholders: Collaborative leadership encourages new attitudes towards collaboration between students, educators, industry, and policymakers to create a dynamic learning ecosystem.

Business leadership

What it is: Within the SHUTTLE framework, the dimension of business leadership refers to a sustainable and human-centered leadership approach that aims to harness business organizations as proactive contributors to sustainable development by engaging all their stakeholders from diverse backgrounds in solving human problems through transdisciplinary dialogue, digital community building, and shared value creation (Liao 2022; Kotler et al. 2021a&b).

What it prepares learners to do: It prepares learners 1) to empathetically listen to and invite dialogue about the needs and expectations of diverse stakeholders; 2) to create purpose-driven visions and value-based trust, resonance, and digital engagement among stakeholders; 3) to create new kinds of digital connectivity and stakeholder communities with new kinds of purpose and meaning; 4) to assess business success in terms of the triple bottom line (TBL) and sustainable development goals (SDGs), considering the wider impacts of business

organizations and their operations on economy, society, and the environment (Liao 2022; Kotler et al. 2021a&b).

What it requires from HE educators and stakeholders: It requires an ability to develop and share transdisciplinary leadership skills and competences that enable educational, business, non-profit, and public stakeholders to work together across sectors to solve common complex problems (Barrett et al. 2019).

Intercultural leadership

What it is: Within the SHUTTLE framework, intercultural leadership and its subset of intercultural communicative leadership in Education 5.0 refer to the ability to effectively navigate self and others through cultural differences on the one hand, and integrating technology, artificial intelligence (AI), personalized learning, and digital ethics to create learner-centered environments on the other hand. Intercultural leaders must navigate cultural, technological, and educational shifts while fostering inclusivity, equity, and innovation.

What it prepares learners to do: Intercultural leadership prepares learners to develop their skills in critical thinking, problem-solving, and creativity to be able to work in interdisciplinary and globalized contexts. In practice this means working effectively in multicultural teams respecting different perspectives and cultural practices while showing adaptability and resilience in the face of ongoing technological shifts in both educational and professional contexts. Learners engage with creative problem-solving by integrating cultural knowledge with technological tools such as AI and by fostering innovation that benefits global communities. This enables them to develop skills to communicate effectively across linguistic and cultural barriers and to embrace responsible and ethical engagement with digital technologies, AI, and social media, while respecting cultural norms and diversity.

What it requires from HE educators and stakeholders: Educators need to address diverse learner needs and design inclusive pedagogical learning activities and scenarios. They need to break down barriers to education, ensuring that marginalized groups (from diverse cultural backgrounds) have equal opportunities to succeed. Educators and stakeholders must develop their own intercultural and digital competencies to effectively guide learners in Education 5.0 environments. They are required to integrate in learning and teaching real-world scenarios that emphasize diversity and technological innovation. They also need to design teaching strategies that critically engage students with AI, highlighting its ethical implications and potential biases. Finally, they are required to leverage AI to offer personalized and participatory learning experiences that accommodate diverse cultural backgrounds and learning needs.

Digital leadership

What it is: Digital leadership is associated with guiding users to apply emerging digital tools and educational technology, sharing technological knowledge while

constantly testing the possibilities and limits of new digital solutions.

What it prepares learners to do: It prepares learners 1) to engage in ethical behaviours in a technology-driven world; 2) to use AI and other emerging technologies ethically and efficiently; and 3) to design both collaborative and personalized learning experiences.

What it requires from HE educators and stakeholders: Digital leadership requires the seamless integration of advanced technologies and enhanced accessibility, engagement, and equity among learners. It emphasises the ethical implications of using advanced technologies with special attention to ensuring data privacy, digital well-being, and ethical use of AI.

2.2 Self-leadership

Woods et al (2023) define self-leadership as an individual's capacity to influence themselves to achieve goals through behavioral, cognitive, and motivational strategies.

According to Miąsek and Bliźniuk (2014), self-leadership refers to the process by which individuals influence themselves to achieve self-direction and self-motivation necessary to perform. It involves self-awareness and self-regulation, enabling individuals to set personal goals, monitor their behavior, and manage their thoughts and emotions to achieve desired outcomes.

Dennison (2024) further highlights self-leadership as the ability to direct, influence, and regulate one's thoughts, emotions, and behaviors to achieve personal and professional goals.

Marquardson (2024) regards self-directed learning as a process where individuals take the initiative in diagnosing their learning needs, formulating goals, identifying resources, and evaluating outcomes, also considering how all this can be enhanced by the use of AI.

Key dimensions of developing self-leadership include:

- Understanding the foundations of self-leadership
- Applying self-leadership in professional and academic settings
- Promoting self-leadership in education and learning
- Integrating self-leadership with other improvement programmes
- Measurement & continuous improvement
- Integrating interactive & digital learning elements

Below, we list the main aspects of each of these self-leadership dimensions.

Understanding the foundations of self-leadership

It is important to understand self-leadership in its historical context (2006, 2010,

2021) as a self-influence process for achieving self-direction and motivation (Neck et al., 2019). The core strategies are:

- Behavior-Focused Strategies (self-discipline, accountability, goal setting)
- Natural Reward Strategies (intrinsic motivation, finding meaning in tasks).
- Constructive Thought Patterns (self-talk, mental imagery, positive thinking).

Applying self-leadership in professional and academic settings

- Career Success & Professional Growth: Applying self-leadership principles to career development, stress management in job interviews, and workplace performance.
- Entrepreneurship & Leadership: How self-leadership enhances entrepreneurial mindset and decision-making under pressure.
- Emotional Regulation & Stress Management: Self-leadership as a tool for managing high pressure environments, reducing anxiety, and improving resilience.
- Teamwork & Collaboration: The impact of self-leadership on team performance, communication, and motivation.

Promoting self-leadership in education and learning

- Academic Performance: Using self-leadership to improve time management, study habits, and goal setting.
- Self-Learning & Autonomy: Encouraging students to take responsibility for their learning outcomes through self-motivation and accountability.
- Training & Skill Development: Practical exercises on self-awareness, decision-making, and leadership empowerment.

Integrating self-leadership with other improvement programmes

- Professional Certification & Development: Linking self-leadership training with career advancement programs.
- Sales & Service Leadership: Self-leadership strategies for customer-facing roles and relationship management.
- Spirituality & Well-Being in the Workplace: Exploring the role of mindfulness, ethical leadership, and workplace spirituality.

Measurement & Continuous Improvement

- Self-Assessment Tools: Introducing the Abbreviated Self-Leadership Questionnaire (ASLQ) for evaluating personal growth.
- Case Studies & Real-World Applications: Analyzing successful self-leadership examples from business, sports, and academia.
- Reflection & Journaling: Encouraging students to maintain a self-leadership diary to track progress.

Interactive & digital learning elements

- Gamification & Simulations: Scenario-based challenges to apply self-leadership concepts.
- Peer Discussions & Group Activities: Collaborative learning through forums and virtual group projects.
- Personalized Coaching & AI-Based Feedback: Adaptive learning paths based on self-leadership assessment results.

2.3. Collaborative leadership

Collaborative leadership can be cultivated across multiple levels: 1) within organizations; 2) among higher education (HE) educators; and 3) between learners united by common goals.

The benefits of collaboration among diverse individuals are significant: it fosters equality, promotes inclusive teamwork, and introduces fresh perspectives that enrich problem-solving and learning processes.

Key principles for developing collaborative leadership in education include:

- **Group dynamics and collaboration**: Understanding and managing the interplay of group interactions effectively.
- **Skill development**: Building strong communication, negotiation, ethical decision making, and adaptability skills.
- **Cognitive scaffolding**: Providing structured support to help individuals expand their learning and understanding.
- **Cross-fertilization of ideas**: Encouraging the exchange of diverse viewpoints to generate innovative solutions.

By prioritizing these core concepts, educational settings can empower individuals to lead collaboratively and create more inclusive and dynamic learning environments.

Dynamics of group collaboration

Effective group collaboration requires a well-organized approach to teamwork, emphasizing factors such as optimal group size, clear role distribution, intrinsic motivation, active engagement, shared responsibility, mutual support, and collective decision making of group members.

Collaborative learning tasks should be meaningful and aligned with real-life scenarios, and they should provide inherent value to the group and its members individually and collectively. Facilitating group dynamics is essential to fostering **positive interdependence** among group members, enabling them to achieve shared learning goals effectively.

Scager et al. (2016, p. 2) define positive interdependence as the perception that each member's contribution is vital for the group's success in completing a given

activity. This concept is closely tied to **individual accountability**, which involves a dual responsibility: completing one's own work while actively supporting the efforts of fellow team members (Ibid, p. 2).

Another related concept is **promotive interaction**, wherein students encourage and facilitate one another's efforts to achieve group goals, addressing both group dynamics and the subject matter (Ibid, p. 2).

Additionally, **trust-building** and **the cultivation of positive peer relationships** are critical to establishing a collaborative environment that supports group success. These elements create the foundation for a cohesive team dynamic, enhancing the overall learning experience.

Learning tasks play a crucial role in shaping the dynamics of group collaboration. Scager et al. (2016, p. 3) introduce the concept of **structured task-based interdependence**, which encourages collaboration by requiring learners to exchange information or tasks in a "jigsaw" format. This approach compels learners to interact and cooperate meaningfully. To facilitate such interaction, group members can be assigned distinct roles, resources, or tasks. Alternatively, collaboration can be "scripted," wherein students are provided with detailed instructions guiding their interaction and teamwork processes (Ibid, p. 3).

Another important concept for fostering effective group collaboration is **shared leadership**. Shared leadership involves distributing decision-making responsibilities among group members or between teachers and students. When learners are granted the autonomy to make both individual and collective decisions within their groups, they are more likely to take ownership of the process. This sense of ownership not only enhances their motivation but also promotes a deeper engagement with the collaborative tasks.

Communicative, negotiation, ethical, and adaptive skills

Collaborative leadership implies understanding and applying relevant skills in authentic contexts that integrate real-world professional practices. Muukkonen et al. (2022, p. 2) highlight the importance of "orchestrating collaboration, and self and co-regulating performance".

Relevant literature points to four categories of important skills:

- Communicative skills, such as active listening and clarity in messaging
- Conflict management and problem-solving skills
- Skills of giving and receiving constructive feedback
- Skills to facilitate group discussions and manage tasks collaboratively.

Additionally, these skills and attitudes should be developed for collaborative leadership:

- Ethical reasoning
- Integrity

- Accountability
- Peer evaluation
- Adaptability to change and uncertain conditions
- Ability to critically analyze problems and collectively generate solutions.

Transdisciplinary work values interpersonal and communication skills for collaboration and teamwork as well as skills in critical thinking and "reflexivity", referring to an ability to analyse and question "one's own assumptions about knowledge" (Barret at al., 2019, p. 737).

Cognitive scaffolding

Cognitive scaffolding addresses the role of group mentors (such as HE educators) in collaborative leadership. One relevant concept connected to cognitive scaffolding is **object-orientedness** (Muukkonen et al., 2022, 3). This implies the organization of course collaboration "around shared knowledge objects (e.g., reports, designs)". By focusing on a particular object, group members' interactions become more meaningful and they approach the model of professional interactive practices.

All meaningful interactions should build on individual and group knowledge and skills, while group mentors (e.g. teachers or external stakeholders) can offer support for knowledge creation.

Active guidance from instructors or mentors is recommended for deeper engagement and understanding among team members, promoting effective collaboration and knowledge construction.

It is also important to allocate time for group members to reflect on their learning experiences during their collaboration. **Reflection** consolidates knowledge and enhances critical thinking abilities.

When working in transdisciplinary teams it is also important to co-develop educational scaffolding that supports co-learning across disciplines and sectors. This implies supporting students to critically analyse the contributions and limitations of their own and others' disciplinary approaches, reflect on those, and gain abilities to go out of their comfort zones and find new methodologies to address challenges of the social and political dimensions of common complex problems.

Cross-fertilization

Cross-fertilization in collaborative leadership is a powerful concept, as it emphasizes the integration of diverse perspectives, expertise, and resources across different fields or organizations. This process fosters innovation, growth, and problem-solving that extend beyond the boundaries of traditional educational institutions (Muukkonen et al., 4).

In the context of collaborative leadership, cross-fertilization can involve:

- Interdisciplinary collaboration
- Transdisciplinary approaches, which differ from inter- and multidisciplinary research approaches. The transdisciplinary research process involves researchers from multiple disciplines, diverse stakeholders, and policymakers who work together to build a shared vision to produce experiential knowledge to innovate approaches to common complex problems (Allen-Scott et al., 2015)
- Collaboration with external stakeholders
- Exchange of ideas and practices across educational institutions
- Co-created innovative design of projects, services, products, etc.

2.4. Business leadership

Business leadership refers to a sustainable and human-centered leadership approach that aims to harness business organizations as proactive contributors to sustainable development by engaging all their stakeholders from diverse backgrounds in solving human problems through transdisciplinary dialogue, digital community building, and shared value creation (Liao, 2022; Kotler et al., 2021a&b).

In the SHUTTLE framework, key principles for developing business leadership are based on the following leadership approaches:

- **Sustainable leadership** (Liao, 2022)
- **H2H business and marketing leadership** (Kotler et al., 2021a and 2021b)
- **Transdisciplinary leadership** (Barrett et al., 2019)

Sustainable leadership

According to a literature review of sustainable leadership by Liao (2022), scholars from different disciplines increasingly agree that integrating the concepts of sustainable development and leadership is key for building more sustainable business organizations. Sustainable leadership aims to respond to rapid global changes and digital transformation by promoting in-depth and extensive learning; long-term development and value co-creation; stakeholder dialogue; shared decision-making; active knowledge-sharing; organizational diversity; mutual learning and support; systematic innovation; high-quality solutions; ethical behavior; self-leadership; mutual trust; as well as job involvement and commitment.

Individual-level sustainable leadership skills include individuals' commitment to sustainable development, their moral values and principles, their ability to inspire people to develop themselves and innovate, their critical awareness and reflective learning abilities, and their self-leadership skills in terms of self-care and stress management.

Organizational-level sustainable leadership aims to shape a shared organizational vision, strategy, culture, and HR policy with basic skills and practices to develop the sustainable innovation of business models and solutions. Such an organizational culture is well poised to promote shared value creation through purpose driven interrelationships between individuals, business communities, the natural environment, as well as diverse societal and market needs.

Cross-level sustainable leadership refers to the systematic interaction and meaningful integration between individual and organizational values and practices aimed at achieving more sustainable and adaptable organizational cultures, business models, and economic systems affecting communities, societies, and the planet.

H2H business and marketing leadership

Kotler et al. (2021a & 2021b) present a human-centered business and marketing leadership approach that they call H2H Marketing, encouraging businesses to "make a positive contribution to solving social problems by becoming proactive change agents" (2021a, p. 217). According to the authors, businesses can achieve this by actively engaging all relevant stakeholders in sustained value co-creation.

The H2H marketing approach is based on an **H2H mindset** and **H2H marketing model**, which are briefly explained here:

H2H mindset: H2H marketing focuses on human interaction whose goal is to solve shared human problems, approaching stakeholders and audiences with emotional intelligence as human beings (rather than B2C or B2B target groups). The required H2H mindset acknowledges the interdependence and interconnectedness of stakeholders and seeks to align their vision, values, needs and interests to solve collective problems through sustainable business models and multi-stakeholder collaboration, using digitalization as a facilitator for co-innovation.

The H2H mindset is built on principles of

- Human-centeredness (common human problems at the core)
- Service orientation (sharing resources to help solve human problems)
- Agility and experimentation (learning through iterative trial and error)
- Empathetic understanding of other perspectives (emotional intelligence)

Overall, **the H2H marketing model** is based on methods and principles of **design thinking, service-oriented logic, and digitalization.** As a new business and marketing leadership model, H2H marketing is aimed at influencing and developing the H2H mindset of employees and other stakeholders and building a corporate culture that enables stakeholders to use their mindset to cope with digitalization, build trust, and find collective solutions to sustainability challenges and to the increasingly intensifying societal polarization.

Transdisciplinary leadership

According to Barrett et al. (2019), to be able to engage in strategic and purpose-driven stakeholder collaboration across sectors, as is also required by the principles of sustainable leadership and H2H marketing, HE researchers, teachers, and learners need transdisciplinary leadership skills. With the help of such leadership skills, it is then possible to effectively coordinate transdisciplinary teamwork, transdisciplinary educational research, and transdisciplinary learning.

In practice, transdisciplinary leadership requires an ability to identify, discuss, critically analyse, and integrate needs, problems, goals, perspectives, methods, solutions, and recommendations relevant to diverse disciplines and sectors.

Transdisciplinary educational research: The transdisciplinary research process involves researchers from multiple disciplines, diverse stakeholders, and policymakers who work together to build a shared vision to produce experiential knowledge and to innovate approaches to common complex problems (Allen-Scott et al., 2015). Based on transdisciplinary research, it is possible to co-develop educational scaffolding that supports co-learning across disciplines and sectors.

Transdisciplinary leadership skills: According to the findings of the 5-year action research by Barrett et al. (2019), there is an increasing need to train HE students for problem-solving across sectors and disciplines by guiding them to develop and share their transdisciplinary leadership skills. The authors found four categories of crucial transdisciplinary leadership skills that persistently need educational scaffolding:

- Teamwork, collaboration, communication, and conflict resolution
- Reflexivity regarding one's own disciplinary and cultural standpoints
- Transdisciplinary analysis of shared needs, goals, and recommendations
- Cross-sectoral engagement with community partners in real-world contexts.

In addition to developing such transdisciplinary collaboration and leadership skills for HE learners, it is also vital to create shared spaces and learning environments that enable HE researchers, teachers, and stakeholders external to academia to engage in corresponding skills development efforts.

2.5 Intercultural leadership

The intercultural leadership topics covered below are Intercultural Communicative Leadership (ILC), Digital Leadership and AI Ethics, and AI or technologically assisted pedagogies.

Akdere and Acheson-Clair (2021) discuss a research proposal to examine the effectiveness of existing and emerging learning environments, particularly video based, virtual-reality (VR) based and augmented-reality (AR) based simulations on cognitive (knowledge), affective (attitudes) and behavioural (skills) aspects of

intercultural leadership competence (ILC) development.

The authors see that the foundation of ILC is in the general intercultural competence defined by Deardorff (2006), which is the ability to communicate effectively and appropriately in intercultural situations based on one's intercultural knowledge, skills, and attitudes. The article suggests creating a simulation series for each technology-assisted learning environment and discusses its advantages.

The authors of the U.S. Department of Education report *Artificial intelligence: A strategic framework for the future of education* (2023) analyse the current state of affairs regarding the use of AI in the US education system and highlight some of the emerging issues including fairness, privacy, and surveillance issues.

In addition to the lack of understanding of AI and AI-powered tools by both learners and teachers, the report mentions the potential risk for bias and unfairness being hardwired into any potential AI system and warns against "unintended consequences" of unscrutinized and unreflected AI use.

This concern falls in line with concerns regarding the so-called AI bias voiced by AI Ethics (Coeckelbergh 2020), issues traditionally discussed in philosophy of technology (ethics by design, naive, anthropocentric, and/or instrumental approach to technology). These concerns are particularly relevant within the context of both ICC and ICL, as well as more generally within the context of digital humanities in general (Coeckelbergh, 2024).

Furthermore, and in line with these considerations, the report mentions a potential risk of unintended consequences as a result of the reliance on mass data collection and pattern recognition, namely, what data sources are being collected and how patterns are being recognized: for example, is each data set given equal weight or are there some kind of vetting or specific criteria included, introducing the concept of "algorithmic discrimination".

Focusing on the cognitive and psychological impact of AI in education, Ahmad et al. (2023) discuss the relationship between the use of AI and loss in decision making, laziness, and safety in education.

The authors highlight the importance of cybersecurity and ethics in the use of AI in the classroom and argue that the increasing role of AI should be balanced by promoting authenticity, creativity, independence, and critical thinking, emphasising that 'human scrutiny must never be neglected".

Although the conclusions rely on a study conducted at a limited number of universities in Pakistan and China, they are in line with the current debates within the field of AI ethics and philosophies of technological mediation (see e.g. Verbeek, 2006), namely, the discussions regarding agency, choice delegation, or choice architecture. The conclusions of this research point to the danger of potential cognitive costs of reliance on AI tools, emphasising the need for educational strategies that "promote critical engagement with AI technologies." (Gerlich, 2025)

How these concerns play out in the field of ICC and ICL is discussed in articles by Dai & Hua (2024) and O'Regan & Ferri (2024). Dai & Hua (2024) once again highlight the potentially adverse effects of "deep learning of the patterns in their training datasets" reflected in the results "produced by Gen AI" and the resulting "representation of culture in the data sets". Discussing some examples of biased, stereotypical or simply wrong AI-generated images, the authors conclude that, importantly, "every time we ask Gen AI to generate new content, whether it is text, images, music, audio, or videos, we are producing and reproducing essentialised artefacts of culture and shaping the understanding of culture". The problem seems to be exacerbated by the loopy or autopoietic nature of Gen AI, which by generating more biased content, feeds back into the data sets Gen AI draws on "and perpetuates discourses of essentialised cultural artefacts". It is then the role and responsibility of the educator or trainer to work with AI in a way that does not reinforce stereotypes, including the curation by professionals and developers.

In a similar vein, O'Regan & Ferri (2024) point out what AI ethics describes as the issue of fairness, accountability, and transparency, as "AI can produce outputs that appear to be humanly generated and therefore 'authentic', primarily by trawling through data that are already available and producing from that data hybridised outputs that appear plausibly coherent and real".

The authors draw on the distinction between the world qua an open system and the world qua a closed system (as advocated by positivism and objectivism - and empiricism in social science) to argue that this scientific/positivist approach reduces "questions about what is (ontology) to questions about what we know (epistemology)". This is an "epistemic fallacy", which eradicates and ignores all irregularities, lacking in "ontological depth". AI outputs can thus be argued to produce an illusion of empirical realism, producing reifications or essentialised images of complex cultural phenomena and perpetuating gender and racial biases embedded in AI (Jenks 2024). These issues once again highlight the responsibility of ICC and ICL teachers and trainers using AI powered tools to encourage critical engagement and reflective use of such tools.

In conclusion, although the articles address a wide range of topic areas and problems, it is possible to generalise the following:

- **The need to remain interdisciplinary** (i.e. not to "compartmentalise" skills or knowledge): Within the current technologically assisted learning environments, the distinction between digital and intercultural leadership becomes blurred.
- **Engage critically**: Teachers and trainers are responsible to develop a meaningful, critically engaged, and reflective practice when using (Gen) AI tools with their students.
- **Be mindful of the complexities of human-technology bonding:** Meaningful engagement with technologies that are not naively human-centric but recognise the complexity of human-technology relationships (Coeckelbergh 2024) as well as the many ways in which technologies (including gen AI) produce meaning.

The following list contains a selection of key concepts to consider for intercultural communicative leadership (ICL):

Generative AI bias and stereotypes

The tendency of generative AI systems to reproduce or amplify existing societal biases and stereotypes present in their training data can result in discriminatory or unfair outputs.

Essentialisation

Essentialisation is a process, often accelerated by inconsiderate use of AI, in which complex social or cultural traits are reduced to fixed, simplistic, or inherent characteristics, often ignoring diversity and fluidity within groups.

Reification of culture

Reification of culture means treating culture as a static, concrete entity rather than a dynamic and evolving set of practices, values, and symbols shaped by human interactions and experiences.

AI for professional intercultural communication (AI-for-PCIC)

The use of AI tools to enhance communication and collaboration between cultures in professional settings, enabling improved understanding, language translation, and context-aware interactions.

AI and privacy

Concerns and challenges related to the collection, use, and storage of personal data by AI systems, raising issues about consent, data security, and individual rights.

AI surveillance

The use of AI technologies to monitor, track, and analyse individuals or groups, often raising ethical concerns about privacy, consent, and potential misuse.

AI fairness and transparency

Principles aimed at ensuring AI systems operate equitably, without discrimination, and in a way that decision-making processes are understandable and accountable to users.

Algorithmic discrimination

Unfair treatment or bias introduced by algorithms, often due to biased training data, flawed design, or lack of diverse representation in system development, or simply due to lack of reflectivity of the users.

(OpenAI. (2025). Definitions adapted based on text generated by ChatGPT on generative AI, bias, and intercultural communication. Retrieved January 15, 2025, from https://chat.openai.com/)

2.6. Digital leadership

Generative AI tools, particularly ChatGPT, as natural language models, are impacting education as a tool for generating human-like text and assisting in several educational tasks. While AI tools help users save time and tailor tasks and instructions according to learners' needs, digital leadership also requires analysis, evaluation, adaptation, and eventually reflective thinking.

There are several **limitations to the use of generative AI tools**, such as the following:

- Biases in generated content
- Misinformation, incorrect answers, random additional output, and 'hallucinations' render correction time-consuming
- Potential misuse (e.g. plagiarism)
- The need for human oversight
- The need to evaluate and adapt the content
- Ethical problems of using AI, including issues with bias.

From the perspective of the learner, generative AI can analyze learning preferences and adapt lesson plans to better match individual learning styles. This personalization aims to boost engagement and improve comprehension by making the learning process more relevant to each learner (Kehoe, 2023).

HE educators, HE learners, and lifelong learners need training in how to use and integrate generative AI in Education 5.0. Some suggestions include:

- **Teacher education programs** about the effective use of generative AI tools. This includes understanding AI algorithms and evaluating AI-generated content across different subjects.
- **Practical opportunities**, such as workshops, webinars, and interactive sessions to gain hands-on experience with various generative AI platforms. Such training enables learners to explore the full potential of these tools in designing engaging and effective lesson plans.
- **Collaboration with technology experts**: Collaboration between teacher training institutions and technology experts is essential. Partnerships with AI developers ensure that pre-service teachers are trained on the latest, most effective tools, promoting safe and efficient adoption of generative AI technologies.
- **Ethics and quality control**: Trainers should emphasize the importance of critically evaluating AI generated content to maintain quality and ethical standards. This includes ensuring accuracy, avoiding biases, and creating inclusive, context-appropriate teaching and learning materials.
- **Encouragement of AI literacy**: Trainers are encouraged to cultivate AI literacy among learners, helping them to understand both the capabilities and limitations of generative AI tools. This literacy enables both teachers and learners to use AI ethically and responsibly in classroom settings.

The main concepts for digital leadership are the following:

Role of generative AI in teaching and learning

Tools like ChatGPT can be utilized for lesson planning and the creation of educational content. It is possible to develop structured and personalized lesson plans with AI assistance. The benefits of AI in education are efficiency, creativity, and quality control provided by the automation of educational processes, but there are biases and limitations that need to be considered.

Critical thinking and ethical use of AI

The use of generative AI requires critical thinking through the evaluation and adaptation of AI generated content. There are limitations and ethical challenges, such as biases, plagiarism, and human oversight, which highlight the need for conscious usage. The ethical use of AI demands cultural sensitivity and inclusivity in the critical evaluation of AI-generated materials.

Flexible AI-based curriculum development

The Education 5.0 framework, integrating technology, humanities, and local wisdom to prepare students for the future can harness generative AI through curriculum development and innovation based on 21st-century competencies. Generative AI can support curricular innovation that translates into flexibility of use, personalisation, and collaboration with stakeholders in curriculum creation.

AI-based personalisation in self-directed learning

Generative AI can support openness in education through open access to educational resources such as lesson plans and support materials. It also makes it possible to tailor teaching according to individual learning styles and interests. Such personalised learning experiences can enhance learner engagement.

Preparing educators and learners for the future

It is important to train teachers in AI literacy and to promote their role as facilitators and motivators in the learning process. Collaboration with tech experts is important, and partnerships between educators and the tech industry are encouraged to keep teacher training up to date.

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