



DIGITAL COMPETENCE

AND THE USE OF AI TO SUPPORT
THE MULTICULTURAL CLASSROOM



Why might this e-book be relevant to you?

This e-book is designed for higher education academic staff who work with multicultural student groups. It aims to enhance their understanding, examples, and knowledge of multiculturalism in pedagogy and how digital competence, including artificial intelligence (hereinafter AI), can support teaching and learning.

The e-book consists of two chapters:

"The Multicultural Classroom in the 21st Century"

"Digital Competence and the Use of AI to Support the Multicultural Classroom"

To enhance the impact of the e-book, we recommend listening to three accompanying podcasts:

Podcast 1 | AI in Publishing Education | Guest: Christoph Bläsi, Professor of Book Studies, Johannes Gutenberg University Mainz | Host: Mauricio Omar Cifuentes, University of Agder (UiA) | 25 min 48 sec. | 20.08.25



Podcast 2 | Course design with AI | Guest: Salvatore Di Dio, Associate Professor of Design, University of Palermo | Host: Mauricio Omar Cifuentes, University of Agder (UiA) | 24 min 03 sec. | 28.08.25

Podcast 3 | The Blooms GPT project | Guest: Apostolos Spanos, Professor of History, University of Agder (UiA) | Host: Mauricio Omar Cifuentes, University of Agder (UiA) | 23 min 43 sec. | 03.09.25

Introduction

This e-book arose within the framework of the FORTHEM Alliance, which aims to transform and shape the future of European higher education and research. FORTHEM is an alliance of nine public universities: the University of Jyväskylä, the University Bourgogne Europe, Johannes Gutenberg University Mainz, Palermo University, the University of Latvia, the University of Agder, the University of Opole, the “Lucian Blaga” University of Sibiu, and the University of Valencia. The Alliance represents a community of 232,000 students and 36,000 staff, in contact with more than 2,000,000 citizens.

FORTHEM diligently implements the “knowledge square” in the respective regions, enhances innovative, student-centered pedagogies in all nine universities, and ensures that multidisciplinary, multiculturalism, and multilingualism are substantial features of education, research, and innovation. FORTHEM melds the unique assets of each partner university into a greater whole to provide excellent transnational experiences for all students and staff.

FORTHEM's mission is skills and competencies, which includes the systematic development of 21st-century Skills, also referred to as Future Skills. This e-book particularly focuses on pedagogical digital competence and teaching multicultural student groups.

To provide valuable insights into pedagogical digital competence and teaching multicultural student groups, the working group, comprised of representatives from nine FORTHEM universities conducted research, transformed their knowledge and experience, gathered recommendations from field experts, and created an e-book consisting of two parts:

1. **The multicultural classroom in the 21st century** - discuss what a multicultural classroom in the 21st century is.

2. **Digital competence and the use of AI to support the multicultural classroom** – discuss how digital competence and AI can support teaching multicultural student groups.

Keywords: *multicultural classroom, digital competence, AI, future skills, pedagogical digital competence, AI in higher education*

More information about FORTHEM: <https://www.forthem-alliance.eu/>

The e-book aims to enhance teachers' pedagogical digital competence and AI-related skills in higher education, enabling them to design and create digital learning materials and teaching methods tailored to multicultural classrooms. It encourages viewing multiculturalism as a resource for effective and diverse work in the classroom. Through shared experiences, best practices from other universities, and expert recommendations, the e-book intends to broaden academics' perspectives on digital competence, AI, and multiculturalism.

Methodology

For sections 1.6 and 2.6, which involve recommendations from experts, Katja Hakel, a professor in Academic Development at the University of Agder and a representative of a European alliance of universities, distributed questions to the UDLHE (Universal Design for Learning in Higher Education) Network, an online community hosted on the Mighty Networks platform. This network comprises approximately 470 members. She also reached out to the Center for Innovation, Design, and Digital Learning (CIDDL), another online network on Mighty Networks, which currently has 718 members.

The questions shared were as follows:

- What do you consider important in a multicultural classroom about these chapters?
- What is a multicultural classroom or curriculum?
- What aspects are included in multiculturalism, and what types of students would you consider here?
- What challenges, difficulties, or opportunities do we need to consider for multicultural students?

A total of 13 responses were collected during the period from March 5, 2024, to March 15, 2024.

Abbreviations

AI - Artificial Intelligence
ML - Machine Learning
LLM - Large Language Model
GANs - Generative Adversarial Networks
VAEs - Variational Autoencoders
DigComp - Digital Competence Framework
UDLHE - Universal Design for Learning in Higher Education
CIDDL - Center for Innovation, Design, and Digital Learning
CIMDU - Centre for the Innovation and Improvement of Academic Didactics
MOOCs - Massive Open Online Courses
VLEs - Virtual Learning Environments
UNICEF - United Nations Children's Fund
RAG - Retrieval Augmented Generation
CBS - Central Bureau of Statistics

Terminology

Intercultural Education: Exchange and integration of diverse cultural elements.
Multicultural Education: Focus on coexisting cultures without enforced integration.
Cultural Identity: The sense of belonging to a particular cultural group.
Ethnocentrism: Belief in the inherent superiority of one's own culture.
Culturally Responsive Teaching: Adapting teaching methods to students' cultural backgrounds.
Constructive Alignment: Alignment of teaching, assessment, and learning outcomes.
Bloom's Taxonomy: Framework for categorizing learning objectives.
Inclusive Curriculum Design: Incorporating diverse cultural perspectives.
ItaStra Model: Multilingual and cultural teaching strategies for migrant students.
Digital Competence: Confident and critical use of digital tools.
Culturally Sensitive AI: Refers to the understanding and consideration of diverse cultural norms, values, and perspectives.
Ethical AI in Education: Addressing bias, transparency, and data privacy.
Hybrid Learning: A learning model that integrates traditional (in-class) methods with online (digital platform) learning.

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“(...) AI and multiculturalism are within the focus of the Forthem alliance working groups, and I am pleased that this e-book has been created through the collaborative efforts of nine universities. The e-book serves as a resource for university educators and administrative staff, enhancing understanding of multiculturalism and how AI can assist in fostering a multicultural classroom environment where everyone is respected, and culture is valued as an essential component of the educational process.

The e-book is a collective work of authors, encompassing experiences from the southern to the northern parts of Europe. It is structured into two main sections: the first describes what a multicultural classroom is, what culture entails, its elements, and how to turn diversity into an advantage rather than viewing it as a challenge (though undeniably, there are many challenges in a multicultural classroom). The second part focuses on digital skills, AI, and how AI tools can assist in the management processes of multicultural classrooms by creating diverse, culturally respectful educational tasks. A significant portion addresses ethical questions important for anyone entering modern classrooms at all levels of education.

The added value of the book lies in the experience stories and case studies from the partners of the Forthem Alliance, as the best learning comes from the experiences of others. As an educator, I appreciate the compilation of AI tools, some of which I have already tried in my classroom, while many I have "rediscovered." The author's idea to include a brief description of each tool on how it enhances or supports a multicultural classroom is commendable. The book is a good combination of theoretical insights and practical applications.

Both topics are complex and intricate, often discussed in the literature as benefits and challenges—sometimes critically, sometimes overly glorified. However, the authors have successfully created a compact overview of these themes. A significant addition to the e-book is the inclusion of video materials. To ensure a smooth reading experience and to aid in the creation of more diverse and inclusive classrooms based on AI, while enhancing digital skills and reducing the digital divide!”

- Dr. Gunta Kalvāne (University of Latvia)

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1. The multicultural classroom in the 21st century

1.1. Introduction – what is a multicultural classroom in the 21st century

Culture

In most societies, there are people from different cultural backgrounds. They share beliefs, customs, traditions, values, lifestyles, knowledge, and different ways of understanding life. Moreover, not only do they share these aspects, but they also share cultural products that are obtained every day. People who share culture have symbolic references that allow them to understand and situate themselves in the group, they establish a way of being and participating with each other. This cultural reference allows us to build relationships between the people who form part of the group. This belonging to a culture and a group places us within parameters that are not static, fixed, and immutable, but quite the opposite. Culture is part of the lifestyle of individuals and groups, and is dynamic, without fixed boundaries, changing according to the spatial and temporal context. When someone belongs to a culture, he or she establishes an identity that can be defined by many symbolic elements, including language as a form of expression.

There are variations in culture that are mediated by ethnocentrism and cultural assimilation that do not help in the process of cultural construction. The consideration of a hierarchy of cultures establishes a gradation according to the power that cultures possess. Thus, when dominant groups impose their symbolic vision on society, one culture is favored over others and other cultures are measured against it. Belonging to a culture of non-dominant groups or ethnic minorities does not allow one to be on the same level socially and in education. The educational curriculum is selected based on educational parameters, but it can also be selected based on the groups that exist on the social level. We see that the curriculum does not always consider the contributions of all cultures in the public space.

Three paradigms respond to cultural diversity, cultural assimilation, cultural integration, and cultural pluralism. These paradigms represent:

1. *Cultural assimilation*: the main objective is to address cultural diversity from the perspective of the dominant group's culture. Different cultures are not valued and schools work in the dominant, resulting in other cultural expressions being marginalized and left to the private space of the family.
2. *Cultural integration*: The aim now is to allow some cultural expressions of minorities and non-dominant groups outside the family space. The dominant culture is still being worked on, but there is a certain permissiveness to other cultural references.
3. *Cultural pluralism*: The aim is to open society and schools to the diversity of cultures that exist, using anti-racism as an educational strategy. Now, different cultures are beginning to play an important role in a strategy of equality.

Cultural Identity

When a culture develops in space and time, the process of belonging and identity arises. Cultural identity can be conceived as belonging to a culture that represents a human group. Identity defines us in a certain way and allows us to set boundaries. When a person belongs to a group, identification is established. It is fundamental to establish the limits and the area of personal and cultural influence. Identity mostly starts with cultural origins, and it is important to establish and negotiate (Benhabib, 2002) what it encompasses. The set of symbolic ideas that define a culture is part of identity, as it allows us to understand what each culture entails. Understanding a culture is an important part of cultural assimilation, as it can help us to establish its boundaries. Not everyone shares the same cultural references. It depends on the culture we represent, and this is evident in schools. The same cultural issues are not respected, nor are the same references worked on. Nor is the curriculum which values some cultures more than others. Some cultures appear while other cultures are more absent. However, in a globalized world ensuring exposure to diverse cultures, cultural identity develops on a variety of pathways. (Jensen et.al. 2011) Yet, the public space does not value all cultures equally; there is no cultural relativism on an equal foundation. On the contrary, one culture is predominant over the others, and this means that schools do not always take all cultures into account equally.

Intercultural approaches raise awareness for cross-cultural identity rooted in migration or shared living spaces. Many people identify with the culture of the situation they live in and not the culture of the country. For example, someone born into a Turkish family living in Germany might feel Turkish or German, depending on whom s/he is talking to. Neglecting these aspects could lead to painful experiences of being misunderstood and wrongly categorized. New cultural identities arise and often they cannot be traced back to a certain culture but are a result of many different influences. In a certain sense, AI, by creating new meaning without explicit cultural inheritances, might be closer to this landscape of cultural uprootedness, raising whether roots are necessary to define culture. Yet, one of the main problems with generative AI seems to be that it adopts cultural inheritances, biases, and stereotypes, potentially perpetuating or amplifying these elements in its outputs.

However, cultural identity is important as it underscores the significance of culture, though it is essential to acknowledge that certain cultures are often regarded as more valuable than others. Why does this happen? What is the point? Answering these questions is necessary to understand the role of identity and the need to build schools that respect the cultural identity of each person. When we want to respect the cultural identity of all students, we must rethink the type of education and curriculum we are offering.

Multicultural education and intercultural education

When different cultures coexist in the same territorial space, it is necessary to understand the type of education we are offering. In Anglo-Saxon contexts, the concept of multicultural education predominates. It is based on the development of different cultures in the same place.

Multiculturalism deals with everyday situations of societies with members of different ethnicities and habits. In this context, the term culture is mainly understood as: ethnicity, traditional practices, and habits. Multi-culturalism refers to a plurality of cultures that to some extent co-exist, for example in a state, etc. Rattansi states: „Multiculturalism (...) usually refers to policies by central states and local authorities that have been put in place to manage and govern the new multiethnicity created by non-white immigrant populations, after the end of the Second World War“ (Rattansi, 2011, p. 12).

The development of each culture takes place with the idea of developing and appraising (Sen, 2006) the identity of each culture. To achieve this, all cultures must develop on an equal footing. This often results in each culture developing in certain neighborhoods, without cultural contact with other cultures. In other words, cultural ghettos can occur. This can be seen when we have neighborhoods in some cities that are identified with a certain culture, such as neighborhoods of Chinese, Italian, Irish, Gypsy, etc. origin. This education is based on not having contact between cultural groups, nor sharing common public space. This type of education allows for cultural enrichment, as each space is associated with a specific culture, and cultural aspects are promoted to their fullest extent. However, it contrasts with another cultural approach, intercultural education—which will be discussed in the next section.

This education is different since it is based on an interaction between the cultures of different groups, with the idea of establishing a productive exchange. Valuing plurality, this education tries to create cultural contact and even a shared social space that allows one to experience diverse cultural elements and beliefs. This experience is based on equality between people with different and often complex cultural backgrounds (Maalouf, 2000).

A debated issue is whether the whole set of beliefs, traditions, and values of all cultures is defensible. It is important to enter the discussion about whether there are aspects that are demeaning or disrespectful of cultural dignity in all groups. If so, it is necessary to go deeply into the defense of personal and group dignity and the defense of the rights of citizenship. Therefore, intercultural education is about working on the different cultures as they grow from the interspace between them (Jullien, 2021), and on the shared, reassuring common space that can help us to build democratic societies that respect diversity.

Most of the time diverse cultures with different practices and sets of values and beliefs are interesting and charming: the music sounds thrilling, and the food tastes different. However, what is interesting at first might soon lead to alienating experiences (Antweiler, 2024) creating unsurpassable gaps between people. Very often the emotional reactions are negative like fear or even disgust when the unknown breaks into one's life. The fascination one might have had from a distance, changes into negative attitudes when sharing the same space. The latter might happen in class: Beyond mere unpolite neglect of diverse cultural backgrounds, animosities could arise. Instead of benefiting from diversity, from different perspectives, barriers rise, and gaps are shoveled. These aspects easily lead to discrimination and often to students falling back on their studying results. Intercultural learning deals with directly addressing these topics and taking preventive actions.

Awareness of the specific learning situation is central to a good learning environment. Just to give an example, the teaching language might be a mother tongue to some students but a foreign language to others. Meanwhile, the focus of any class remains the teaching material, the approach would be different from an intercultural perspective, enhancing for example collaborative relations among students and responsivity (Waldenfels, 2011) to socio-cultural situatedness.

1.2. Intercultural and multicultural education

Globalization, digitization, technology, socio-economic shifts, and geopolitical changes have led to the coexistence of diverse cultures within a single space, whether physical or virtual. This phenomenon reshapes the learning and teaching processes, aiming to optimize each student's potential to achieve the best possible outcomes.

Internationalization of higher education in theory is "the process of integrating an international, intercultural, or global dimension into the purpose, functions or delivery of education" (Knight, 2003). Internationalization has emerged as a strategic vehicle for transforming higher education and has become a prominent trend in universities worldwide over the past few decades. The internationalization of higher education has been influenced by the evolution of digital technologies and the emergence of both local and global online e-learning markets.

However, this trend has also been met with increased insecurity and vulnerability, exacerbated by pandemics, financial crises, geopolitical tensions, and natural disasters (Tran et al., 2023).

Although often used interchangeably, it's vital to distinguish between being international, intercultural, and multicultural. Understanding these differences is key, as they can impact individuals' abilities to relate to one another. However, the crucial similarity lies in celebrating differences and appreciating diversity. These elements enrich our education, fostering empathy and gratitude, and allowing us to view the world through multiple lenses.

Multicultural and intercultural education are frequently treated as interchangeable terms in the literature (Nieto, 2006; Hill, 2007), although some scholars argue for a distinction between the two (Holm & Zilliacu, 2009). It is noteworthy that these terms are often assumed to have universal understanding and denote a singular type of education. However, multicultural education can encompass various approaches and perspectives.

UNESCO provides clear definitions for two terms: "Multicultural" refers to the diverse cultural makeup of human society, encompassing ethnic, national, linguistic, religious, and socio-economic diversity. Notably, UNESCO's definition does not include factors like gender or race. Conversely, "Intercultural" is described as a dynamic concept that denotes the evolving relations between cultural groups. Interculturality builds upon multiculturalism and emerges from ongoing intercultural exchanges and dialogues at various levels, whether local, regional, national, or international (UNESCO, 2006, p. 17).

Table.1. Terms from Oxford English Dictionary

<p>Internationalization [1]</p> <p>The action or process of making something international in character, composition, or scope.</p> <p>Designating or relating to relations between two or more nations or organizations made up of nations; agreed, recognized, carried on between, or constituted by nations or national governments.</p>	<p>The earliest known use of the noun internationalization is in the 1860s. OED's earliest evidence for internationalization is from 1860, in North Brit. Review.</p>
<p>Multicultural[2]</p> <p>Off or relating to a society consisting of several cultural groups, esp. in which the distinctive cultural identity of each group is maintained.</p>	<p>The earliest known use of the adjective multicultural is in the 1930s. OED's earliest evidence for multiculturalism is from 1935, in the American Journal of Sociology.</p>
<p>Intercultural [3]</p> <p>Inter- prefix + cultural adj.</p> <p>Denoting 'Between or among other things or persons; between the parts of, in the intervals of, or during, something; together with; between times or places, at intervals, here and there'.</p>	<p>The earliest known use of the adjective intercultural is in the 1930s.</p>

1. Oxford English Dictionary, s.v. "internationalization (n.)," July 2023, <https://doi.org/10.1093/OED/3623408924>.
2. Oxford English Dictionary, s.v. "multicultural (adj.)," July 2023, <https://doi.org/10.1093/OED/2871452017>
3. Oxford English Dictionary, s.v. "intercultural (adj.)," March 2024, <https://doi.org/10.1093/OED/1194654713>

Sum up

Establishing positive and meaningful social connections, known as relatedness, is recognized as a fundamental psychological need for students (Deci & Ryan, 1985). However, contemporary educational institutions face difficulties fostering learning environments where all students feel equally included, represented, and valued (Huijnk et al., 2016). Research indicates that students from marginalized ethnic backgrounds tend to exhibit lower academic performance, as evidenced by standardized test scores and higher dropout rates compared to their peers from the majority group (CBS, 2020). To address this challenge, integrating multicultural practices into education is suggested in literature as a potential solution that can benefit all students.

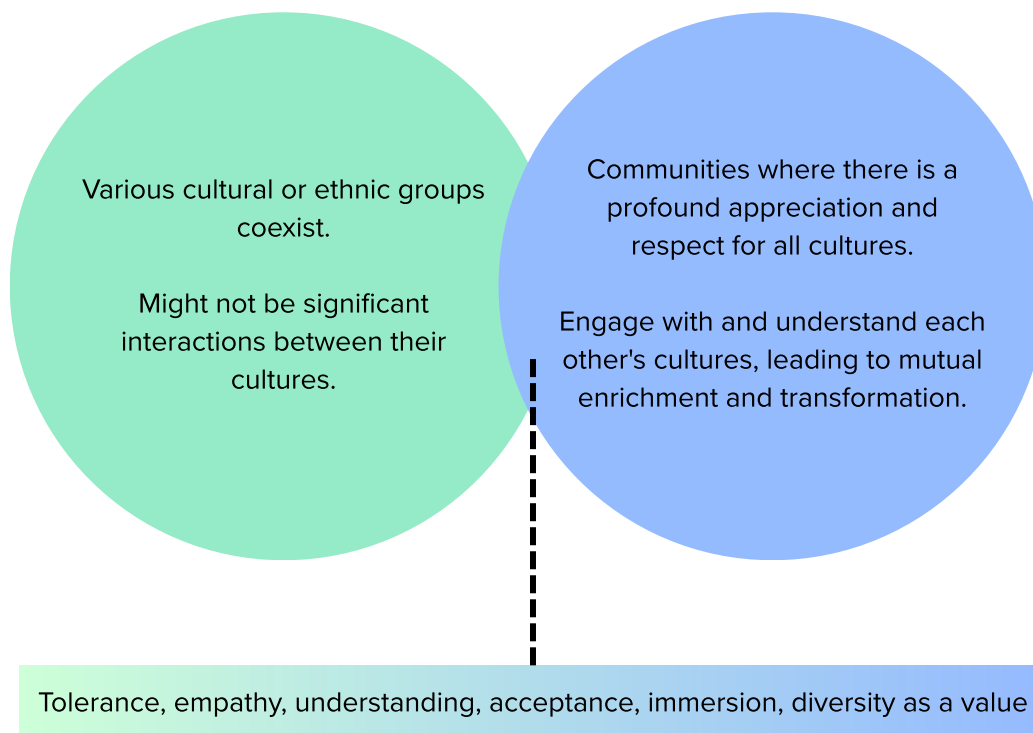


Fig.1. Multicultural vs Intercultural. Made by authors

Education, as a discipline, focuses on the methods of teaching and learning. It encompasses the transmission of societal values and accumulated knowledge, akin to what social scientists refer to as socialization or enculturation. It is imperative that education is universally accessible with consistent quality, irrespective of cultural, linguistic, ethnic, or religious differences, and regardless of one's place of residence.

1.3. Pedagogy in a multicultural context

Teaching in a multicultural context requires thoughtful consideration and careful preparation. Culturally responsive teaching can be defined as using the cultural knowledge, prior experiences, frames of reference, and performance style of ethnically diverse students to make learning encounters more relevant and effective for them” (Gay, 2018). This chapter will analyze some key principles of making the teaching process more multiculturally adjusted, based on constructive alignment (Biggs, 1996). The central idea is to align the learning activities, assessments, and intended learning outcomes in a way that promotes deep learning and understanding among students. (recommended reading: Biggs&Tang, 2011, Larkin& Richardson, 2013, Moulding, 2010, Wang et al. 2013).

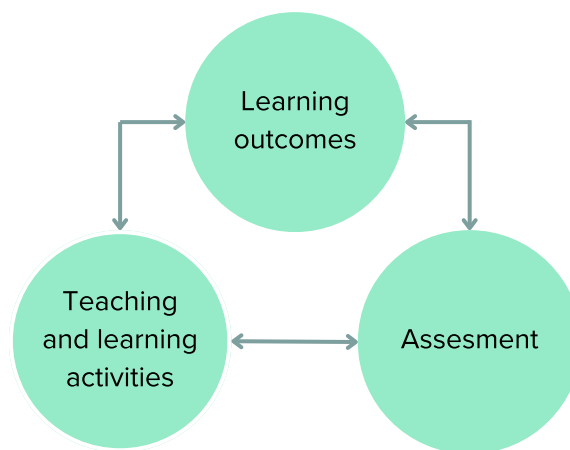


Fig.2. Constructive alignment. Made by authors

Since students in a multicultural classroom differ in many ways because of coming from various learning environments and learning systems, having cultural backgrounds and language competencies, constructive alignment should be specified.

Learning Outcomes

It is important to formulate and communicate intended learning outcomes to the students. Many meta-analyses show leads to more effective learning (Feldmann, 2007, Hatie 2009). “Writing appropriate learning outcomes on the whiteboard at the start of the session not only aids students in understanding what is expected of them but also creates pathways to learning by breaking down the lesson content into smaller, more easily understood parts” (Hebblethwaite, 2010).

In the multicultural classroom, the focus might lie on:

- Cultural Competence: Pedagogy in a multicultural university setting aims to cultivate cultural competence among students. Learning outcomes may include the ability to understand and respect diverse cultural perspectives, communicate effectively across cultures, and navigate multicultural environments (Gay, 2018).

- **Critical Thinking:** Pedagogical approaches encourage critical thinking skills that enable students to analyze information from multiple cultural perspectives, question assumptions, and engage in respectful dialogue (Gay, 2018).
- **Global Awareness:** Learning outcomes may emphasize global awareness and understanding, including knowledge of global issues, appreciation for diverse cultures, and readiness to engage with the world as responsible global citizens.

By categorizing learning objectives into different levels, Bloom's Taxonomy allows educators to tailor their instruction to meet the diverse needs of students. Bloom's Taxonomy, developed by Benjamin Bloom and his colleagues in 1956, is a hierarchical model that classifies educational learning objectives into levels of complexity and specificity. This taxonomy is widely recognized for its strengths in enhancing educational practices and outcomes.

The framework provides educators with a structure for learning objectives, ranging from basic knowledge recall to higher-order thinking skills such as analyzing, evaluating, and creating. This structured approach helps in designing curricula that progressively build students' cognitive abilities. The taxonomy emphasizes higher-order thinking skills, encouraging students to move beyond mere memorization (Anderson, L. W., & Krathwohl, D. R. 2001).

In summary, Bloom's Taxonomy is a robust framework that supports the development of comprehensive educational programs, promotes critical thinking, and facilitates effective communication among educators. Its enduring relevance and adaptability make it an invaluable tool in education (Voss, 2023).

Teaching and learning activities

The basic principle governing the preparation of in-class activities is recognizing students' cultural backgrounds and tailoring teaching methods accordingly. Educators should consider:

- **Inclusive Teaching Strategies:** Pedagogical methods should be inclusive and accessible to students from diverse backgrounds. (Makhalemele & Tlale 2018). Teaching should be tailored to accommodate different learning and cultural preferences. This may involve using a variety of instructional techniques, such as group discussions, collaborative projects, multimedia resources, hands-on activities, and experiential learning opportunities (Banks 2016).
- **Active Learning:** Encouraging active learning methods, such as problem-solving activities, role-playing exercises, and simulations, promotes student engagement and deepens understanding of multicultural issues by allowing students to apply theoretical concepts to real-world situations (Hebblethwaite, 2010; Kerres, 2018).
- **Social context:** learning happens in the interaction with others, which is a good strategy in a multicultural class. Small groups are recommended: "small groups offer a safer, more intimate environment for students to exchange knowledge and perspectives with classmates, thus students are more willing to open up when discussing contested multicultural issues" (Brazill, 2020).

- Teacher's roles: The role of the teacher changes in these settings – teachers are more facilitators who support the individual learning processes of the students than knowledge brokers (Brasill, 2020).
- Relationships: Moreover, Gay (2018) emphasizes the importance of building strong relationships with students. Learning about their cultural backgrounds, interests, and experiences will not only show genuine care and respect but will also help build a community of learners based on shared experiences. This fosters the learning process, and everyone will feel safe expressing their thoughts and opinions without fear of judgment or discrimination.
- Culturally Relevant Content and Inclusive Curriculum Design: Incorporating culturally relevant content into lessons helps students see themselves represented in the curriculum and enhances their engagement and learning outcomes. It also means teaching about different cultures in a respectful way that avoids stereotypes or oversimplifications. This can include using examples, case studies, and readings that reflect the diversity of cultures and experiences. (Brasill, 2020). What is more, Banks (2016) recommend incorporating materials and literature from various cultures to illustrate key concepts, principles, and theories from any given subject area or discipline.

Assessment

Assessment methods should align with the learning outcomes and pedagogical approach, providing authentic opportunities for students to demonstrate their understanding of multicultural concepts and skills. Assessment methods must be fair, and culturally sensitive, and allow students to demonstrate their knowledge and skills in multiple ways (Banks, 2016). Most of all educators should consider:

- Formative assessment: “Formative assessments create opportunities for students to make mistakes and advance their learning through making these mistakes in a low-risk environment because constructive feedback can be provided without the possibly demoralizing effect of a low mark or grade“ (Hebblethwaite, 2010). This form of assessment is essential in multicultural classrooms as it promotes personalized learning as well as fosters equity, and relationship-building.
- Diverse Assessment Formats: Offering diverse assessment formats accommodates different learning preferences. For example, providing options for written assignments, oral presentations, group projects, and multimedia projects allows students to showcase their learning in ways that best suit their strengths. Peer assessment can be valuable as the feedback can be more interactive (Hebblethwaite, 2010). Diverse assessments will also mitigate the potential misuse of AI tools in academic responses.
- Culturally Sensitive Evaluation: When evaluating student performance, instructors should be mindful of cultural differences and avoid biases that may impact assessment outcomes. Providing clear evaluation criteria and constructive feedback helps ensure fairness and transparency in the assessment process (Banks, 2016).

1.4. Case study: Multiculturalism and multilingualism in the Italian L2 (second language) class

ItaStra's didactic approach and activities for plurilingual students arrived in Palermo after an undocumented migratory journey.

Multiculturalism in education encompasses a multifaceted array of factors, spanning linguistic diversity to socio-cultural contexts. Within the School of Italian for Foreigners (ItaStra) affiliated with the University of Palermo (Sicily), this concept transcends mere theoretical discourse to manifest as a tangible reality. Founded in 2008, ItaStra's overarching mission is to advance pedagogical, instructional, advisory, and scholarly endeavors in Italian as a second language. However, as Palermo experienced an uptick in young migrant arrivals, the school confronted the imperative to reassess conventional language teaching paradigms. This necessitated a recalibration of traditional L2 learning/teaching methodologies to cater to the unique needs of young adults with limited or no formal education yet possessing rich linguistic repertoires and advanced linguistic-communicative competencies. Within this socio-political framework, the student cohort at ItaStra progressively diversified, encompassing individuals from various global regions, including the African continent, Pakistan, and Bangladesh, many of whom arrived in Palermo via undocumented migration routes. These students brought - and still bring - with them a rich tapestry of linguistic skills, and cultural backgrounds, presenting both challenges and opportunities for the institution's teachers and researchers. For them and the new students, the challenge has been dual fold. Firstly, it involved innovating pedagogical approaches to address diverse learner profiles previously overlooked by national and local educational systems. Secondly, it required expedited acquisition and instruction of the Italian language to meet pressing needs, such as navigating bureaucratic formalities to secure residency permits, often contingent on Italian language proficiency certifications.

To tackle these objectives, ItaStra has leveraged insights from the European glottodidactic landscape and Italian second-language education, particularly multilingualism in instructional settings. This has culminated in the development and consolidation of a teaching framework that begins by valorizing learners' multilingual repertoires and transcultural identities, thereby empowering them as active contributors to democratic citizenship at a local and global level. This rendition encapsulates the intricate interplay of multiculturalism, language education, and migration dynamics within the educational sphere of ItaStra, aligning with the analytical rigor expected in scientific research.

Models and practices for plurilingual students in the multicultural classroom.

The ItaStra teaching model recognizes the importance of acknowledging and valuing the linguistic and cultural diversity that unfolds within the didactic practice and activities. It aims to enhance students by leveraging their multilingual repertoire and integrating them into the learning process. The active learner's language use is a personal and social act of expression and sharing of culture, feelings, affectivity, rights, perceptions, and representations about language and its varieties.

In designing a multicultural classroom environment, several factors must be considered to ensure effective learning outcomes. At ItaStra, the focus is promoting awareness of and emphasizing the correlation between linguistic structures and social attitudes, fostering socio-linguistic sensitivity among students. All of these elements are objectives of ItaStra's programming and teaching model, which is developed along four theoretical-sectoral lines that make it (1) multilingual; (2) focused on variational (neo)competence; and (3) L2 extensivity.

Working with multicultural student groups requires innovative and adaptable teaching practices. At ItaStra, educators have developed a dynamic teaching methodology that encompasses textual dimensions to enhance language acquisition. This approach fosters a collaborative relationship between learners and texts, promoting linguistic exploration and expression. Additionally, the school emphasizes the development of strategic competencies, particularly for learners with low literacy levels, through initiatives like PONTIdiPAROLE (lit. 'bridges of words'), which utilize written, oral, visual, audiovisual, multimedia, and digital materials selected rigorously. PONTIdiPAROLE was developed as a pioneering 'didactic model' aimed at users with low literacy levels (children, adolescents, unaccompanied foreign minors, and adult migrants), designed for use by teachers, schools, and reception centers. The articulation of the PONTIdiPAROLE pathway is born to meet two contrasting needs characterizing the needs of migrants with low or no schooling: the need to quickly learn to use the Italian language to navigate society and the need for extended time to learn to read and write in a foreign language, peculiar to adults. The path identified for teaching/learning is based on two aspects: the centrality of texts and the development of strategic competencies. In this sense, ItaStra adheres to a dynamic idea of (neo)competence. The latter is characterized by (1) variability as it represents contextualized linguistic acts, predisposed to change over time and across different speech situations; (2) fragmentarily as it is functionally related to the biographical, linguistic, social, personal, and group profiles of learners. The properties just listed of (neo)competence reflect the variational nature of students' linguistic repertoires with a migratory past and instability, which characterizes them as open, plastic, and constantly evolving systems. In such a framework, (neo)competence is achieved through specific socio-pragmatic linguistic objectives connected to, among all the other linguistic objectives, the ability to conceptualize the fundamental cores of society, culture, and history of the destination context, both diachronically and synchronically and the awareness of the close correlation between linguistic structures and language use, and social attitudes and behaviors, fostering socio-linguistic sensitivity and the exercise of functional relationship between language and rights.

With the rise of digital technologies, to bring students closer to a more conscious use and mastery of mobile devices, the PONTIdiPAROLE teaching model, previously designed in hard copy, was redefined for digital use, resulting in the platform "Studiare migrando" (lit. 'study migrating'). The e-learning platform "Studiare migrando", was aimed at young migrants and refugees living in Palermo. It provides interactive multimedia materials for learning Italian and school subjects, to pass eighth-grade examinations, and was designed to be used in formal and non-formal contexts, through the personal smartphones of the students.

This project resulted from a collaboration between ItaStra and the Institute for Educational Technologies of the National Research Council (CNR) and was supported by the United Nations Children's Fund (UNICEF). This recent adaptation of teaching models for digital use, such as the "Studiare migrando" platform, highlights ItaStra's commitment to leveraging technology for inclusive education.

In this sense, the ItaStra model is also L2-extensive. This means that the gap between the learning context and the acquisition context is annulled in didactic and formative practice. ItaStra's strategy involves a single process of language acquisition that includes classroom teaching and linguistic immersion activities in the community. Thus, learners experience a continuous period of language education, cooperating with specialized teachers and Italian native-speaking peers specially trained. On the other hand, the model aims to achieve linguistic immersion in the target Italian language even in second-language contexts, by replicating the L2 environment with particular attention to cognitive, cultural, and linguistic dimensions. Therefore, ItaStra's dynamic model, founded on (neo) competencies, usage contexts, language, and cultural plurality, highly sensitive to the pragmatics of norms and usage, is primarily open to contributions from parallel fields of study: variational theory primarily, but also related disciplines such as literature and textuality methodology, such as potential literature and linguistic creativity. At the core of the glottodidactic architecture lies the persistence of the monad Learner-student, in a position of epistemic privilege: the place from which everything starts and where everything returns.

Conclusion

ItaStra's approach to multicultural education transcends traditional boundaries, embracing linguistic diversity as a cornerstone of learning. By valuing students' multilingual repertoires and implementing innovative teaching practices, the school fosters an inclusive learning environment where all learners can thrive. Through its dynamic and extensive multi-modal teaching model, ItaStra continues to shape the landscape of multicultural education, preparing students for success in an increasingly interconnected society.



1.5. Recommendations from experts

- In general, I also feel that a multicultural classroom is an equity-minded classroom--anyone from any background is given the chance to participate and contribute. The University of Michigan has some good resources on teaching for equity:<https://crlt.umich.edu/equity-focused-teaching/principles-strategies-resources>
- When I think of multicultural students, I think of culturally responsive pedagogy. This source outlines it well though it's targeted at K-12 students. <https://educationonline.ku.edu/community/multicultural-education-in-todays-classrooms>
- Intercultural communication is all about power relations, including symbolic violence, epistemic justice, etc. - so my initial thought would be a concern about this in general. I will respond as a researcher of diversity (I am a sociologist studying drug user cultures and migrations), but also as a creator of an Intercultural Communication MA program in Sociology at the UO and a former head and creator of the International Study Programs Office, which dealt with enrollment and service to the international students at the UO. It is important to acknowledge the multitude of academic cultures, i.e. educational systems that brought up students. This shapes what students think is important, what is rewarding, or how to be "tactical" in the classroom. It is important to be reflexive and explore mutual expectations, especially the tacit ones. It is a cross-stage comment: intersubjectivity should be the default. A multicultural classroom is not only about ethnicity but also about other intersectional qualities, inc. gender, sexuality, religiosity, social class, worldview, and many other categories. A multicultural curriculum challenges the dominant order of knowledge creation; one that dismantles the discipline that re-creates the power relation (as opposed to personal and community growth). A multicultural curriculum starts with the deconstruction of tacit assumptions that lie behind the values and norms structuring it. All students are "multicultural", we just fail to acknowledge that and push out an agenda that reflects the majority/hegemonic group views and ensures that academically, the dominant group thrives. It is important to lay out the blueprint for the universalities that apply in a given classroom - that go beyond the dominant cultural group values and are rooted in a more holistic combination of academic goals, sustainable development conditions, and inclusive, socially just principles (Michał Wanke PhD, Opole University, michal@uni.opole.pl).
- A multicultural classroom to me is synonymous with a multicultural society. In each, there is cultural pluralism or diversity within the group or society, including an institution or classroom. The classroom should be treated with the same equity and care as expected.
- Approaches to multicultural approaches to teaching, as well as techniques, and teaching beliefs that support teaching decisions.
- I fully agree and would also like to emphasize the importance of critical thinking as fundamental to any intercultural classroom/ teaching. As e.g. Miller & Tucker (2015) and Sobkowiak (2016), based on current research, argue: that critical thinking (CT) and intercultural competencies are closely related or overlap. For example, CT requires seeking and understanding other perspectives, and suspending judgment where necessary. Similarly, Intercultural thinking and competencies include

responding to other perspectives and comparing cultural aspects, practices, etc. without being one-sided. CT should be integrated as an important dimension in the multicultural classroom through guided active reflection by all students, if not yet anchored in the textbooks. Another aspect that can be helpful is interdisciplinarity, which to a certain extent is also a form of 'multiculturality', based on the diversity of subjects with their sometimes highly diverse prerequisites, assumptions, data, and methods ("subject cultures"). Wherever students from different subjects come together in the multicultural classroom, this dimension could also be used to promote the overarching goals of multicultural teaching and studying. Of course, this is largely limited to HE contexts (Dr. Daniel Schmicking, Johannes Gutenberg-Universität Mainz)

- A multicultural classroom is not only a classroom where there is diversity of many kinds (religion, culture, language, etc.) but where that diversity is harnessed to create a learning experience.
- What challenges, difficulties, or opportunities would we need to consider for multicultural students? Soft skills, cooperating, managing emotions, etc.
- Any additional tips, suggestions, tricks, or resources we can link to? I think collaborative learning is key to the multicultural classroom.

1.6. Further reading

- Here are some articles interesting about the Theoretical Matrix of Culturally Relevant Assessment: https://www.researchgate.net/publication/335010340_Theoretical_Matrix_of_Culturally_Relevant_Assessment ; <https://www.tamuc.edu/wp-content/uploads/2024/02/Approaches-to-Building-Diversity-Equity-and-Inclusion-in-Student-Learning-Outcomes-Assessment-.pdf>
- The University of Michigan has some good resources on teaching for equity: <https://crlt.umich.edu/equity-focused-teaching/principles-strategies-resources>
- This source outlines it well though it's targeted at K-12 students. <https://educationonline.ku.edu/community/multicultural-education-in-todays-classrooms>
- John W. Miller, Jennifer S. Tucker, Addressing and assessing critical thinking in intercultural contexts: Investigating the distance learning outcomes of military leaders, *International Journal of Intercultural Relations*, Volume 48, 2015, Pages 120-136, ISSN 0147-1767, <https://doi.org/10.1016/j.ijintrel.2015.07.002>.
- Paweł Sobkowiak, Critical thinking in the intercultural context: Investigating EFL textbooks. *SSLT* 6 (4). 2016. 697-716, doi: 10.14746/sslit.2016.6.4.7, <http://www.sslit.amu.edu.pl>

Conclusion Chapter 1

The multicultural classroom is a dynamic environment where students from diverse cultural backgrounds come together. In such settings, culture is not static but evolves based on interactions and societal changes. Three key paradigms address cultural diversity:

1. **Cultural Assimilation** – Dominant cultures override minority cultures.
2. **Cultural Integration** – Minority cultures are permitted, but the dominant culture prevails.
3. **Cultural Pluralism** – All cultures are valued equally, promoting anti-racism and equality in education.

Teaching in multicultural settings requires an intercultural approach, where student's diverse identities are acknowledged, respected, and included in the curriculum. This includes:

- **Culturally responsive teaching** – Incorporating student's cultural knowledge, experiences, and learning styles to make education more relevant and effective.
- **Inclusive curriculum design** – Ensuring that learning materials reflect the diversity of student backgrounds, avoiding stereotypes, and including literature from various cultures.

In addition to fostering an inclusive environment, educators are encouraged to implement diverse teaching strategies such as collaborative learning, active participation, and formative assessments. This approach promotes cultural competence, critical thinking, and global awareness among students, helping them navigate multicultural environments effectively.

Programs like ItaStra's in Palermo, Italy, which focuses on the linguistic and cultural diversity of migrant students, demonstrate the success of integrating multilingualism into education. These efforts are supported by modern digital platforms that provide accessible learning tools for migrants, showing the potential of technology in fostering inclusive education. Overall, the aim is to create a "brave space" in classrooms where students are encouraged to engage with one another openly, fostering mutual respect and co-creating their learning environment.

2. Digital competence and the use of AI to support the multicultural classroom

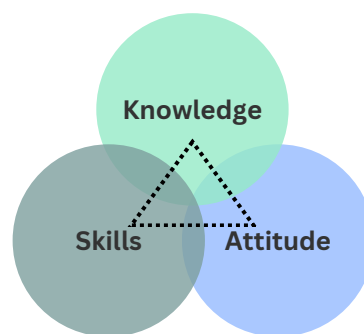
2.1. Introduction

The topicality of AI refers to its current relevance, importance, and the extensive attention it receives across various domains, including technology, business, healthcare, education, and ethics. This relevance is driven by several key factors, one of which is its educational impact. AI-driven tools provide personalized learning experiences, adapting to individual students' needs and learning styles, which is particularly important for managing multicultural classrooms. AI tools can enhance educational outcomes and accessibility by providing real-time feedback and identifying areas for improvement.

AI significantly contributes to the development and enhancement of digital competence by providing personalized learning, automating tasks, improving accessibility, enhancing security, and fostering innovation. These capabilities enable individuals to navigate and excel in an increasingly digital world, thereby underscoring the integral role of AI in cultivating comprehensive digital literacy and proficiency.

AI can be described according to knowledge, skills, and attitude in various ways, highlighting its multifaceted impact on both individuals and organizations.

Table.2. Elements of competence and their characterization in the context of AI.



Knowledge	Skills	Attitude
<p>Knowledge in the context of AI involves understanding the fundamental concepts, theories, and technologies that underpin artificial intelligence. This includes foundational concepts and technical knowledge.</p>	<p>Skills refer to the practical ability to apply AI knowledge to solve problems and create solutions. Key AI-related skills include: data analysis, data preprocessing, exploratory data analysis, evaluation and validation, implementation and deployment, coding, problem-solving etc.</p>	<p>Attitude encompasses the mindset and behavioral attributes necessary for effectively leveraging AI technologies. This includes: curiosity and lifelong Learning, experimentation, ethical responsibility, bias mitigation, interdisciplinary collaboration, communication.</p>

AI encompasses a rich blend of knowledge, skills, and attitudes that enable individuals and organizations to harness its potential effectively. By fostering a deep understanding of AI concepts, developing practical skills for AI application, and maintaining a responsible and collaborative attitude, one can fully leverage the transformative power of artificial intelligence.

What is digital competence?

Digital competence refers to the confident, critical, and responsible use of digital technologies for learning, at work, and for participation in society.

The DigComp 2.2 framework developed by the European Commission defines the term in 5 different areas:

1. Information and Data Literacy: The ability to articulate information needs, locate and retrieve digital data, and manage and organize digital content.
2. Communication and Collaboration: Using digital technologies to interact and collaborate, while being aware of cultural and generational diversity.
3. Digital Content Creation: The skills to create and edit digital content, integrate information into an existing body of knowledge, and understand copyright and licensing.
4. Safety: Protecting devices, content, personal data, and privacy in digital environments, as well as being aware of the environmental impact of digital technologies.
5. Problem Solving: Identifying and resolving problems in digital environments, using digital tools to innovate, and keeping up-to-date with the digital evolution.

Fundamentals of AI

There are several terms and concepts within the field of Artificial Intelligence.

- Machine Learning: ML is a subset of AI that focuses on the development of algorithms that can learn from and make predictions or decisions based on data. It includes a variety of techniques like regression, classification, clustering, and more.
- Deep Learning: DL is a subset of ML that uses neural networks with multiple layers (deep neural networks) to analyze data. These networks are capable of learning complex patterns and are particularly powerful for tasks like image and speech
- -recognition.
- Generative AI: This refers to AI models that can generate new content similar to the content they were trained on. Generative AI often uses deep learning techniques, especially Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs). GANs consist of two neural networks, the generator and the discriminator, which are trained simultaneously through a competitive process:
 - The generator creates new data instances (like images, music, video, or text).
 - The discriminator evaluates them against real data, trying to distinguish genuine from generated content. The process continues until the generator becomes so good at producing data that the discriminator can't tell the difference between real and generated content.

These generative models based on DL, require tremendous amounts of data, data that works as examples for the models. Consequently, this leads to a significant increase in the demand for robust hardware capable of supporting and processing these intensive computational tasks. Very successful models belonging to this category are the so-called Large Language Models (LLM) which are used in several software tools, also in the context of education.

A large language model (LLM) is an artificial intelligence model engineered to comprehend, produce, and modify human language. These models are trained on extensive text data, enabling them to acquire patterns, syntax, factual information, and a degree of reasoning.

LLMs can indeed be seen as a tool that predicts the generation of words in a text. Specifically, LLMs use patterns they have learned during training to estimate the probability of a word or sequence of words following a given context.

Popular examples of large language models include OpenAI's GPT series, Google's BERT, and T5. These models have numerous applications across industries, from customer support to content creation.

2.2. AI in the context of education

The incursion of Artificial Intelligence (AI) into the educational sphere heralds a paradigm shift in pedagogical methodologies and the operational framework of learning institutions. This chapter delineates the multifaceted role of AI in augmenting the educational process, addressing its potential to individualize learning trajectories and streamline administrative functions, while also acknowledging the inherent limitations and ethical dilemmas it presents.

The Potentiation of Individual Learning Trajectories via AI

Customization of Educational Material AI's capacity to analyze and interpret complex student data allows for the customization of educational material, thereby accommodating diverse learning velocities and styles, a cornerstone of contemporary pedagogical strategies.

Operational Efficiency in Educational Administration The automation of administrative tasks, facilitated by AI, can significantly enhance operational efficiency, thereby reallocating educational resources toward direct pedagogical engagement and student support.

Accessibility and Globalization of Education AI technologies are instrumental in transcending geographical constraints, facilitating access to quality educational resources, and fostering a globalized learning environment.

The Potentiation of Individual Learning Trajectories via AI

Data Privacy and Ethical Utilization The deployment of AI in educational contexts necessitates rigorous scrutiny regarding data privacy and the ethical utilization of student information, emphasizing maintaining transparency and robust security protocols.

Technological Dependency An over-dependence on AI systems may precipitate a diminution in conventional pedagogical practices and the erosion of essential interpersonal competencies among learners.

Disparities in Technological Access The disparity in access to AI tools between disparate educational entities may exacerbate educational inequities, necessitating policy interventions to bridge the digital divide.

Methodological Innovations in AI-Enhanced Teaching

Hybridized Learning Environments The synthesis of AI with human pedagogy engenders a hybridized learning environment, wherein AI supplements the educational process with adaptive content and analytics, while educators provide the irreplaceable human dimension vital for nuanced problem-solving and emotional intelligence development.

The Flipped Classroom Model AI facilitates the flipped classroom model by enabling students to engage with new content digitally, optimizing in-class time for applied learning and interactive discourse under educator facilitation.

AI Integration within the Classroom Within the classroom setting, AI can function as an adjunctive pedagogical tool, offering instantaneous evaluative feedback, orchestrating educational activities, and customizing instructional materials in real-time.

Asynchronous Online Learning Platforms In asynchronous learning contexts, AI excels by providing learners with the autonomy to progress at their preferred pace. AI systems can deliver immediate evaluative feedback, autonomously assess learner submissions, and curate educational content congruent with individual learner progression.

These advancements aim to support students and educators, fostering skills like critical thinking, creativity, and problem-solving, which are essential for success in the modern world. UNESCO also explores how AI can innovate teaching and learning practices while promoting sustainable development goals in education.

Educators can address the ethical concerns related to AI technologies in education by adopting the following strategies:

- **Understanding AI and Its Implications:** Educators should be knowledgeable about AI technologies and their potential impact on education. This includes understanding how AI works and the ethical considerations it entails.
- **Transparency:** Transparency in AI algorithms is crucial. Educators and institutions must prioritize understanding how AI systems make decisions, which builds trust and allows for the identification and correction of biases.
- **Ethical Training and Curriculum:** Incorporating ethics into the curriculum can help students and educators understand the importance of ethical technology use. This includes exploring diverse perspectives and the consequences of AI deployment.
- **Data Privacy:** Ensuring the privacy and security of student data is paramount. Educators must advocate for and adhere to strict data protection policies to safeguard against breaches and misuse.
- **Bias and Fairness:** Actively work to identify and mitigate biases in AI systems. This involves scrutinizing data sets for representativeness and challenging discriminatory algorithms.
- **Collaborative Development:** Engage with AI developers to ensure educational tools are designed with ethical considerations. This collaboration can help align AI technologies with educational values and goals.
- **Policy Advocacy:** Educators should be involved in policy discussions to shape the ethical use of AI in education. They can advocate for regulations that promote fairness, transparency, and accountability.

By implementing these strategies, educators can help ensure that AI technologies are used responsibly and ethically in educational settings, enhancing learning while upholding ethical standards.

AI bias in educational tools can manifest in various ways, impacting the fairness and effectiveness of these technologies. AI chatbots and language models like ChatGPT or Microsoft Copilot are trained on vast amounts of online text, which can reflect societal biases.

These biases may include a dominance of white, male perspectives, and a strong influence of American culture and capitalism. Bias in data and algorithms can exhibit biases in language, data, and algorithms, leading to fabricated information and potentially offensive responses. These biases are amplified when AI replaces human judgment in job applications, college admissions, and security screenings.

Bias in automated grading systems may not be equipped to handle the nuances of subjective assessments and could be biased against non-standard answers or writing styles, particularly affecting students for whom English is not a first language. In addition, Student Support Systems used to identify student strengths and weaknesses or to provide testing support may rely on biased data sets, leading to inaccurate assessments and reinforcing existing educational disparities.

Addressing these biases requires a concerted effort to ensure that AI tools are developed and implemented with a focus on fairness, inclusivity, and ethical considerations. More on the ethical issues of AI in higher education are explained in chapter 2.4.

2.3. Digital competence and the use of AI in a multicultural context

In a multicultural classroom, digital competence and AI play crucial roles in enhancing learning outcomes and inclusivity. AI-driven tools can help bridge cultural and linguistic gaps by offering personalized learning experiences, adapting to students' diverse needs, and providing real-time feedback. This is especially important for multicultural students, as they come from different cultural and educational backgrounds with varied learning styles. Digital competence, as defined by the European Commission's DigComp 2.2 framework, includes data literacy, communication, and problem-solving. AI tools can strengthen these competencies by enabling students to navigate digital spaces confidently, collaborate with peers across cultural boundaries, and develop critical thinking skills.

When designing and implementing AI in a multicultural classroom, it is important to consider key principles that ensure inclusivity and cultural sensitivity. Firstly, AI systems should account for diverse learning styles and languages, providing content that respects cultural differences. Secondly, AI tools must avoid biases in data and algorithms, which could disadvantage minority students or misinterpret cultural nuances. Educators should actively seek AI tools that promote equity and fairness, ensuring that no group is marginalized.

Moreover, incorporating culturally relevant content and promoting digital safety for all students is essential for creating a supportive environment. Addressing these needs ensures that AI systems not only enhance learning but also create an inclusive, respectful, and culturally adjusted classroom that empowers all students to succeed.

Here are tools that can be integrated into multicultural classrooms to enhance digital competence and create a more inclusive learning environment.

Grammarly assists with writing by offering grammar, tone, and style suggestions. Multicultural Benefit: Helps non-native English speakers improve their writing by providing real-time feedback tailored to different proficiency levels.

Quizlet – AI-powered tool for creating and sharing educational content like flashcards, quizzes, and games. Multicultural Benefit: Supports multilingual learning, allowing students from various linguistic backgrounds to engage with content in their own languages.

Duolingo – AI-driven language learning app. Multicultural Benefit: Helps students improve their language skills, whether learning the classroom's primary language or another language relevant to their studies.

Microsoft Immersive Reader – A tool that reads text aloud, translates content and provides a visual aid to improve reading comprehension. Multicultural Benefit: Supports students from diverse backgrounds by offering text translation and adjusting reading levels, making it easier for those with limited language proficiency to follow along.

Khan Academy – AI-powered learning platform offering lessons across various subjects. Multicultural Benefit: Provides multilingual options and personalized learning paths to meet diverse cultural and educational needs.

Google Translate – Translates text, speech, and images across multiple languages. Multicultural Benefit: Helps students and teachers bridge language gaps in real-time, fostering better communication in a multilingual classroom.

EdPuzzle – AI-powered video-based learning tool. Multicultural Benefit: Teachers can integrate captions and translations into videos, making lessons accessible for students with different language needs.

Sutori – Collaborative storytelling tool powered by AI. Multicultural Benefit: Encourages cross-cultural collaboration among students, allowing them to share stories and learn from different cultural perspectives.

EssayGrader.ai - An AI tool designed to help teachers provide feedback on written assignments. Multicultural Benefit: Especially useful for English Language Learner (ELL) students, offering feedback on structure, grammar, and content with a focus on improving writing skills across different languages.

Live Presentations in PowerPoint from Office 365 - The translation tool in the online PowerPoint version of Office 365 could be a significant asset in teacher education, particularly for supporting universal design and facilitating translation to the student's own language. A distinguished benefit for multicultural classrooms. The presentation can also be given remotely in real-time to an audience. For more information on how to use the tool visit the support page of Microsoft.

Census GPT - This tool provides data analysis and demographic insights that can be used in a multicultural context, offering a suite of AI-driven features designed to simplify the complex process of extracting, analyzing, and visualizing census data.

Tutorai.me - TutorAI's wide range of topics, gaming features, and advanced technology make it a great tool for learners looking for an engaging and effective study assistant. It creates content according to the needs of the student, and examples and questions to train the student.

Q-Chat - A Quizlet's AI-powered learning assistant that uses the Socratic method to promote critical thinking. It allows learners to put their knowledge to work in an immersive learning experience.

Wisdolia - A smart AI learning assistant that creates flashcards and lessons on any subject in seconds. It supports over 10+ languages. Wisdolia is a tool that caters to diverse learning needs. Its personalized feedback feature helps learners improve their grasp of the subject matter.

Whiteboard AI – is an AI-enhanced learning tool. It instantly summarizes and chats with videos, creates notes and flashcards from any document and answers any question. Whiteboard AI is a comprehensive learning assistant that can significantly enhance the learning process.

Turboscribe - is an AI-powered transcription and note-taking tool designed to automatically convert speech or audio into text. Multicultural Benefit: promotes learning by transcribing lessons, videos, or student contributions in real time, which allows students from diverse linguistic backgrounds to follow along, review the content at their own pace, and bridge language barriers.

NaturalReaders - is a text-to-speech tool that converts written text into spoken audio, offering customizable voices and formats for easy listening. Multicultural Benefit: promotes learning by enabling students to listen to written content in various languages and accents, improving comprehension for those who are auditory learners or have different language proficiencies.

2.4. Ethical issues of AI

According to UNESCO (2020), six major issues are related to AI in education (AIED). Firstly, AIED policies are not globally consistent. Teachers also lack sufficient training, and there is not enough relevant research about the benefits and challenges of AIED. In addition to this, more ethically sustainable product development that takes diverse needs into account and equal possibilities to use AI systems in education is needed. Finally, the most significant challenges regarding the ethical use of AI (e.g., data collection, usage, and dissemination) have yet to be resolved.

The following challenges (in no particular order) were brought up in informal discussions with HE teachers from different faculties at one of the FORTHEM alliance universities for one year (Kousa, personal communication 2023):

- lack of training and resources
- rapid technology changes
- responsibility issues
- plagiarism
- untrustworthiness of language models
- inclusion and accessibility issues
- problems with instructions, assessment, and evaluation

Many of the HE teachers shared similar questions such as:

- How to find the best and safest AI tools for me and my students?
- What is allowed/not allowed?
- Where to get support and training?
- How to make sure that students learn?

It can be concluded that the challenges experienced by the teachers are in line with the six major challenges presented by UNESCO (2020). Many other researchers have reached similar conclusions about the teachers' challenges (e.g., Stone et al. 2016; Dignum, 2018; Kousa & Niemi, 2023).

AI ethics principles behind the regulations

It has been said that the growth of ethical challenges is directly in line with the development of technology (e.g., HAI 2020). However, higher education (HE) teachers should be able to trust that the AI systems for teaching and learning are transparent, understandable, safe, and most importantly, contribute to learning. Hagendorff (2020) claims that educational technology (EdTech) companies do not respect ethical requirements because there are no penalties for their violations. According to some EdTech companies, there are too many regulations and guidelines for ethical AI and they are often too difficult to understand (e.g. Jobin, Ienca, & Vayena, 2019; Kousa & Niemi, 2022). Therefore, many companies follow ethical guidelines not necessarily comparable or consistent with other companies. AI ethics only exists in companies' marketing strategies and speeches, argues Hagendorff (2020).

EdTech companies think that AI regulations and guidelines are ambiguous but the situation is not as straightforward in education. (Holmes et al., 2021). Furthermore, people understand the concept of ethics differently. Without going deeper into philosophical considerations about morality and ethics, we can try to understand AI ethics by looking at it from the perspective of deontological ethics, utilitarianism, and virtue ethics. Firstly, the main question of Immanuel Kant's deontology is "What is my duty?" Secondly, the question for Jeremy Bentham's and John Stuart Mill's utilitarianism is "What is the greatest possible good for the greatest number?" Thirdly, Aristotle's virtue ethics deals with the question "Who should I be?" (Burton et al., 2017) These questions do not exclude each other but offer different perspectives on ethical problems. There are a vast amount of governmental, organizational, institutional, and company-based principles for ethical AI both at national and international levels that are based on those three ethical approaches mentioned. According to the literature review by Morley et al. (2020), there are five ethical principles of ethical AI: beneficence, non-maleficence, autonomy, justice, and explicability. Every principle overlaps each other and has many sub-principles such as AI literacy which is part of explicability (explainable AI). It is not always clear what should be explained about AI tools and materials (Coeckelbergh, 2020) and who decides that (Floridi et al. 2018). In addition, it is also not clear who is to blame if something goes wrong, say, that you are trying to do an essay with the help of a language model and you have false information which leads to the rejection of the essay. Who is responsible in this case: the company that owns the model, the product development unit, the creator(s) of the model, or you?

AI ethics and higher education teaching in practice

The three paradigms of Artificial Intelligence in Education (AIED) by Oyjang & Jiao (2021) might be a good way of understanding the relations between the learner and AI systems. According to the researchers, there are 1) AI-directed, 2) AI-supported, and 3) AI-empowered paradigms. It can be simplified that in the first paradigm, AI is the boss, and no personalized learning is possible. In the second paradigm, AI is the collaborator and the learner's assistant. The collaboration between the learner and AI makes the learning profile more personalized when the learner can decide what support is needed. In the ideal world, the learners have the agency and ability to lead their learning and collaboration with AI systems. However, the researchers remind us that there are many open questions about data collection and privacy and the systems are too complex. Furthermore, critical viewpoints on the cognitive, emotional, social, economic, and ethical issues in education need to be considered when designing AI systems that make learner agency and collaboration with AI possible.

So how could the teacher bring up AI ethics in courses? It is good to remember that AI systems have been used for decades even though we are not even aware of it. We are now in the era of big language models, but no one knows what the next step will be. Here are a few tips that might be useful in teaching:

1. Understanding the basics of how AI systems work
2. Understanding the basics of AI ethics and principles
3. Having support from the university (training, safe AI tools, guidelines, curriculum, etc.)
4. Discussing the challenges and possibilities of AI systems with your students
5. Introducing cases and examples of ethical dilemmas and having different viewpoints on how to solve them
6. By asking leading questions concerning responsibility issues, for example, what happens if I use the AI system in an unethical way
7. Giving sufficient information to students how to use AI systems in an ethically sustainable way and taking care of the diverse needs of students

Finally, it is good to remember that AI systems bring many education opportunities, not just challenges. For example, AI can help teachers with routine work, making summaries and course plans or acquiring relevant information for the lesson. It also can support learning difficulties. More examples of tools that can be used in diverse and multicultural classrooms are presented in the previous chapter 2.3.

2.5. Case studies

The Centre for the Innovation and Improvement of Academic Didactics (CIMDU)

Founded in 2019, the Centre for the Innovation and Improvement of Academic Didactics (CIMDU) is located at the University of Palermo.

In line with the University's Strategic Plan, the CIMDU conducts its operations, namely aimed at enhancing didactics, by executing specialized measures to help the teaching profession. The implemented measures encompass comprehensive services for educators, such as providing seminars on academic teaching for newly hired personnel and offering training courses for contract professors.

The seminars are organized to impart motivation for acquiring knowledge in participative didactics, as well as teaching perspectives and active didactics. Reflection and consultation among peers are taken into account, along with the most effective approaches and techniques in student-centered methodologies. Ethical considerations can also be present in academic instruction, formative and summative evaluation, and peer observation sessions.

Another function of the center is to offer courses for the coordinators of the degree programs, including topics such as legislation, indicators, and essential literature for the degree course. Special emphasis is given to the process of internationalization and the matter of student support. This paper also presents several examples of didactic innovation implementations.

A primary focus of the center is providing broad blended services, specifically offering training courses for UNIPA faculty members on emerging didactic technology. These encompass paradigms such as Massive Open Online Courses (MOOCs), Virtual Learning Environments (VLEs), Hybrids, and their particular implementation on well-known platforms like Moodle and Microsoft Teams, as well as Digital Academy Solutions and Learning Management Systems, which are also built upon Artificial Intelligence. All seminars addressing these points were conducted in the year 2024.

Another function of the center is to provide counseling services specifically tailored for foreign language instruction.

A case study from the University of Opole

Enhancing Writing Skills in Multicultural Groups through ChatGPT Integration.

The English in Public Communication (EPC) BA program offered by the University of Opole attracts students from across the globe by providing an integrated approach to public communication in areas

such as politics, culture, society, management, business, and technology. All courses within the program are taught in English. Practical English courses, including reading, listening, speaking, writing, and grammar, are designed to develop students' language skills and help them attain a high level of proficiency in English. Subject-specific courses, such as Public Communication and Public Relations, Cultural and Media Studies, Persuasion and Rhetoric, Communication as Critical Inquiry, and Intercultural Communication, broaden students' knowledge and skills in analyzing various communicative situations, managing information, and creating effective messages across diverse media.

As a writing and grammar tutor, I face the challenge of tailoring my classes to meet the needs of highly heterogeneous groups, as my EPC students come from countries such as Poland, Ukraine, Kazakhstan, Algeria, Nigeria, and China. Given their different cultural backgrounds and language competencies, the main objective of my classes is to promote active learning methods that ensure higher levels of student engagement (see 1.3 Pedagogy in a Multicultural Context).

One of the tools I have used to achieve this objective is ChatGPT, which I have incorporated into my teaching in several ways to help develop students' writing skills:

Preparing Materials

Using ChatGPT, I generated sample texts for in-class analysis, including examining complex structures, distinguishing between essay types, creating examples to support given statements, and demonstrating the effects of using stylistic devices. By carefully setting prompts in ChatGPT, I was able to create materials tailored to the student's proficiency levels and interests, while also facilitating their focus on the topic and improving their critical thinking skills. In addition, ChatGPT can provide scaffolded writing assistance for lower-level students by:

- Compiling necessary lexical sets for specific essay types at any required level.
- Generating sentence starters or basic outlines, enabling students to focus on content rather than structure.
- Describing basic essay structures, and providing guidance on each part (introduction, body, conclusion).

This approach allows instructors to break down writing tasks into smaller, more manageable steps.

Personalization

I also used ChatGPT to process students' writing, helping them recognize differences in writing genres. By setting the right prompt, students' narrative essays were transformed into news reports. Analyzing materials based on their ideas helped them quickly grasp these distinctions.

Brainstorming Topics and Collecting Ideas

ChatGPT can be an effective tool for overcoming writer's block by allowing students to brainstorm topics and gather ideas. I have used it to demonstrate how writing should adapt when addressing different types of audiences as far as the content and the style are concerned.

Providing Feedback

ChatGPT proved to be a valuable tool for providing feedback. By adjusting the prompts, I was able to direct my students' attention to areas we had practiced in class. The feedback they received was both detailed and motivating, as I set prompts to emphasize strengths while also offering suggestions for improvement.

Support with Corrections

ChatGPT helps identify grammatical errors, offers stylistic suggestions, and highlights unclear sections, giving students opportunities for self-revision.

After completing a course that incorporated ChatGPT into writing skill development, I conducted a survey among my English in Public Communication students. The results indicated that students most valued ChatGPT for helping them expand their vocabulary and master the structures needed for writing tasks, as well as for the feedback they received. They also found the activities based on ChatGPT-generated texts more engaging and noted that these exercises helped them notice aspects of writing they had never been aware of. As an instructor, I observed that ChatGPT-generated tasks and materials made the classes more engaging and helped achieve learning objectives more effectively. However, it is essential to have a student discussion on the ethical and legal considerations of using ChatGPT at the beginning of the course.

A case study from University of Agder

Towards Automatic Debriefing: Leveraging AI for Enhanced Student Feedback in Higher Education
By Knut Erik Bonnier

Abstract

This paper explores the potential of artificial intelligence (AI) and machine learning (ML) technologies, particularly Large Language Models (LLMs), in automating and enhancing the process of providing student feedback in higher education. The study presents a case of implementing AI-assisted feedback in a graduate-level course, discussing the methodology, challenges, and preliminary outcomes. The findings suggest that AI-augmented feedback systems can potentially increase the quality and quantity of student feedback. However, it is important to emphasize that while AI can enhance the process, human oversight is still necessary.

1. Introduction

The higher education landscape is constantly evolving, with increasing student numbers often leading to decreased individual attention. Simultaneously, teachers face a growing workload of creating exams, assignments, grading rubrics, and providing student feedback. These challenges, which can often be overwhelming, have prompted educators and researchers to urgently explore innovative solutions, including the application of artificial intelligence (AI) and machine learning (ML) in educational contexts (Smith & Johnson, 2021).

Since late 2022, AI and machine learning have made exceptional progress, particularly in developing and applying neural networks such as Large Language Models (LLMs). Techniques like Retrieval Augmented Generation (RAG) have been refined and made more accessible to developers and researchers (Riedel et al., 2020). This has facilitated tailoring these models for specific use cases (Gao et al., 2023), while the context window - the total amount of tokens a model can process - has steadily increased.

Enhancements such as JSON templates and various prompting techniques, including Chain-of-Thought (Wei et al., 2022), have contributed to more deterministic behavior and improved output quality from these models. These advancements have opened possibilities for using LLMs in more critical applications, such as providing student feedback and debriefing.

2. Background and Rationale

Proper feedback facilitates knowledge dissemination and student learning (Raths, 1987). However, providing thorough and thoughtful feedback can be challenging due to time constraints and increasing student numbers. This often results in less-than-ideal feedback, potentially hampering student progression and societal advancement.

The author's experience teaching since 2015 and informal discussions with colleagues have highlighted a growing consensus that providing adequate student feedback is increasingly challenging. The introduction of ChatGPT in 2022 presented an opportunity to experiment with AI in an educational context, specifically for enhancing feedback processes.

3. Methodology

3.1 AI-Assisted Feedback System Development

The author developed an AI-assisted feedback system using the following components:
Two AI agents[1]: "Professor Kurt" (critical and scrutinizing) and "Professor Lupe" (positive and encouraging). These have since been replaced with other agents.

Dify, an open-source AI application framework utilizing OpenAI's GPT-4 Turbo model.

Retrieval Augmented Generation (RAG) to incorporate course-specific knowledge.

Custom templates for structuring AI-generated feedback.

Examples of student feedback.

3.2 Implementation Context

In 2023, the system was implemented in a graduate-level Continuous Improvement and Lean course with eighty-three students. In addition, in 2024, the system was used as a supplementary tool for providing feedback on four master's theses. The course assessment consisted of a term paper written in groups of 4-5 students, making up 100% of the grade. 44

3.3 Process

The process has evolved since its inception in 2022, becoming more elaborate and taking advantage of the progress made in AI and machine learning.

1. Course materials, grading rubrics, anonymized term papers, and refined student feedback from previous years were input into the AI system.
2. A hybrid search was used to retrieve data
3. Each AI agent processed each term paper thrice (Kurt and Lupe).
4. The author reviewed and verified the AI-generated feedback for accuracy.
5. Final feedback was compiled using another AI agent and then reviewed and edited by the author.

Details are provided in **Table 1**

Table 1 - Process details

LLM used	GPT-4 Turbo-1106-preview
LLM Context Window	128k tokens
RAG Input Language	Norwegian and English
RAG Input (.txt files)	Grading rubrics: - 8406 characters (Nor) - 8309 characters (Eng) Hybrid Search Manually Chunked Feedback Template: - 4937 characters (Nor) - 4842 characters (Eng) - Hybrid Search - Manually Chunked Course Description & Syllabus (Nor & Eng) - Hybrid Search - Manually Chunked Refined student feedback: - 6031 characters (Nor) - 5435 characters (Eng) - Hybrid Search - Manually Chunked Anonymized term papers - on average, approximately ten pages per paper, excluding images and references. - The agents were given 3-4 pages at a time
RAG Settings (Dify/Knowledge)	Chunk Settings: Custom Delimiter: ### Max. Chunk Length: 500-1000 Chunk Overlap: 10% of Chunk Length Index Method: High Quality Embedding Model: OpenAI text-embedding-3-large Retrieval Settings: Hybrid Search Rerank Model: - Cohere rerank-english-v2.0 - Cohere rerank-multilingual-v2.0 Top K: 3 Score Threshold: 0.6-0.66

4. Results and Discussion

The implementation of the AI-assisted feedback system yielded several notable outcomes:

1. **Increased feedback volume:** On average, two feedback pages were generated per paper, later condensed to one and a half pages (**Table 2**). However, this was marginally a greater volume than the other previously produced, but the quality was improved noticeably. The feedback seems more balanced and, in particular, highlighted positive aspects more than what was the case before.

Table 2 - Feedback Volume and Quality

Total Number of Term Papers	18 term papers
Feedback Pages Generated per Term Paper	500-650 words ~2 pages
Condensed Feedback Pages	340-450 words ~1.5 pages
Differences in Feedback Quality	A noticeable increase in quality More balanced feedback More emphasis on positive feedback This is believed to be strongly correlated to the quality and quantity of examples

2. **Time efficiency:** While the initial setup was time-consuming (**Table 3**), subsequent uses required significantly less preparation time. Most of the setup time was related to experimentation or tasks later found unnecessary. The time spent generating text was negligible and can be fully automated using, e.g., Dify Workflows or similar methods.

Table 3 - Initial Setup Software

Installation and Setup	Approx. 10 minutes
Creating Agents	Approx. 12-14 hours The process was very experimental at first, and about sixty percent of the time was spent experimenting with RAG search settings
Reformatting and Refining Grading Rubrics, Course Description, Syllabus	Approx. 2 hours Approximately seventy percent of the time was spent fixing formatting errors when converting .pdf files to .txt. The conversion process was later found to be unnecessary.
Refined Student Feedback (example)	Approx. 4-5 hours. - This was done iteratively while experimenting It seems that spending time on refining student feedback examples or simply adding more has a significant impact on the quality of output Multimodal input can enhance the quality of examples (Multimodal Input).
Anonymizing Term Papers	Approx. 3 hours This was done in parallel with reading/grading the term papers, so it is hard to quantify precisely, but on average, approximately 10 minutes per paper, which equals 3 hours in total

3. **Student satisfaction:** Informal discussions with students indicated general satisfaction with the feedback quality.

4. **Reduced re-evaluation requests:** Only one group requested a re-evaluation, which is lower than in previous years, which usually has two or three re-evaluation requests.

These preliminary results suggest that the AI-assisted feedback system has potential benefits regarding feedback quality and quantity. However, human oversight remains necessary to ensure the accuracy and relevance of AI-generated feedback.

4.1 Practical Takeaways

Working iteratively to create prompts and adjust or add instructions one layer at a time is recommended. Dify has a built-in prompt generator that tries to optimize input and uses XML formatting to structure the instructions. This can be quite effective as it only needs a bullet list to provide a decent prompt. Note that several models are available for use as prompt generators. This includes all the top proprietary models as well as the top open-source models. The essential part of creating solid instructions is the quality and extent of the provided examples.

The author found that carefully refining student feedback, enhancing it, and making it as good as possible is a good strategy, as the agent will use it as inspiration. The output quality seems to increase if the agent is provided more examples, and the author did not reach a saturation point. The bottleneck used to be the context window, but this has since increased, so it should not pose a problem. Adding more examples seems to positively impact the output. Still, it is possible to achieve good results even with a single instance if it is of proper quality.

5. Limitations and Future Work

This study is limited by its focus on a single course and the need for formal evaluation metrics. Future work should include:

1. Expanding the implementation to multiple courses and disciplines.
2. Developing quantitative measures to assess feedback quality and student learning outcomes.
3. Exploring integration with existing educational platforms (e.g., Inspera, Canvas).

The author is collaborating with colleagues to develop this approach further, integrating AI agents into various educational platforms. A comprehensive publication detailing this work is expected in late 2025.

6. Conclusion

Implementing an AI-assisted feedback system demonstrates promising potential for enhancing the quality and quantity of student feedback in higher education. While challenges remain, particularly in ensuring accuracy and maintaining the human element in education, this approach offers a potential solution to the increasing demands placed on educators. As AI technologies continue to evolve, their thoughtful integration into 48 educational practices may significantly improve the learning experience for students and alleviate some of the pressures educators face.

Appendix

This appendix has resources for those who want to make their own AI agent.

Dify:

The community version is accessible from this GitHub repository, and it is free to use:

- <https://github.com/langgenius/dify>

Cloud version. Requires an account and costs a modest monthly/yearly fee:

- <https://cloud.dify.ai/>

Documentation can be found here:

- <https://docs.dify.ai/>

Multimodal Input:

Some models, such as Anthropic's and OpenAI's, can receive multimodal input. This can be quite useful, particularly when explaining relations. The Mermaid Diagramming and Charting Tool is an example of how you can share visual data even without an image. Mermaid seems to work with most models.

- Mermaid link: <https://mermaid.js.org/>
- Mermaid tutorial: <https://mermaid.js.org/ecosystem/tutorials.html>
- Mermaid documentation: <https://mermaid.js.org/intro>
- Mermaid live editor (enables preview): <https://mermaid.live/>

[1] The term «agent» is used because of that it is the term used in Dify where the user can select between Chatbot, Agent, and Workflow.

Case study from University of Latvia

Computer Science Faculty

Artificial intelligence (AI) tools are becoming an integral part of the study process at Computer Science faculty, with both teaching staff and students increasingly exploring and adopting various applications of these technologies. Faculty members have started incorporating AI models into their teaching methods to enhance the learning experience and streamline academic tasks.

For instance, one faculty member has used AI tools to create more dynamic and effective multiple-choice tests. By asking the AI to include incorrect answer options, they've been able to design more challenging assessments. Another intriguing potential application, though not yet implemented, involves generating individualized versions of assignments for students. This could be particularly useful in courses like database design, where each student would be tasked with creating a table structure tailored to a specific, unique company scenario. This would ensure that while students are working on similar tasks, each assignment is distinct, thereby reducing opportunities for collaboration or plagiarism.

AI tools such as ChatGPT have also proven helpful in generating templates for test questions, which allows faculty to avoid reusing previous years' tasks—tasks whose answers are often readily available to students. During the spring semester of last year, large language models (LLMs) like ChatGPT and

GitHub Copilot became more widely accessible, and these tools were introduced in lectures, especially in subjects such as web technologies. In these lectures, educators demonstrated how AI could assist in writing code by showing live examples of code generation through GitHub Copilot.

Considering these advancements, the faculty has started to adjust the structure of their courses. There is now an increased focus on oral presentations and face-to-face interactions, where students are required to present their work in person. This shift is a response to the ease with which students can use AI to generate written content and presentations, but in-person discussions are harder to replicate using AI, making them a valuable form of assessment. Additionally, for final theses, students are required to attend weekly consultations and present their progress along with the sources they have used, reinforcing the importance of original work.

In terms of homework assignments, students are permitted to use AI tools, provided they document the entire interaction. This includes specifying the questions they asked the AI and the responses they received. By doing this, students are encouraged to engage critically with AI technologies, viewing them as tools that complement rather than replace their learning.

In summary, while AI tools are being embraced as useful assets in the teaching and learning processes, the faculty is also mindful of the challenges they present. Educators are adapting their teaching methods to ensure that these tools are used responsibly and that students continue to develop essential skills that go beyond AI-assisted tasks.

The Faculty of Theology and the experience of the Institute of Mechanics of Materials on the use of AI in the Department of Physics, University of Latvia

At the Theology Faculty, artificial intelligence tools, particularly ChatGPT and OpenAI, have become essential resources in both teaching and student work. Most users rely on the free versions of these tools, although some students opt for paid versions, which offer additional features such as image processing and social media content generation. Lecturers primarily utilize AI to streamline their research process—finding, clarifying, and identifying the latest literature, as well as organizing and systematizing information to ensure no important details are overlooked.

Similarly, at the University of Latvia's Physics Department within the Institute of Mechanics of Materials, AI is used to enhance both teaching and learning. Faculty members often pre-test assignments with ChatGPT to ensure that the problems cannot be easily solved with AI assistance. The main applications of AI in this context involve text and image processing, as well as data management and analysis. AI is employed specifically for handling large datasets performing complex tasks like linear regression and steering clear text generation for academic purposes.

In chemistry programs, AI tools have been enthusiastically embraced for a long time, with applications tailored to data analysis and the processing of chemical structures, such as protons. This is indicative of a growing trend where specialized AI tools are developed for specific industries, making them indispensable for academic work in those fields.

2.6. Recommendations from experts

Are there tools that allow students to contribute to courses & classes by explicitly referring to their background?

I am not exactly sure about the tools you need explicitly but I like essaygrader.ai for feedback to support ELL students and storyboard due to their extensive cultural expansions of content for all cultures and ethnicities. They do both costs, though. I also really like Sutori for collaborative works and GeoGuesser as a fun cultural game on world mode.

Which considerations do we need to make regarding multicultural students and the use of technology/tools?

Being conscious of what prompts we are putting into programs like chat GPT to include the considerations of various cultures and ethnicities. We, as educators, may have to be explicit about typing in prompts and seeking inclusive language in our AI-generated text, images, etc.

Conclusion Chapter 2

AI technologies offer powerful tools for enhancing educational experiences, especially in multicultural classrooms. By personalizing learning and providing adaptive content, AI can cater to diverse cultural and learning needs, improving accessibility and learning outcomes. The DigComp 2.2 framework outlines five key areas of digital competence that AI can help develop: data literacy, communication, content creation, safety, and problem-solving.

In multicultural classrooms, AI provides tailored educational materials, and real-time feedback, and supports different learning styles, helping students from varied cultural backgrounds succeed. However, the implementation of AI in education comes with ethical challenges, including data privacy, bias, and disparities in technological access, which need careful consideration.

Educators can mitigate these challenges by understanding AI technologies, promoting transparency in AI decision-making processes, addressing biases, and ensuring fair use. Multicultural students, in particular, benefit from AI when it is used to respect and reflect their cultural backgrounds in both the content and learning methods, fostering inclusivity and fairness. Effective integration of AI can help bridge educational gaps, ensuring that all students, regardless of their background, have equal opportunities to thrive in the classroom.

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The idea for this book emerged within the framework of the **FORTHem Alliance**, which aims to transform and shape the future of the European higher education and research area.

This book is primarily **designed for higher education academic staff** working with multicultural student groups. It supports those who wish to deepen their understanding of **multicultural pedagogy** and explore how **digital competence**—including **artificial intelligence (AI)**—can enhance teaching and learning.

The book aims to strengthen teachers' pedagogical digital competence and AI-related skills in higher education, enabling them to design and develop **digital learning materials and teaching methods** tailored for multicultural classrooms. It promotes viewing **multiculturalism as a valuable resource** for inclusive and effective education.

Through shared experiences, best practices from partner universities, and expert recommendations, the book offers **new perspectives on digital competence, AI, and multiculturalism in academia**.

It consists of two chapters:

- **The Multicultural Classroom in the 21st Century**
- **Digital Competence and the Use of AI to Support the Multicultural Classroom**

Keywords: multicultural classroom, digital competence, AI, future skills, pedagogical digital competence, AI in higher education.



More information about **FORTHem**: www.forthem-alliance.eu

