Medienimpulse
ISSN 2307-3187
Jg. 63, Nr. 1, 2025
doi: 10.21243/mi-01-25-16

AI in Global Teacher Collaboration: Lessons from Singapore, Australia, and Austria

Claudia Muellauer

Thi Diem Hang Ngo

Sea Fong Liang

This study explores how AI-enhanced teacher collaboration and student engagement emerged in a partnership among educators from Singapore, Austria, and Australia. Using tools like ChatGPT, BriskTeaching, Magic School AI, and DALL-E 3, teachers improved collaboration, pedagogical adaptability, and student interactions. Findings highlight how institutional policies shaped implementation: structured adoption in Singapore, open experimentation in Austria, and cautious integration in Australia. Teachers developed AI literacy while facing challenges

such as ethical concerns and AI's ecological impact ('AI paradox'). Ultimately, AI supported teaching, student motivation, and human connection but did not replace pedagogical expertise.

Die vorliegende Fallstudie untersucht die Auswirkungen Künstlicher Intelligenz (KI) auf die Zusammenarbeit zwischen Lehrkräften und das Engagement von Schüler:innen in einer Kooperation zwischen Pädagog:innen aus Singapur, Österreich und Australien. Die Implementierung von KI Instrumenten wie ChatGPT, BriskTeaching, Magic School AI und DALL-E 3 optimierte die Kooperation, erleichterte die Anpassung der Lehrmethoden und intensivierte die Interaktion mit den Schüler:innen. Die Umsetzung wurde maßgeblich von institutionellen Richtlinien geprägt: Singapur setzte auf eine strukturierte Einführung, Österreich experimentierte offen, und Australien integrierte KI vorsichtig in den Unterricht. Lehrkräfte entwickelten ihre KI-Kompetenz weiter, standen jedoch vor Herausforderungen wie ethischen Fragen und den ökologischen Auswirkungen der Technologie („KI-Paradoxon"). Insgesamt verbesserte KI die Unterrichtspraxis und förderte zwischenmenschliche Verbindungen, ersetzte jedoch nicht die pädagogische Expertise der Lehrkräfte.

1. Context and Backgrounds

The integration of artificial intelligence (AI) in education is reshaping teaching and learning, offering new opportunities for collaboration, personalization, and efficiency. As AI becomes widespread, educators must balance effective implementation with pedagogical integrity. Through the ASEFClassNet17 project, we explored this challenge, coming together from Austria, Australia, and Singapore to design and implement an AI-enhanced climate change ed-

ucation program (ASEF 2024a). What made our initiative unique was our dual role – both as practitioners using AI in teaching and as researchers analyzing its impact on pedagogy, collaboration, and student engagement.

Titled *From Alps to Singapore to Outback: Climate Activism Insights and Impact*, we were strategically grouped by Asia-Europe Foundation (ASEF) to ensure regional diversity and similar student age levels, meeting weekly to develop shared resources, coordinate lessons, and document our experiences. As educators, we implemented a project-based learning approach, guiding students through local activism research, collaborative Padlet discussions, and AI-supported digital storytelling. Our goal was not only to raise awareness of climate activism across different cultural contexts but also to introduce students to generative AI technologies, encouraging critical engagement with both their benefits and limitations. As researchers, we examined AI tools impact on collaboration, pedagogy, and student engagement through reflective journals, meeting recordings, student feedback, and assessment frameworks. This process revealed potential to enhance teaching efficiency and adaptability but also highlighted challenges, including content accuracy, ethical concerns, and "AI hallucinations"—Instances where GenAI generates plausible yet incorrect information.

We selected AI tools based on familiarity and evolving expertise, but their impact varied. ChatGPT & CoPilot aided lesson planning but often produced generic content requiring refinement. Brisk-

Teaching's paid version provided targeted, context-aware feedback, streamlining assessment. Magic School AI automated feedback but sometimes lacked depth for meaningful guidance, it proved more useful in the modified class setting. DALL-E 3 generated visuals, though often superficial or inaccurate, requiring teacher intervention. Suno enabled AI-generated music but had limited pedagogical value. InVideo streamlined digital storytelling but risked over-reliance on AI rather than student creativity. While these tools improved efficiency, their use required continuous oversight and adaptation.

2. Introduction

The rapid rise of AI is reshaping education, influencing communication, lesson planning, and student support. A 2024 *Frontiers in Artificial Intelligence* editorial highlights Industry 5.0's focus on Human-Centered AI (HCAI), which aims to enhance—not replace—human expertise. It states that HCAI "assumes a pivotal role in shaping this industrial era" and "prioritizes the augmentation, rather than the replacement, of human capabilities" (Mentzas et al. 2024: 3). While this aligns with the idea that AI should support, not replace, teachers, its impact depends on implementation, policy, and institutional priorities rather than on technological potential alone.

This case study examines AI's role in teacher collaboration across borders—not as a simple automation tool, but as a mechanism

for cross-cultural exchange and professional development. Based on experiences in Singapore, Austria, and Australia, we explored:

1. How do AI-enhanced tools support effective communication, curriculum coordination, and competence development among teachers in intercultural collaborations?
2. What factors contribute to successful collaborative curriculum design and student engagement in AI-supported international partnerships, particularly regarding climate activism education?
3. What ethical, ecological, and institutional challenges and opportunities emerge when integrating AI tools in diverse cultural and policy contexts, such as Singapore, Australia, and Austria?

While most research separates AI in education from international collaboration, we examined their intersection. Comparing three distinct education systems, we analyzed how policy, culture, and technology shape AI's role in teaching. However, this study is based on a small sample and relies primarily on researcher self-reporting, which introduces potential bias in assessing AI's effectiveness. While reflections and recorded discussions provided valuable insights, they might not fully capture the complexities of AI integration in broader educational contexts. Our findings provide practical insights into AI's limitations and potential, emphasizing that its effectiveness depends more on teacher agency, institutional policies, and critical adaptation than on AI itself. Industry 5.0 promotes ethical, inclusive, and sustainable AI integration (Mentzas et al. 2024), but whether these ideals translate into meaningful educational change remains an open question. While this study provides insights into AI's role in teacher collaboration, its findings are based on a small, self-reported sample. Future re-

search should include larger, more diverse participant groups to validate these findings.

3. Theoretical Framework

We examined how AI enhances cross-cultural teacher collaboration by drawing on media pedagogy, Communities of Practice, and action research frameworks. As practitioners rather than media pedagogy experts, we applied these concepts to understand AI's influence on teaching strategies while acknowledging the limitations of our small sample size and self-reported data, which affects the generalizability of our findings.

3.1 Framing the Project within Media Pedagogy

Media pedagogy explores how digital tools shape teaching practices and critical media literacy (Share et al. 2016). Our project followed ASEFClassNet17's two-part approach to AI education (ASEF 2024b): "Learning about AI" develops critical awareness of AI capabilities, biases, and social impacts (Ng et al. 2025; Crawford 2022; Robertson et al. 2016), while "Learning with AI" focuses on implementing AI for instructional design and personalization (Holmes/Tuomi 2022). We found that AI's educational value depends heavily on thoughtful implementation, teacher oversight, and adaptation to classroom contexts rather than the technology itself (Davies et al. 2021). This project aimed to develop media competence by fostering both AI literacy and the critical application of AI tools in education. Incorporating insights from recent

Medienimpulse publications, this study aligns with contemporary discussions on AI in media pedagogy. Sabitzer, Hörmann, and (2024a) emphasize that AI integration in education must go beyond automation, fostering creativity, linguistic development, and critical engagement with digital content. Their work highlights the necessity of AI literacy as an interdisciplinary competence, ensuring students develop problem-solving skills alongside technological proficiency (Sabitzer 2023). Furthermore, they argue against simplistic narratives of AI's role in education, advocating for a nuanced approach that considers ethical, didactic, and technological implications (Sabitzer et al. 2024b). These perspectives support our application of media pedagogy principles, positioning AI as a tool for reflective and adaptive learning rather than mere efficiency enhancement.

3.2 Supporting Frameworks

We applied additional frameworks to complement our media pedagogy approach:

Action research (Bradbury 2015) guided our iterative refinement of AI teaching strategies through cycles of planning, action, observation, and reflection. This allowed us to adapt our implementation based on real-world challenges including student engagement, institutional constraints, and ethical concerns. We acknowledge that our reliance on self-reported reflections introduces some subjectivity and may not fully capture AI's long-term learning impact.

Communities of Practice (CoPs) (Lave/Wenger 1991) structured our cross-cultural knowledge exchange. Our CoP featured a shared domain (AI in education), a community (teachers and students), and shared practice (developing AI-enhanced lessons) (Easley/Kleinberg 2010; Holmes/Tuomi 2022). This framework proved valuable for collaboration across different educational systems. For teachers, CoPs facilitated resource sharing, with AI-generated materials serving as adaptable templates that could align with varied national curricula and institutional policies (Zewe 2023). Students formed their own CoP through climate activism projects, using Padlet and InVideo to share research findings and AI-assisted content, which deepened their engagement with climate issues while developing critical AI literacy.

While Industry 4.0 emphasized automation, Industry 5.0 promotes human-AI collaboration and teacher agency (World Economic Forum 2022; Teachflow 2023). Our findings suggest that AI's ability to support culturally responsive education depends on teachers' critical assessment and contextualization skills (Sevak 2024). Although AI-powered CoPs can enhance teacher collaboration, their effectiveness ultimately depends on teacher expertise, institutional support, and critical engagement with AI-generated content. At the same time, AI isn't just a passive tool—it actively influences how knowledge is created and shared. That's why educators must critically engage with AI-generated content (Coeckelbergh 2020) to ensure technology supports, rather than undermines, teacher agency and student learning. Despite AI's benefits,

scholars warn against over-reliance on these tools. AI-driven personalization can shift control from teachers to opaque algorithms (Williamson 2020), potentially reinforcing educational inequalities (Selwyn 2019).

4. Methodology

This study employed a CoP approach to examine AI integration in cross-cultural education. The research was structured in two phases, combining theoretical exploration and practical implementation while addressing the opportunities and limitations of AI-supported teaching.

The first phase (April–July 2024) focused on knowledge-building and educator training through virtual sessions featuring multiple AI education experts, including Wayne Holmes, with mentorship provided by Juliette Bentley as the assigned group mentor (MEd, Adobe Creative Educator Innovator). These sessions established a theoretical foundation in AI literacy, ethics, and pedagogical considerations. While discussions provided valuable insights into AI's potential, they also exposed gaps in existing frameworks, particularly regarding the pedagogical validity of AI-generated content and ethical concerns surrounding automation in education.

The second phase (August–November 2024) involved the design, application, and evaluation of AI-enhanced teaching practices. The study aimed to critically assess AI's role in climate education across different cultural and institutional settings. Teachers met weekly to collaborate on lesson planning, analyze AI-generated

materials, and reflect on the challenges of integrating AI into classroom practice. The focus was twofold: first, to examine how AI-supported inquiry-based learning, digital storytelling, and climate activism influenced student engagement, and second, to evaluate the extent to which AI tools supported rather than replaced effective teaching. Despite its potential to streamline lesson planning and resource sharing, AI's practical application varied across contexts, requiring substantial human oversight to ensure alignment with curriculum objectives and institutional policies. Findings were presented and critically discussed during the ASEFClassNet17 in Manila in November 2024 (ASEF 2024c), facilitating peer review and broader discourse.

Aligned with SDG 13 – Climate Action, the project engaged students in local and international activism, encouraging them to analyze climate policies, compare advocacy strategies, and share insights globally. AI tools were integrated to support lesson development, structured debates, and digital content creation, though their effectiveness remained contingent on teacher mediation and contextual adaptation. The tools used included large language models like ChatGPT, Copilot, Claude, and specialised tools like BriskTeaching, Magic School AI, Suno, InVideo, and DALL-E 3, each with distinct advantages and limitations.[1] BriskTeaching was particularly useful for automating lesson planning and personalized feedback, though the paid version offered more precise and context-aware feedback. Claudia used BriskTeaching to generate presentations on climate challenges in Austria, drawing from pub-

licly available resources such as Österreich.gv.at, demonstrating the potential for AI-assisted localization of learning materials. Magic School AI facilitated brainstorming and structured writing prompts, though its analytical capabilities were limited by a lack of contextual nuance, requiring teacher intervention to refine output. Suno was introduced to allow students to compose AI-generated climate activism songs, which enhanced engagement but contributed more to student motivation than substantive learning outcomes. InVideo simplified the process of digital storytelling, yet its reliance on AI-generated content raised concerns about students becoming passive consumers rather than active creators. Similarly, DALL-E 3 allowed students to visualize climate scenarios, yet the generated imagery was sometimes factually inaccurate or lacked depth, necessitating critical evaluation by students and educators.

The implementation of AI tools followed the SAMR model (Puentedura 2018), distinguishing between substitution, where AI automated basic tasks such as summarizing research, and redefinition, where AI-enabled students to co-create digital projects and engage in global discussions on climate action. However, while some tools allowed for authentic engagement and creativity, others risked fostering dependency on AI-generated content rather than cultivating analytical and research skills. The study revealed significant disparities in AI implementation across educational contexts, with institutional constraints shaping its effectiveness. Privacy regulations in Australia, for instance, restricted real-time

student participation, necessitating asynchronous engagement via Padlet, which limited direct interaction. Differences in technological infrastructure also affected classroom integration, with some schools having limited access to advanced AI platforms, restricting the scope of experimentation. The ethical implications of AI in climate activism education further underscored tensions between technological innovation and sustainability, particularly regarding the paradox of using energy-intensive AI to promote environmental awareness. Throughout the study, the necessity of teacher oversight remained a central finding, as AI-generated materials frequently required refinement to address inaccuracies, biases, and cultural insensitivities.

By structuring the study around cross-cultural collaboration and iterative implementation, the methodology provided insights into both the potential and constraints of AI in education.

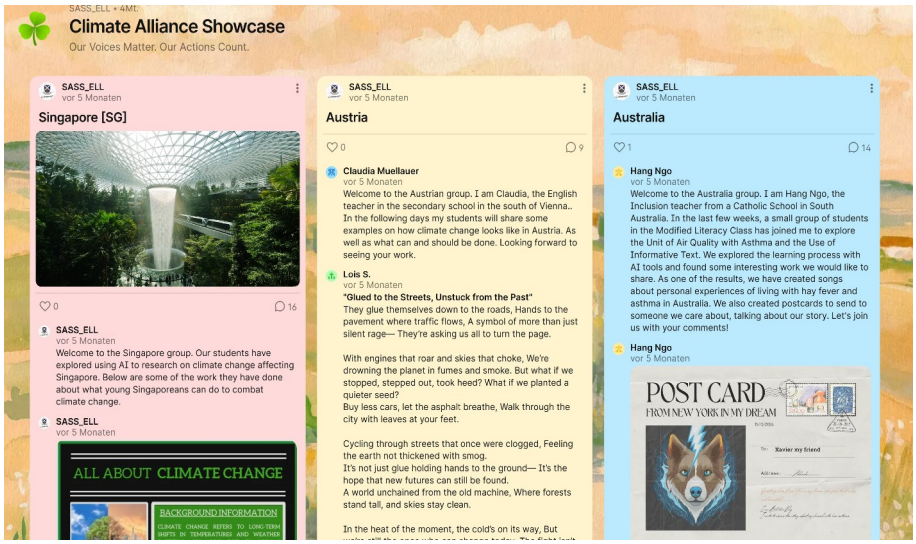

Figure 1: Padlet Screenshot Climate Alliance

After establishing the framework, we volunteered for lesson components matching our expertise, ensuring resources were tailored to local educational standards and student needs. The process was systematically documented through recorded meetings, shared national education frameworks, and theoretical models, with all data stored in a shared Google Drive folder. A project website was created for dissemination at the conference, and the student Padlet remains active for ongoing collaboration and resource sharing.

4.1 Data collection

This study employed a combination of qualitative methods to examine AI's role in teacher collaboration and student engagement.

Data collection was conducted in two phases. In the first phase, we (teachers) maintained written journals to document our experiences with AI integration, noting challenges, successes, and shifts in our pedagogical approaches. Weekly Zoom meetings were held to discuss lesson planning, AI tool effectiveness, and institutional support structures. These discussions were recorded and transcribed using Otter.ai, ensuring a comprehensive dataset for analysis. Additionally, students contributed feedback through Padlet discussions, surveys, and interviews, providing insights into their engagement with AI-enhanced learning activities.

The second phase focused on classroom implementation and the analysis of lesson materials. AI-generated lesson plans and student work samples, including climate activism projects, AI-assisted creative writing, and digital storytelling, were reviewed to assess how AI influenced both teaching strategies and student engagement. Our lesson plans and meeting notes were examined to track adaptations over time, highlighting the iterative process of AI integration in the classroom. Interviews with students and student reflections were also added. All materials were systematically stored in a shared Google Drive, ensuring consistency in data management and facilitating collaborative analysis among the research team.

4.2. Data Analysis

To identify key themes in the collected data, a systematic coding process was employed. The analysis began with open coding, in which all teacher reflections, meeting transcripts, and student

work samples were reviewed to identify recurring themes such as AI literacy development, pedagogical adaptation, and ethical concerns. This was followed by an AI-assisted coding phase, where Claude AI was used to streamline the identification of patterns. However, we as human reviewers cross-checked all AI-generated codes to ensure contextual accuracy and prevent algorithmic misinterpretation following Kuckart's and Rädiker's (2024) recommendations on integrating AI in Qualitative Content Analysis. Once initial codes were established, insights were categorized into broader thematic areas, including teacher adaptation to AI (such as increasing confidence and shifts in instructional strategies), student engagement (assessing motivation levels and critical use of AI tools), and institutional barriers (exploring policy differences across countries and their impact on AI adoption). To enhance the validity of findings, a cross-validation process was applied. Teacher self-reflections were compared with student feedback and lesson artifacts to identify consistencies and discrepancies, while peer debriefing sessions were conducted to refine interpretations and mitigate potential bias. By employing this structured analytical approach, the study ensured a comprehensive understanding of how AI influenced teaching and learning across different educational contexts. The triangulation of multiple data sources provided a nuanced perspective on AI's role in fostering teacher collaboration, student engagement, and the broader institutional challenges surrounding AI integration in education.

5. Key Findings

5.1 Professional Identity and AI Adoption

Teacher reflections, derived from self-assessments, recorded debriefings, reflective journals, and structured documentation, provided key insights into professional identity formation in AI-integrated education. Reflection was systematically incorporated, capturing evolving perceptions, pedagogical shifts, emerging challenges, and the role of teachers as facilitators of AI-enhanced learning. Three primary themes emerged, highlighting the development of AI competence, pedagogical adaptation, and ethical considerations.

We initially expressed skepticism or hesitation in using AI tools, but as we engaged with these technologies, our confidence grew. This trajectory, supported by meeting recordings and iterative lesson plan adaptations, revealed a shift from AI-assisted to AI-augmented instructional design. Over time, we not only adopted AI but actively shaped its integration into our pedagogical practice, demonstrating increasing agency in its application. The role of AI in lesson planning, instructional differentiation, and assessment was a recurring theme in our reflections, and the analysis of student work samples, lesson revisions, and digital discussions provided further evidence of AI's role in scaffolding learning. This process required varying degrees of teacher adaptation, influenced by the contextual factors within each educational setting.

In parallel, we critically examined the ethical and professional dimensions of AI implementation. Our reflections addressed concerns regarding student agency, misinformation, and the ethical implications of AI use in climate education, particularly with regard to bias, data privacy, and environmental sustainability. Student feedback further reinforced these concerns, demonstrating varying levels of AI literacy and cultural perceptions of AI-generated content. Throughout this process, we experienced what Lave and Wenger (1991: 29) describe as "legitimate peripheral participation," evolving from novices to experienced practitioners in AI-enhanced education. Despite differences in prior AI experience, we followed a shared trajectory of discovery, adaptation, and professional growth, mirroring broader patterns of technological adoption in education.

Claudia's experience highlights the challenges of implementing AI in the absence of institutional frameworks. Her reflections reveal an initial sense of uncertainty, which evolved into advocacy for systematic AI integration: "These exchanges underscored the urgency of developing a framework for responsible AI use in schools". Seeking guidance, she explored existing policies on AI in education but found that Austria's *Leitfaden KI*, while a step in the right direction, lacked the practical guidance needed for daily teaching. The Austrian Federal Ministry's AI guidelines (BMBWF 2023) provide a theoretical foundation for AI integration but do not include concrete implementation examples or practical use cases. This gap between policy frameworks and application

proved particularly challenging, as teachers had to develop their own strategies for AI integration without established best practices. In contrast, discussions with Sea Fong and Hang revealed that structured national AI policies offered clear frameworks for ethical AI use, student engagement, and teacher training in their countries. Singapore's *EdTech Masterplan* and *AI Governance Framework for Education* provide ethical guidelines, implementation roadmaps, and regulatory recommendations, ensuring that AI integration aligns with educational equity, data privacy, and pedagogical best practices. Similarly, Australia's *AI in Schools* initiative offers professional development programs, student AI literacy frameworks, and regulatory safeguards, demonstrating a more systematic approach to AI integration.

Hang's experience further illustrates institutional resistance. Reflecting on her time teaching at a public school in South Australia, she noted that "despite some pioneering voices in staff meetings, most middle school teachers hesitated to introduce AI to students". Her move to a Catholic school in 2023 presented additional hurdles, as AI was not merely ignored but actively criticized as a "cheating tool", with some colleagues advocating for a return to traditional paper-based assessments. Her reflections describe a strategic negotiation process, in which she secured permission to implement AI in her classroom only after careful discussions with the Director of Inclusion.

Sea Fong's experience presents a more structured approach, supported by national frameworks such as the *SURE (Source, Under-*

stand, Research, Evaluate) framework, which was adapted from media literacy to AI literacy. This institutional support facilitated a confident integration of AI tools, as ethical concerns remained central. As he noted, "As Singapore is a well-governed state, I had no fear of my boys getting wrong information from AI or the websites". While clear policies provided security, he emphasized that AI-literate teachers remain crucial for effective implementation. His collaboration with Hang and Claudia further contributed to his understanding, increasing his confidence in planning discussions with students: "From the Austrian context, I gained a hands-on understanding of AI in education in a different culture and gained confidence to share resources, which Claudia was happy to adopt and adapt," he added.

Across these diverse contexts, we used AI strategically to support lesson planning and enhance collaboration. AI tools facilitated resource adaptation and asynchronous collaboration, allowing us to efficiently modify content for different educational settings while overcoming logistical barriers such as time zones and language differences. At the same time, by engaging critically with AI prompted reflection on pedagogical implications, ethical concerns, and cultural responsiveness, we ensured that its integration was not merely a technical enhancement but also a deliberate, pedagogically sound practice. Through collaborative discussions, we examined AI's potential biases, algorithmic limitations, and role in shaping instructional decisions, fostering a deeper understanding of AI's place in education. This supports Holmes and

Tumoi's (2022) argument that successful AI integration is not solely dependent on technological advancement but also on fostering teacher agency and culturally responsive pedagogy, ensuring that AI serves as an enabler of meaningful, context-aware learning experiences rather than a one-size-fits-all solution.

5.2 Cultural Mediation and Technology

Student reflections illustrate the ways in which cultural contexts shape AI integration, aligning with Wenger's (2015) concept of "shared repertoire" within communities of practice. The analysis reveals distinct patterns in how AI integration manifested across different cultural settings. In Singapore, AI adoption followed a structured, policy-driven approach, with students viewing AI primarily as a tool for efficiency. One student remarked, "AI is just another tool for efficiency. If we use it correctly, it helps us stay ahead". In Austria, students engaged more critically, particularly in creative applications of AI tools. One student noted, "I like using AI for brainstorming, but I don't trust it to write for me—I still want my voice". Another student emphasized, "I realized AI can suggest ideas, but I need to question them. It's like having a second opinion, but not always the right one". Australian students, especially those requiring learning modifications, expressed more diverse reactions, with one student commenting, "I do not want to use any of the tools, there are too many options".

In response to these varying contexts, we developed distinct adaptation strategies. Sea Fong leveraged the structured approach by embedding AI literacy lessons within the *SURE* frame-

work and incorporating school-approved AI tools to scaffold student research skills. Claudia embraced uncertainty by positioning herself as a co-learner, frequently engaging students in metacognitive discussions about AI's reliability and ethical concerns. She structured lessons where students critically evaluated AI-generated texts against traditional research methods, prompting deeper engagement. Hang adopted highly individualized strategies, integrating AI into differentiated instruction for students with diverse learning needs. In her modified classroom, she used AI-powered text simplification tools to support students with literacy challenges and experimented with voice-to-text features for students who struggled with traditional writing tasks. These case-specific adaptations highlight how institutional and cultural contexts shape both AI implementation and pedagogical strategies, reinforcing that AI is not a neutral tool but one mediated by existing structures, expectations, and learning environments.

5.3 Pedagogical Transformation

Our reflections document significant pedagogical professional development, particularly in how we conceptualize and implement learning experiences. This manifests in three key areas:

Instructional Design: We moved from traditional planning to AI-enhanced lesson development: "Via BriskTeaching, I was able to churn out a lesson plan on the fly based on the lesson ideas discussed with Hang and Claudia. From there, I could refine it to meet my needs" (Sea Fong). Through iterative cycles of collaboration and reflection, we adjusted AI integration strategies based on

student engagement and institutional constraints. Initially, we primarily used ChatGPT for lesson planning, generating differentiated practice materials, and creating formative assessments. As the program progressed, we expanded usage to include BriskTeaching and MagicSchool AI for real-time classroom support in answering student questions and developing personalized learning pathways. Students gradually transitioned from using these tools solely for writing assistance to leveraging them for research synthesis, creative ideation, and self-directed learning projects—with InVideo helping them create multimedia presentations and Suno enabling audio-based learning materials. However, we had to continually refine implementation approaches to address challenges with network reliability (Austria), device access limitations, and varying levels of AI literacy among both teachers and students. Pedagogical development ultimately depends on human decision-making and instructional design, rather than merely the introduction of AI tools. While BriskTeaching and MagicSchool AI offered innovative capabilities for generating lesson content and personalized learning pathways, we consistently found that effective implementation required our critical evaluation of AI outputs, contextual adaptation to student needs, and alignment with curriculum objectives. We observed several significant limitations when using these tools, including inaccuracies in researching local climate change challenges and activism, difficulty in recognizing culturally nuanced learning contexts, and occasional generation of overly generic materials lacking depth. Students similarly encountered limitations when using Suno, noting inconsistent qual-

ity in generated content, challenges in refining outputs to match their specific vision, and occasional technical glitches that disrupted their workflow. These limitations reinforced the critical role of teacher expertise in curating, refining, and sometimes rejecting AI-generated materials, highlighting that successful AI integration requires deliberate human judgment at every stage of the educational process.

The AI Paradox in Climate Education: The integration of AI tools broadened teaching methods, but it also revealed an overlooked contradiction: "For future iterations, I recommend explicitly addressing the environmental impact of AI use in climate activism education" (Claudia). Through professional development, she became aware of AI's significant energy consumption, highlighting the paradox of using AI in lessons on sustainability without acknowledging its ecological footprint. This realization underscored the importance of critically reflecting on AI's role in education—not just as a tool for innovation, but also as a subject of ethical and environmental discussion. Future research should explore low-energy AI alternatives and sustainable digital teaching strategies. Crawford (2022) highlights how AI is embedded in political and economic power structures, influencing its application in education. This paradox underscores a broader tension in sustainable education—while AI offers innovative tools for climate activism, its high energy consumption challenges the very sustainability goals it aims to support, necessitating a critical evaluation of its role in environmentally responsible pedagogy.

Student Engagement: We noticed enhanced student engagement through cross-cultural exchange: "Sir, I really enjoy having this opportunity to speak and listen to Austrian students and [the] teacher, as well as the Australian teacher", said a usually "quiet boy" (Sea Fong). Austrian students voluntarily started lessons earlier to meet despite time zone challenges and Australian students made an effort to write virtual postcards. The Singaporean students actually stayed back for the live Zoom session as school had already been dismissed two hours earlier.

5.4 AI and Student Work: Creative Engagement with Climate Education

Student projects demonstrated how AI can enhance creative engagement with climate issues while also requiring critical reflection and adaptation. Singaporean students produced AI-assisted visual artworks depicting major climate initiatives in their country, such as the "City in Nature" vision, integrating elements like the Supertree Grove at Gardens by the Bay and vertical forests in urban infrastructure. These real-world examples were contextualized through AI-generated imagery, prompting students to assess both AI's creative potential and its limitations in ensuring factual accuracy. One student reflected, "AI helped us visualize these projects creatively, but we had to ensure accuracy in our descriptions". Their reflections highlighted the balance between leveraging AI's generative capabilities and maintaining content reliability. The level of engagement and motivation among students was evident in their willingness to refine AI-generated outputs, their par-

ticipation in peer discussions to evaluate accuracy, and their ability to integrate AI-produced visuals with their own interpretations of environmental initiatives. Following AI integration, we observed a notable shift in engagement patterns. Prior to AI use, students primarily engaged with traditional research and writing tasks. Post-AI integration, they demonstrated increased initiative, refining AI-generated content, participating in deeper discussions on ethical AI use, and collaborating cross-culturally more actively, particularly in climate activism projects.

To quantify student engagement, we examined multiple factors, including participation in AI-assisted activities, the number of revisions made to AI-generated content, the depth of critical reflection in student discussions, and the extent of peer interaction on collaborative platforms such as Padlet. Additionally, engagement was measured by tracking student contributions to AI-enhanced projects, the complexity of their AI prompts, their ability to refine and critique AI-generated outputs, and the level of independent research incorporated into their final submissions. Structured teacher observations and student self-assessments further provided insights into how AI influenced motivation, creativity, and inquiry-based learning. The frequency and depth of student discussions on the ethical implications of AI tools also served as an indicator of cognitive engagement with the subject matter.

Austrian students explored AI's potential in visual storytelling and poetic expression. Using AI tools, they generated GIFs illustrating the rapid melting of Austrian glaciers and composed poems in-

spired by climate activists engaging in civil disobedience, such as those gluing themselves to streets. The juxtaposition of AI-generated visuals and student-authored poetry emphasized both the empirical urgency of climate change and the emotional resonance of activism. One student remarked, "The AI-generated visuals made the glacier melting feel more real, it increased urgency". Another stated that "our poems helped express the creative side of activism". The depth of engagement was reflected in students' iterative approach to AI-generated content, their collaboration in refining messages, and their ability to link AI-assisted visuals with historical and contemporary climate movements.

Australian students engaged with AI in both musical and public awareness campaigns. They used Suno, an AI-powered music generator, to compose songs addressing how pollution affects asthma sufferers, connecting climate change to personal health experiences. Additionally, they designed postcards illustrating climate change's impact on Australia, including bushfires and rising temperatures, to enhance public engagement. One student noted, "Writing a song with AI made it easier to share my personal experience with air pollution, and the postcards helped us reach more people". Motivation and engagement in these projects were evident in students' selection of AI tools that best complemented their intended messages, their persistence in experimenting with multiple AI-generated song variations, and their proactive efforts to distribute postcards within their communities to maximize impact.

Across all contexts, AI served as both a tool for creative exploration and a subject of critical engagement. While enabling new artistic and textual expressions, students emphasized the need for human oversight to ensure accuracy and relevance. Engagement increased post-AI integration, with students taking greater initiative in refining outputs, evaluating AI-generated content, and participating in ethical and technical discussions, reinforcing the importance of critical AI literacy in education

5.5 Challenges and Adaptations

Student and teacher reflections highlight shared challenges across contexts. Time management was a key issue, particularly in coordinating across time zones, balancing AI integration with curriculum demands, and adapting to differing academic calendars (e.g., Australia vs. Europe). Technical barriers varied by policy. Singapore's national AI framework (Ministry of Education Singapore 2023) provided clear guidance, whereas Australia's AI policies (Australian Government Department of Education 2023) remained broad and lacked implementation specifics. Despite strong technical infrastructures, AI adoption must be viewed within broader digital capitalism dynamics, where control over digital infrastructures dictates power (Staab 2019). Cultural differences influenced AI adoption. Students in rigid systems struggled with open-ended AI tasks, such as AI-assisted brainstorming, inquiry-based research, and automated content generation, which required independent evaluation and adaptation. Institutional acceptance ranged from full integration to restrictions due to con-

cerns over academic integrity, data privacy, and AI bias. Schools also voiced concerns about governance of student data processed by third-party AI tools and potential disparities in technological access. Despite these barriers, a cross-cultural AI community of practice supported effective integration. Key success factors included institutional flexibility (adapting AI to grading systems), responsive pedagogy (avoiding increased workload), international collaboration (sharing best practices), and cultural sensitivity (ensuring AI aligns with diverse perspectives). This approach reinforced Staab's (2019) argument that digital infrastructures are embedded in cultural and political power structures.

5.6 Conclusion and Implications

Our findings highlight how AI-enhanced intercultural CoPs serve as dynamic spaces for teacher and student growth, blending structure and flexibility to foster pedagogical innovation. The cross-cultural dimension enables teachers to bridge geographical and institutional divides, enriching their professional development and creating deeper learning experiences for students. AI integration enhances communication and collaboration by removing logistical barriers, yet its effectiveness ultimately depends on human decision-making, instructional design, and ethical oversight. AI functions as an assistive tool rather than a replacement for human-led instruction, facilitating new approaches to teaching and learning while supporting creativity and efficiency within established pedagogical frameworks.

Beyond collaboration, AI integration contributes to our (teachers) growth by enhancing digital literacy, refining instructional strategies, and prompting critical engagement with ethical considerations. We moved from initial skepticism to active experimentation, critically assessing AI's capabilities and limitations. This reflective engagement deepened our understanding of AI's role in education, equipping us to guide students in responsible AI use. However, critical concerns emerged, including bias in AI-generated content, risks to data privacy, and the challenge of ensuring academic integrity in AI-assisted learning. We also grappled with the ecological footprint of AI technologies, prompting discussions on sustainable digital practices. For students, AI-enhanced CoPs empowers learners by fostering independent inquiry, global citizenship, and cross-cultural collaboration. Engaging in AI-supported activities allowed students to develop both technical and critical thinking skills, particularly in understanding climate change advocacy through creative outputs. The intersection of digital competencies and cultural awareness suggests that AI-driven educational communities can prepare students for an interconnected world where adaptability and ethical reasoning are crucial. Our study of the ASEFClassNet17 collaboration underscores how AI-enhanced CoPs promote AI literacy, global citizenship, and meaningful cross-cultural engagement while preserving the human essence of education. To sustain and expand these benefits, future educational policies should:

- Ensure comprehensive AI literacy training for teachers to build confidence in AI-assisted instruction.

- Support multilingual participation to reduce language barriers in global learning contexts.
- Protect teacher agency by positioning AI as a pedagogical aid rather than a directive force.
- Address ethical concerns surrounding AI-generated content bias and data privacy.

While AI can enhance inclusivity and personalize learning experiences, challenges persist in navigating unequal access, varied national policies, and differing cultural attitudes toward automation. Singapore and Australia have developed structured AI policies for education, whereas Austria's guidelines remain fragmented. Addressing disparities in AI adoption requires targeted investment in teacher training and the development of ethical AI policies that uphold transparency and equity.

The implications of this study extend beyond climate change education, offering insights into AI's broader role in fostering international collaboration and pedagogical innovation. Future research should examine AI-enhanced CoPs beyond climate education, focusing on ethical AI integration and sustainable pedagogical innovations. Ultimately, what made this collaboration impactful was not just the technology itself but the way teachers and students learned from one another, co-created resources, and benefited from mentorship—exemplified by Juliette Bentley's expert guidance within ASEF Classroom Network 17. By aligning AI integration with Industry 5.0's human-centered vision, educational systems can ensure that AI serves as a collaborative and ethical tool,

fostering inclusive and pedagogically sound learning experiences rather than reinforcing automation-driven inequalities.

6. Study Limitations and Future Research

This study has several limitations that should be acknowledged. The most prominent is the small sample size, consisting of only three teachers from three different countries. While this case study approach allowed for an in-depth exploration of our collaborative experiences, the findings may not be generalizable to other contexts. The study also faces a significant self-reporting bias, as our accounts of our AI integration experiences may be influenced by our personal perspectives, motivations, and potential desire to present our efforts favorably. This self-reporting framework potentially limits the objectivity in assessing the actual effectiveness and challenges of AI implementation in our classrooms. Factors such as varying levels of technological proficiency, diverse school cultures and policies, and the specific AI tools utilized could influence the outcomes of similar collaborations. Furthermore, the specific focus on a climate change education initiative may limit the transferability of findings to other subject areas. Future research involving larger and more diverse samples of teachers, across different disciplines and utilizing a wider range of AI tools, is needed to explore the broader impact of AI on cross-cultural teacher collaboration.

While the AI tools utilized in this study (Chat GPT, Copilot, Claude AI, DALL_E 3, Bing AI, BriskTeaching, Magic School AI, InVideo and

Suno) offer potential benefits for collaboration, we acknowledge the potential for algorithmic bias within these tools. Although the specific algorithms used by these tools are proprietary and not fully transparent, we discussed potential biases related to content generation and personalized learning pathways for our students.

Acknowledgements

This research was conducted as part of the ASEFClassNet17 School Collaboration initiative, supported by the Asia-Europe Foundation (ASEF). We acknowledge the contributions of participating schools, teachers, and students from Singapore, Austria, and Australia.

Anmerkung

1 Various AI tools were utilized to support curriculum development, lesson planning, and differentiated material design. Large language models such as ChatGPT (https://chatgpt.com/), Copilot (https://copilot.microsoft.com/), and Claude (https://claude.ai/) were used for brainstorming and content generation. Suno AI (https://suno.com/) facilitated song creation, while image generation was carried out using DALL·E 3 (integrated into ChatGPT and

Bing AI). Additionally, specialized AI tools for education were employed: BriskTeaching (https://www.briskteaching.com/) and Magic School AI (https://www.magicschool.ai/). BriskTeaching offers features such as lesson planning, slide creation, rubric generation, instant feedback, and quiz development. Magic School AI provides over 60 functions, including math assistance, real-world applications, project-based learning support, STEM teaching resources, personalized learning plans, rubric generation, reading level assessments, translation, and text decoding.

Literatur

Asia-Europe Foundation (ASEF) (2024a): ASEFClassNet17 – Open Call. ASEFClassNet School Collaboration: "Learning about AI and Learning with AI, online at: https://asef.org/wp-content/uploads/2024/02/240229_ClassNet17_OpenCall.pdf (last accessed: February 15, 2025).

Asia-Europe Foundation (ASEF) (2024b): ASEFClassNet17 Concept Note. ASEF Classroom Network Project Series, online at: https://asef.org/wp-content/uploads/2024/02/240507_ASEFClassNet17_Concept-Note.pdf (last accessed: February 15, 2025).

Asia-Europe Foundation (ASEF) (2024c): ASEFClassNet17 Conference 11–15 Nov 2024 in Manila, Philippines, online at: https://asef.org/news/asefclassnet17-conference-11-15-nov-2024-in-manila-philippines/ (last accessed: February 21, 2025).

Bundesministerium für Bildung, Wissenschaft und Forschung (BMBWF) (2023): Auseinandersetzung mit Künstlicher Intelligenz im Bildungssystem, online at: https://www.bmbwf.gv.at/Themen/schule/zrp/ki/ki_asbs.html (last accessed: February 15, 2025).

Bradbury, Hilary (ed.) (2015): The SAGE Handbook of Action Research, Third Edition, London: SAGE Publications. https://doi.org/10.4135/9781473921290.

Coeckelbergh, Mark (2020): AI Ethics, Cambridge/Massachusetts: The MIT Press.

Crawford, Kate (2022): Atlas of AI: Power, Politics and the Planetary Costs of Artificial Intelligence, New Haven/London: Yale University Press.

Davies, Huw. C./Eynon, Rebecca/Salveson, Cory (2021): The Mobilisation of AI in Education: A Bourdieusean Field Analysis, in: Sociology 55(3), 539–560. https://doi.org/10.1177/0038038520967888.

Australian Government Department of Education (2023): Australian Framework for Generative Artificial Intelligence (AI) in Schools, online at: https://www.education.gov.au/schooling/resources/australian-framework-generative-artificial-intelligence-ai-schools (last accessed: February 15, 2025).

Holmes, Wayne/Tuomi, Ilkka (2022): State of the art and practice in AI in education, in: European Journal of Education 57, 542–570. https://doi.org/10.1111/ejed.12533.

Kuckartz, Udo/Rädiker, Stefan (2024): Integrating Artificial Intelligence (AI) in Qualitative Content Analysis, online at: https://tinyurl.com/4f58fpde (last accessed: February 23, 2025).

Lave, Jean/Wenger, Etienne (1991): Situated Learning: Legitimate Peripheral Participation, Cambridge: Cambridge University Press.

Mentzas, Gregoris/Hribernik, Karl/Stahre, Johan/Romero, David/Soldatos, John (2024): Editorial: Human-Centered Artificial Intelligence in Industry 5.0, in: Frontiers Artificial Intelligence 7. https://doi.org/10.3389/frai.2024.1429186.

Ministry of Education Singapore (2023): Artificial intelligence in education: Learn about the use of artificial intelligence tools to support your child's learning, online at: https://www.moe.gov.sg/education-in-sg/educational-technology-journey/edtech-masterplan/artificial-intelligence-in-education (last accessed: February 15, 2025).

Ng, Davy Tsz Kit/O'Dea, Xianghan (2025): AI literacy and gen-AI literacy frameworks, in: O'Dea, Xianghan/Ng, Davy Tsz Kit (eds.): Effective Practices in AI Literacy Education: Case Studies and Reflections, Bingley: Emerald Publishing Limited, 21–27. https://doi.org/10.1108/978-1-83608-852-320241003.

Puentedura, Ruben (2018): SAMR, the EdTech Quintet, and Shared Practices: An Introduction, online at: https://tinyurl.com/5xchpr9p (last accessed: February 15, 2025).

Robertson, Lorayne/Scheidler-Benns, Joli (2016): Critical Media Literacy as a Transformative Pedagogy, in: Literacy Information and Computer Education Journal 7(1), 2247–2253. https://doi.org/10.20533/licej.2040.2589.2016.0297.

Sabitzer, Barbara/Hörmann, Corinna/Kuka, Lisa (2024a): Künstliche Intelligenz (KI) in der Bildung – Ein Kinderspiel? Chancen, Herausforderungen und Anwendungsbeispiele für die Praxis, in: Medienimpulse 62(3). https://doi.org/10.21243/mi-03-24-22.

Sabitzer, Barbara (2023): Künstliche Intelligenz im Unterricht. Lehr-/Lernszenarien für verschiedene Gegenstände, in: Medienimpulse 61(2). https://doi.org/10.21243/mi-02-23-07.

Sabitzer, Barbara/Hörmann, Corinna/Kuka, Lisa (2024b): Künstliche Intelligenz und Bildung: Differenzierte Betrachtung statt Pauschalurteil, in: Medienimpulse 62(4). https://doi.org/10.21243/mi-04-24-03.

Selwyn, Neil (2019): Should Robots Replace Teachers? AI and the Future of Education, Cambridge: Polity Press.

Sevak, Amit (2024): How to Support Human-AI Collaboration in the Intelligent Age, online at: https://tinyurl.com/zmda7tbv (last accessed: February 15, 2025).

Share, Jeff/Douglas, Kellner/Funk, Steven (2016): Critical Media Literacy as Transformative Pedagogy, in: Information Resources Management Association (ed): Journalism and Ethics Breakthroughs in Research and Practice, 318–348. https://doi.org/10.4018/978-1-5225-8359-2.ch019.

Staab, Philipp (2019): Digitaler Kapitalismus. Markt und Herrschaft in der Ökonomie der Unknappheit, Berlin: Suhrkamp.

Teachflow (2023): Building a Culturally Responsive Classroom with Teachflow.AI, online at: https://teachflow.ai (last accessed: February 15, 2025).

Wenger-Trayner, Étienne/Wenger-Trayner, Beverly (2015): Communities of Practice: A Brief Introduction, online at: https://www.wenger-trayner.com/introduction-to-communities-of-practice/ (last accessed: February 15, 2025).

Williamson, Ben (2020): Big Data in Education: The digital future of learning, policy, and practice, London: Sage. https://doi.org/10.4135/9781529714920.

World Economic Forum (2022): A Blueprint for Equity and Inclusion in Artificial Intelligence, White Paper June 2022, online at: https://www.weforum.org/publications/a-blueprint-for-equity-and-inclusion-in-artificial-intelligence/ (last accessed: February 15, 2025).

Zewe, Adam (2023): Explained: Generative AI, online at: https://news.mit.edu/2023/explained-generative-ai-1109 (last accessed: February 21, 2025)