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Empowering adult migrants through digital technology: language learning, identity, and career pathways

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Abstract This paper examines how digital technology practices in adult education contribute to processes of empowerment and exclusion for migrants and refugees when viewed through an intersectional lens. Drawing on two case studies from Germany and the United States, the analysis explores how factors such as migration status, gender, age, and educational background shape participation in digitally mediated learning. In Germany, the integration of virtual reality into literacy and language courses opened new opportunities for workplace-related language practice but also revealed challenges linked to accessibility, technical barriers, and institutional discourses. In the United States, a technology-supported curriculum combining English instruction with civic education provided valuable learning opportunities, while irregular attendance and varying digital skills limited participation for some groups. The findings highlight both the potential of digital tools to strengthen participation and the risk of reinforcing existing inequalities when learners' diverse needs and institutional conditions are not sufficiently considered. By bringing together perspectives on intersectionality, digital divides, and institutional practices, this paper contributes to a deeper understanding of how adult education can function both as a site of recognition and as a space where exclusionary dynamics persist. The paper concludes with reflections on implications for practice and future research.

Keywords Adult education · Digital technology · Migration · Intersectionality · Empowerment · Digital inclusion

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Empowerment erwachsener Migrantinnen und Migranten durch digitale Technologien: Sprachenlernen, Identität und berufliche Perspektiven

Zusammenfassung Der Beitrag untersucht, wie Praktiken des Einsatzes digitaler Technologien in der Erwachsenenbildung zu Prozessen der Stärkung und Ausgrenzung von Migrantinnen, Migranten und Geflüchteten beitragen, wenn sie aus einer intersektionalen Perspektive betrachtet werden. Auf Grundlage von zwei Fallstudien aus Deutschland und den Vereinigten Staaten wird analysiert, wie Faktoren wie Aufenthaltsstatus, Geschlecht, Alter und Bildungshintergrund die Teilhabe an digital vermitteltem Lernen prägen. In Deutschland eröffnete die Integration von Virtual-Reality-Anwendungen in Alphabetisierungs- und Sprachkursen neue Möglichkeiten zur berufsbezogenen Sprachpraxis, machte jedoch zugleich Probleme in Bezug auf Zugänglichkeit, technische Barrieren und institutionelle Diskurse sichtbar. In den Vereinigten Staaten bot ein technologiegestütztes Curriculum, das Englischunterricht mit politischer Bildung verband, wertvolle Lerngelegenheiten, während unregelmäßige Teilnahme und unterschiedliche digitale Kompetenzen die Beteiligung einzelner Gruppen einschränkten. Die Ergebnisse verdeutlichen sowohl das Potenzial digitaler Werkzeuge zur Stärkung von Teilhabe als auch das Risiko, bestehende Ungleichheiten zu verstärken, wenn die vielfältigen Bedürfnisse der Lernenden und institutionelle Rahmenbedingungen nicht hinreichend berücksichtigt werden. Durch die Verbindung von Perspektiven auf Intersektionalität, digitale Spaltungen und institutionelle Praktiken trägt der Beitrag zum Verständnis bei, wie Erwachsenenbildung sowohl Anerkennung ermöglichen als auch Ausschluss reproduzieren kann. Abschließend werden Implikationen für die Praxis sowie Ansätze für zukünftige Forschung diskutiert.

Schlüsselwörter Erwachsenenbildung · Digitale Technologien · Migration · Intersektionalität · Empowerment · Digital Inklusion

1 Introduction

Migration is one of the defining dynamics of contemporary societies, shaping education, labour markets, and civic participation in profound ways. At the same time, it is deeply embedded in global regimes of capitalism, nationalism, and racialized exclusion that regulate mobility and belonging (Maitra and Guo 2019; Walia 2021). Adult migrants and refugees are frequently confronted with intersecting structural barriers in education, labour markets, language acquisition, and social participation. These barriers are often compounded by discrimination and by the limited recognition of prior qualifications, as documented in several chapters of the OECD report (2018, pp. 26, 117, 152).

At the same time, adults are active agents who draw on diverse resources, including digital technology, to pursue education, build careers, and negotiate identities in their new societies (UNESCO Institute for Statistics 2018).

To address this complexity, our analysis adopts an intersectional perspective. Originating in critical legal and feminist scholarship (Crenshaw 1991), intersectionality highlights how categories of difference such as race, gender, and class are not simply additive but mutually constitutive, producing distinct configurations of inequality and exclusion. In the field of adult education, intersectional approaches illuminate how migration status, educational background, gender, age, and linguistic repertoires intersect to shape learners' opportunities for participation (Sprung 2011). Adopting this lens allows us to move beyond treating "migrants" as a homogeneous group and instead foreground the differentiated ways in which digital technology can both foster empowerment and risk reinforcing marginalization.

Against this background, our paper is guided by the following research question: How do digital technology practices in adult education contribute to empowerment processes of migrants and refugees when analyzed through an intersectional lens? More specifically, we ask:

1. In what ways do intersecting factors such as migration status, gender, age, and educational background shape participation in technology-enhanced learning?
2. How do the BEF Alpha (Germany) and CILIA-T (United States) projects illustrate the empowering potential as well as the limitations of digital technology in supporting language learning, career orientation, and civic participation?

This paper draws on two case studies, one from Germany and one from the United States, that illustrate both the promises and the challenges of technology-enhanced learning in migration contexts. The BEF Alpha project in Baden-Württemberg integrates Virtual Reality (VR) into literacy and language courses for refugees, enabling participants to explore professional fields and rehearse workplace interactions. Earlier work has introduced the project's general approach to literacy and career orientation (Durgunoğlu et al. 2026b).

The Content-Integrated Language Instruction for Adults—with Technology Support (CILIA-T) project in the United States combines content-based English instruction with technology-enhanced activities to promote civics and history education and digital literacy. Although situated in distinct national and institutional settings, both projects provide valuable insights into how digital tools can foster empowerment, agency, and community building among adult learners.

At the same time, digital technology cannot be understood as neutral instruments. Their use is shaped by existing inequalities and may reinforce exclusion if access, readiness, and recognition are unevenly distributed (Langer 2025). By foregrounding the intersectional dynamics of migration, education, and digitalization, this paper offers a more nuanced understanding of empowerment in adult education and aims to inform both research and practice.

2 Theoretical framework

2.1 Intersectionality and adult education

Rather than treating dimensions such as race, gender, and class as separate or additive, we employ an intersectional lens that highlights how their interplay produces specific constellations of privilege and disadvantage. This perspective has become increasingly influential across the social sciences as a tool for analyzing how structural inequalities are reinforced in different societal domains (Collins and Bilge 2020; Anthias 2013; Yuval-Davis 2006; Showunmi 2020).

In adult education research, intersectionality has been applied to examine the complex conditions under which participation, access, and learning processes are shaped (Sprung 2011; Maitra and Guo 2019).

Sprung (2011) emphasizes that adult education in migration societies is situated in a field of tension between recognition and discrimination, where learners' opportunities are often mediated by intersecting factors such as gender, migration history, and socio-economic status. Similarly, Heinemann et al. (2018) argue for a discrimination-critical organizational development in adult education, which acknowledges that barriers to participation cannot be reduced to a single category such as migration status but are instead compounded by educational background, age, linguistic repertoires, and institutional practices. More recently, Öztürk (2021) highlights the need for diversity-oriented approaches that integrate both research and practice perspectives in order to transform adult education into a space of equity and recognition.

In addition, power relations add another dimension to intersectional analyses of adult education. As Schinkel (2018), Maitra and Guo (2019) and Fejes (2019) argue, institutional discourses often reproduce deficit-oriented views of migrants as "lacking" skills or as subjects in need of constant adaptation, thereby reinforcing hierarchies of belonging. Yet adult education can also serve as a space of recognition and empowerment when it acknowledges and builds on learners' diverse experiences (Morrice 2013). This tension underscores that adult education is never a neutral field but is structured by broader relations of power that intersect with categories such as migration status, gender, and educational background.

Building on this scholarship, this paper adopts an intersectional lens to explore how adult migrants' opportunities in technology-enhanced learning are conditioned by multiple, overlapping axes of difference. This perspective is directly linked to our first research question: *In what ways do intersecting factors such as migration status, gender, age, and educational background shape participation in technology-enhanced teaching and learning?* By foregrounding intersectionality, we aim to avoid homogenizing the experiences of "migrants" and instead shed light on the differentiated ways in which learners navigate, and are constrained by, adult education systems.

2.2 Digital technology between empowerment and exclusion

In recent years, research has increasingly examined the role of digital technologies in adult education contexts for migrants and refugees (Helsper 2021; Guichon 2024). Studies highlight that digital tools can expand opportunities for language learning, civic engagement, and access to services, particularly in contexts where migrants face structural barriers to participation in education and employment (Guichon 2024; Bradley et al. 2025). At the same time, scholars emphasize that digitalization does not automatically reduce inequalities but often intersects with existing disparities in literacy, educational background, and socio-economic status, shaping who is able to benefit from technology-enhanced learning environments (van Deursen and van Dijk 2019; Helsper 2021).

These dynamics are also evident in participation patterns in adult education. Studies such as the AES-MIGRA supplementary survey on adult education participation in Germany demonstrate persistent inequalities among people with migration backgrounds, highlighting that structural barriers to educational participation often intersect with migration status, educational background, and socio-economic conditions (BMBF 2017).

Digital technology has therefore become central to contemporary debates on adult education and migration, as it simultaneously offers opportunities for participation while also creating new risks of exclusion. From an empowerment perspective, digital technologies can support individuals and communities in gaining the skills and confidence needed to shape their own life trajectories and make strategic choices about education, work, and participation (Ragnedda 2018; Öztürk 2021). Within adult education, digital tools can thus function as resources for language learning, civic engagement, career orientation, and identity work. They enable learners not only to acquire linguistic and vocational competences but also to articulate their experiences and aspirations in ways that foster agency and recognition (UNESCO Institute for Statistics 2018; Koppel et al. 2025). In this sense, digital technology can create spaces in which adult migrants and refugees move beyond deficit-oriented narratives and position themselves as active participants in education, work, and society.

At the same time, research on digital divides demonstrates that inequalities persist across multiple levels (van Deursen and van Dijk 2019; Helsper 2021; Beach et al. *in press*). These include unequal access to infrastructure and devices (first-level divide), unequal opportunities to develop digital literacies (second-level divide), and unequal outcomes of digital participation (third-level divide). Building on Bourdieu's theory of capital (Bourdieu 1986), scholars have introduced concepts such as digital capital (Ragnedda 2018) and digital habitus (Bolten-Bühler 2021) to describe how access, skills, and dispositions related to digital technology are unevenly distributed and closely linked to socio-economic, cultural, and linguistic backgrounds. Reder's (2015, 2025) Digital Inclusion Pathway further illustrates how progression from basic access through motivation ("digital taste") and readiness toward sustained digital literacies is shaped by cumulative experiences and institutional support.

These frameworks are particularly relevant for marginalized adults. Research shows that adults with low literacy skills often face what has been described as *dual*

exclusion: they are marginalized both from traditional literacy practices and from participation in digital infrastructures that presuppose baseline reading and navigation skills (Grotlüschen et al. 2020; Wicht et al. 2021; Koppel and Langer 2020). This challenge is particularly pronounced for refugees, who frequently encounter language barriers in the host country while simultaneously having limited opportunities to develop foundational literacy skills. As a result, their risk of exclusion from digitalized learning environments may be further intensified. Without targeted pedagogical strategies and sustained institutional support, they risk being excluded from essential services and opportunities that are increasingly mediated through digital systems (Langer 2025). Structural inequalities—such as broadband gaps in rural areas or discriminatory practices like digital redlining—may further reinforce these patterns of exclusion (Beach et al. *in press*; Heeks 2022).

This ambivalence between empowerment and exclusion is central to our analysis and directly informs the second research question: *How do the BEF Alpha (Germany) and CILIA-T (United States) projects illustrate both the empowering potential and the limitations of digital technology in supporting language learning, career orientation, and civic participation?* By foregrounding both dimensions, this study highlights the need for intersectional and critical perspectives on the role of digital technology in adult education.

2.3 Synthesis and transition to the case studies

The two strands of our theoretical framework—intersectionality and the ambivalent role of digital technology—converge to provide a critical lens for analyzing the two case studies presented in this paper.

Taken together, these perspectives provide the conceptual basis for our two case studies: BEF Alpha in Germany and CILIA-T in the United States. Both projects are situated within migration societies where learners navigate multiple and intersecting challenges. Both employ digital technology as tools for inclusion, yet operate within contexts marked by structural inequalities. By applying our framework, we aim to illustrate not only the empowering potential of technology-enhanced adult education but also the risks of reproducing exclusionary dynamics. This approach directly addresses our research questions by foregrounding how intersectionality and digital technology intersect in shaping the educational experiences of adult migrants and refugees.

3 Methodology

In this paper, two case studies—BEF Alpha in Germany and CILIA-T in the United States—draw on qualitative and mixed methods approaches that foreground the perspectives of adult learners and instructors to examine how intersecting factors such as migration background, educational trajectories, gender, age, and linguistic repertoires influence learning opportunities across different settings.

The selection of the two case studies was guided by both organizational and contextual considerations. On the organizational level, BEF Alpha in Germany and

CILIA-T in the United States represent adult education initiatives that explicitly integrate digital technology into language learning environments for adult migrants and refugees. Both programmes combine language learning with broader educational goals, such as vocational orientation or civic participation, and therefore provide relevant contexts for examining how technology-enhanced learning may contribute to empowerment processes in adult education.

On the contextual level, the cases are situated in two different national adult education systems that differ in institutional structures, migration policies, and traditions of adult education provision. Examining these two contexts allows us to explore how similar pedagogical intentions—namely the use of digital technologies to support participation and learning—unfold within different institutional and socio-political environments. Rather than conducting a systematic comparison, the two cases are used as analytically complementary examples that illustrate how intersecting factors such as migration background, gender, educational trajectories, and digital skills shape participation in technology-enhanced adult education settings.

3.1 Case study 1: BEF Alpha (Germany)

The BEF Alpha project in Baden-Württemberg integrates literacy and language learning for adult refugees with vocational orientation and, more recently, with the use of Virtual Reality (VR). To evaluate the integration of VR into BEF Alpha courses, an external evaluation was commissioned by the Ministry of Education of Baden-Württemberg and conducted under the scientific direction of S. Langer, with I. Koppel serving as scientific supervisor, in collaboration with three Master's theses (Weiß et al. 2024).

The evaluation followed a multi-method qualitative design, combining classroom observations, expert interviews with instructors and institutional leaders, focus group discussions with participants, and a roundtable with key stakeholders. The methodological approach was guided by triangulation of perspectives (Flick 2020; Kuckartz 2014) in order to capture institutional, pedagogical, and learner-level experiences. The analysis drew on criterion-based observation protocols, interview guides, and qualitative content analysis with MAXQDA (Kuckartz and Rädiker 2020). This design made it possible to investigate not only the technical and organizational prerequisites for VR use but also its perceived potential for language learning, vocational orientation, and the professionalization of instructors.

3.2 Case study 2: CILIA-T (United States)

CILIA-T (Content-Integrated Language Instruction for Adults—with Technology Support) is a free, open-access curriculum that combines English as a Second Language instruction with civics and U.S. history education, supported by technology-enhanced activities. The program is designed for immigrants and refugees in the United States and integrates discussions of U.S. history, systems, and civics with digital skills development. Because adults often lead busy lives, each activity is designed to accomplish multiple goals—for example, English instruction takes place while learners study historical topics or practice digital skills.

The curriculum is openly available to reduce the financial burden on adult education organizations and learners, who often face resource constraints and budget cuts. While the ebook can be used independently, it is most effective when adopted by teachers as a classroom text.

CILIA-T employs digital technology for two main purposes: (a) as a teaching and learning tool to deliver content more effectively—for instance, academic vocabulary is reviewed through games and flashcards, and videos illustrate historical events—and (b) as a means of building digital literacy skills while engaging with civics and history content. Learners might, for example, conduct internet searches on wars and related songs or practice sending a formal email to the mayor of their city. In addition, six short videos provide instruction on basic digital skills. These can be used flexibly by teachers and learners to refresh digital competences or to support individuals with lower proficiency to catch up with their classmates.

CILIA-T was implemented in six pilot classrooms that varied widely in format and composition—a typical feature of adult education in the United States, since the educational system is decentralized. Two classes were fully online, while four operated in hybrid mode (some students attending class in-person while some attended online). The students, aged 18 to 60, came from Central and South America, Africa, Europe, and the Middle East. Due to rolling enrolment, participation fluctuated: although 95 students enrolled across the six classrooms, only about half attended for the full duration. Attendance was often disrupted by life events such as employment changes, childcare responsibilities, or health issues.

Courses also differed in duration and intensity. Four classes ran during the spring term for five months (6–12 h per week), while two shorter courses were offered in summer. Given these variations, the complete 16-module curriculum could only be covered in one class, while others completed between 6 and 14 modules.

Data were gathered through structured classroom observations and focus groups with teachers and participants. Observations occurred biweekly during the summer classes. For the spring classes, the first half of the class had weekly observations, followed by biweekly observations during the second half. Focus groups used structured questions, with each participant given equal opportunity to respond. Although the initial study was conducted to evaluate the curriculum (Durgunoğlu et al. 2026a), this paper draws selectively on these data to examine intersectional dimensions of participation and exclusion in technology-enhanced teaching and learning.

3.3 Analytical approach

The present article draws on a secondary qualitative analysis of selected data generated within the evaluation of the BEF Alpha project in Germany and the implementation of the CILIA-T curriculum in the United States. The original data collection served broader evaluative and pedagogical purposes. For the purposes of this article, we re-examined relevant data segments in order to explore how participation in technology-enhanced learning environments is shaped by intersecting social and educational factors. Secondary analysis is increasingly discussed as a distinct methodological approach that enables the re-use and reinterpretation of existing qualitative

data in light of new research questions, while also raising specific methodological considerations regarding context and data generation (Medjedović 2018).

The secondary analysis focused particularly on how migration background, gender, educational trajectories, language proficiency, and digital skills influence learners' opportunities to participate in digitally mediated learning activities.

Following principles of qualitative content analysis (Kuckartz and Rädiker 2020), relevant data segments from classroom observations, focus groups with participants, and interviews with instructors were systematically re-analysed. Analytical categories were developed inductively from the data and interpreted in relation to the theoretical framework of intersectionality and digital inclusion, with particular attention to recurring themes related to empowerment, participation, and barriers to learning. Rather than evaluating programme effectiveness, the analysis examines how digital technology practices interact with institutional conditions and learners' diverse biographies. This approach allows us to illuminate intersectional dynamics of inclusion and exclusion within technology-enhanced adult education settings.

3.4 Participant diversity and methodological considerations

Participant diversity constituted a central methodological consideration across both case studies. As demographic surveys and classroom observations showed, participants differed not only in terms of migration experiences, prior educational trajectories, and linguistic repertoires but also in age, gender, and socio-economic circumstances.

In BEF Alpha, participants ranged from young adults in their early twenties to older adults with family responsibilities and included both individuals with limited prior schooling and those with professional experience in their countries of origin. Similarly, CILIA-T engaged a heterogeneous population of immigrants and refugees in the United States, encompassing a wide spectrum of educational backgrounds, employment histories, and digital skills.

The following section presents the key analytical themes that emerged from this secondary analysis.

Table 1 Key analytical themes across the two case studies

Analytical theme	Evidence from BEF Alpha (Germany)	Evidence from CILIA-T (United States)
Immersive learning opportunities	VR simulations allowed learners to rehearse workplace communication and explore professions	Technology-supported curriculum connected language learning with civic and historical content
Technical and usability barriers	Unstable internet, low-quality headsets, motion sickness	Uneven digital skills, varying familiarity with digital tools, and challenges related to participation (e.g. irregular attendance)
Linguistic accessibility	VR materials often exceeded learners' language proficiency	Some tasks required higher levels of English proficiency and digital literacy
Institutional conditions	Need for teacher training, adapted materials, and institutional support	Varying course modalities, irregular attendance, and structural constraints of adult education provision

4 Findings

Building on the inductive qualitative analysis described in the methodology section, four recurring analytical themes emerged from the data. Table 1 provides an overview of these themes and illustrates how they manifest across the two case studies.

4.1 Germany: VR in literacy and language courses (BEF Alpha)

The evaluation of VR integration in BEF Alpha courses revealed both opportunities and challenges in combining literacy, language learning, and vocational orientation. Classroom observations and focus group discussions with participants indicated that the use of VR applications enabled learners to explore professional contexts and rehearse workplace interactions in immersive environments. Several participants emphasized that the VR-supported activities helped them to learn new words, while instructors observed that the simulations facilitated participation, stimulated classroom discussion, and encouraged communication in work-related contexts that are often difficult to replicate in traditional teaching formats (focus groups GD01; instructor interviews KL02). As one instructor explained, “*With VR, we were able to involve learners much more, even those who usually struggle to participate*” (KL02, Pos. 64; authors’ translation).

These observations suggest that immersive environments can support a closer alignment between language learning and vocationally relevant contexts. Rather than engaging only with abstract vocabulary exercises, learners were able to situate language use within simulated work environments, which increased both engagement and the perceived relevance of the learning activities.

At the same time, classroom observations and instructor interviews revealed several limitations of the VR integration. Technical barriers such as unstable internet connections and insufficient availability or quality of headsets frequently disrupted lessons and interrupted the learning flow (classroom observations BO01, BO02). In several observed sessions, technical difficulties required instructors to pause or abandon planned VR activities, which sometimes led to frustration among participants and was also described as demotivating by instructors (instructor interviews KL02; classroom observations BO02; focus group GD_MA02).

Some learners reported physical discomfort, including dizziness, eye strain, or motion sickness, while others struggled with the usability and physical fit of the devices. Observations indicate that such issues led some participants to remove the headsets repeatedly or to avoid using them altogether (focus group GD_MA02; classroom observations BO02).

Under these circumstances, the intended immersive learning experience occasionally shifted from a motivating activity to a source of distraction, as sustained engagement with VR required a level of motivation and curiosity that was difficult to maintain (roundtable RTB_MA03).

A further challenge, highlighted particularly in instructor interviews and focus group discussions, concerned the linguistic accessibility of VR materials. Videos and simulations often operated at a language level above the learners’ actual proficiency. Both instructors and participants reported that vocabulary, technical termi-

nology, and the speed of spoken language posed significant difficulties (focus group GD_MA02). As one instructor noted, “*They did not understand anything from the video*” (instructor interview KL01, Pos. 111; authors’ translation).

In response, instructors emphasized the need for materials that are more closely aligned with the linguistic level of the target group and that explicitly support communication (instructor interviews KL01). As several instructors noted, participants sometimes focused more on decoding unfamiliar vocabulary than on engaging with the simulated workplace scenarios themselves. In these situations, the immersive potential of VR was undermined, as learners were unable to fully follow the instructions or narrative structure of the simulations.

Interviews with instructors and discussions with stakeholders also pointed to broader institutional dynamics. While adult education programmes such as BEF Alpha are explicitly designed to promote inclusion through language learning and vocational preparation, instructors repeatedly noted tensions between programme goals and the realities of implementation.

In particular, the availability of suitable and target-group-specific materials emerged as a key challenge. Instructors emphasized that VR applications and learning materials were often not sufficiently adapted to the needs of participants with German as a second language, which occasionally produced exclusionary effects rather than facilitating participation (instructor interviews KL01, KL02).

Furthermore, instructors highlighted the importance of integrating VR technologies more systematically into the curriculum, including the definition of clear learning objectives and the alignment with pedagogical goals (instructor interviews KL01). At the same time, the usability of the software was identified as a critical factor, as applications need to be designed as intuitively as possible to be accessible for learners with limited language proficiency (instructor interviews KL02).

These observations highlight a broader tension within adult education programmes for migrants and refugees: while such programmes aim to support inclusion and empowerment, institutional practices may simultaneously reproduce deficit-oriented assumptions about learners’ abilities and needs. Similar tensions between inclusion-oriented goals and deficit-oriented institutional discourses have been discussed in research on migration and adult education (Sprung 2011; Morrice 2013; Fejes 2019).

Taken together, the findings from BEF Alpha illustrate a tension between adult education as a space intended to foster recognition and participation and the persistence of structural constraints that may reproduce exclusionary dynamics. Addressing these tensions requires institutional support structures such as teacher training, curriculum adaptation, and adequate technological infrastructure. In this sense, the effectiveness of VR integration depends not only on technological availability but also on its pedagogical and institutional embedding.

4.2 United States: CILIA-T technology-supported ESL

Classroom observations and focus group discussions with teachers and students indicated that the curriculum was generally perceived as engaging and useful. At the same time, participants demonstrated varying levels of digital proficiency, reflecting

the considerable heterogeneity of the learner group: younger and more educated participants typically showed stronger digital skills, while others required additional support.

For example, one young participant reported teaching online yoga classes from the United States to students in her home country, illustrating advanced digital competences (student focus group 5). In contrast, other participants were still becoming familiar with digital tools (student focus groups 1 and 5). Across the dataset, tools such as WhatsApp and Google Translate were used by nearly all students (student focus groups 1, 4, and 6; classroom observations). As one participant explained, *“This class really, really helped me because before I only used WhatsApp ... but now I know how to send emails and use other tools and websites”* (student focus group 1).

These observations suggest that the integration of digital tools into language instruction can support the expansion of learners’ digital repertoires, particularly when building on familiar applications. For learners with lower levels of digital proficiency, tools such as WhatsApp and Google Translate could be incorporated into the curriculum with minimal instruction, thereby providing accessible entry points into digital learning environments.

At the same time, the data indicate that not all tools were equally accessible to all learners. Some participants encountered difficulties when engaging with unfamiliar technologies or more complex tasks. As one participant noted, *“When I worked, I never used the internet to send messages ... we were just typing and printing, but here I learned many other things”* (student focus group 3). This highlights how prior educational and occupational experiences shape learners’ starting points in digital environments.

Furthermore, participation in technology-supported activities was closely linked to learners’ linguistic and educational resources. While some participants described the curriculum as manageable, others experienced difficulties due to limited English proficiency. As one participant explained, *“For me it was easy because I knew the vocabulary, but for others it was difficult because of the language level”* (student focus group 1).

These findings indicate that the effectiveness of technology-enhanced instruction depends not only on the availability of digital tools but also, and critically, on their alignment with learners’ linguistic and educational levels. When such alignment is lacking, digital tasks may reinforce rather than reduce participation gaps.

Participants also expressed interest in learning about new technologies, including Artificial Intelligence (AI), as noted in one focus group (student focus group 6). Classroom discussions addressed the basic functioning of AI, potential biases, and the use of prompts to support language learning. In addition, participants highlighted the relevance of learning how to use digital communication tools such as email in more formal contexts (student focus groups 4 and 6).

At the same time, organizational conditions played a crucial role in shaping participation. Irregular attendance emerged as a major challenge across the observed courses, often due to employment obligations, childcare responsibilities, or health-related issues. To address this, the CILIA-T curriculum incorporated several supportive strategies, including systematic repetition and review activities, peer group work, and digital videos designed to support learners with lower proficiency levels.

These findings highlight that participation in CILIA-T was shaped not only by learners' digital and linguistic resources but also by the structural conditions of adult education provision in the United States, including course modality, duration, and fluctuating attendance patterns.

4.3 Intersectional perspectives across the two case studies

An intersectional lens makes visible how empowerment and exclusion in technology-enhanced adult education are unevenly distributed across learners. Findings from BEF Alpha show that age, educational background, gender, and linguistic repertoires significantly shaped participants' experiences with VR. Younger participants and those with prior schooling were generally more confident in navigating VR applications, while older learners and those with very limited literacy skills often faced substantial barriers. Gender intersected with caregiving responsibilities, as female participants with young children had less consistent course attendance and reported greater challenges in adapting to technological demands. In terms of language, participants with stronger oral skills in German benefited more from VR-supported dialogues, whereas learners with minimal proficiency struggled with comprehension, particularly when simulations operated above their actual level.

Findings from CILIA-T indicate similar dynamics that shape participants' experiences. The curriculum design, which integrates civic content with technology-enhanced activities, tended to benefit participants with prior educational experience or existing digital literacies, while those with limited schooling, low English proficiency, or restricted access to technology outside of class faced greater obstacles to full participation.

Taken together, the two case studies highlight that digital technology in adult education cannot be analysed in isolation from the intersecting categories of migration status, gender, age, and educational background. Digital technologies may open powerful opportunities for language learning, identity work, and career orientation, but these benefits are not evenly distributed. Without sustained institutional support and adaptation to learners' diverse needs, digital innovations risk privileging those who already possess certain forms of educational or digital capital, thereby reproducing rather than reducing inequalities.

5 Discussion

This paper addressed two research questions: (1) In what ways do intersecting factors such as migration status, gender, age, and educational background shape participation in technology-enhanced learning? and (2) How do the BEF Alpha (Germany) and CILIA-T (United States) projects illustrate the empowering potential as well as the limitations of digital technology in supporting language learning, career orientation, and civic participation?

5.1 Empowerment and reproduced inequalities

The four analytical themes identified in the findings—immersive learning opportunities, technological barriers, linguistic accessibility, and institutional conditions—help illuminate how digital technology simultaneously enables empowerment and reproduces inequalities in adult education contexts.

Both case studies demonstrate that digital technology can create new opportunities for empowerment. In BEF Alpha, VR-based simulations enabled participants to practice workplace interactions, rehearse job-related vocabulary, and develop confidence in professional communication. These observations resonate with earlier research emphasizing the motivational and language-learning potential of immersive environments (Lan 2020; Tschanz and Baerlocher 2022; Legault et al. 2019). Findings from the CILIA-T case likewise suggest that the integration of history and civics content with technology-enhanced activities can foster both linguistic development and digital skills, thereby supporting civic engagement and agency among migrants. This aligns with broader research on digital technology in adult education and migration contexts, which highlights both its potential to support learning and participation and the persistence of structural inequalities shaping access and use (Helsper 2021; van Deursen and van Dijk 2019).

Yet empowerment is unevenly distributed. Our findings align with intersectionality theory (Crenshaw 1991; Sprung 2011), demonstrating that learners' opportunities are shaped by overlapping axes of difference. In BEF Alpha, older learners and those with limited literacy faced greater challenges, while younger participants with prior schooling adapted more easily. Women with caregiving responsibilities reported additional constraints in course attendance and engagement. Similarly, in CILIA-T, participants with stronger educational backgrounds and existing digital literacies benefited more, while those with limited prior schooling or low English proficiency experienced reduced gains. These patterns illustrate how digital technology may amplify existing inequalities if programs do not explicitly address diverse learner needs. They also resonate with Helsper's (2021) notion of the *digital disconnect*, in which social inequalities determine who can transform access into meaningful digital participation.

5.2 Opportunities and risks of digital technology

Our analysis further demonstrates that digital technology is neither neutral nor uniformly beneficial. While the BEF Alpha and CILIA-T cases illustrate the empowering potential of digital tools, they also reveal structural limitations and unequal participation opportunities. The potential of VR in BEF Alpha and the technology-enhanced curriculum of CILIA-T confirm UNESCO Institute for Statistics' (2018) argument that digital tools can expand spaces for expression, reflection, and civic participation. At the same time, persistent digital divides complicate these opportunities. As van Deursen and van Dijk (2019) and Beach et al. (in press) emphasize, inequalities in access, digital literacies, and outcomes remain central barriers.

Reder's (2015, 2025) Digital Inclusion Pathway illustrates that learners progress unevenly from access to sustained digital literacies, depending on motivation, readi-

ness, and institutional support. As Reder (2025) notes in his recent reflections, sustainable digital inclusion requires cumulative engagement and long-term institutional commitment rather than one-time interventions. Without sustained institutional support, learners with low literacy and limited digital confidence risk permanent exclusion (Grotlüschen et al. 2020; Wicht et al. 2021; Langer 2025). These observations also resonate with Koppel and Langer's (2020) framework of basic digital literacy, which outlines the foundational requirements needed to enable meaningful participation for marginalized learners.

Taken together, these findings suggest that digital technology in adult education simultaneously creates pathways for empowerment and reproduces risks of exclusion. Empowerment is possible when digital tools are aligned with learners' needs, embedded in supportive curricula, and accompanied by institutional commitment to equity. Exclusion occurs when technologies are implemented without sufficient adaptation, when infrastructural inequalities persist, or when learners' heterogeneity is overlooked.

5.3 Synthesis

Taken together, our analysis confirms that empowerment and exclusion in technology-enhanced adult education are not mutually exclusive but deeply interdependent. Digital technology opens new possibilities for language learning, vocational orientation, and civic engagement, yet their benefits are unevenly distributed along intersecting lines of migration status, gender, age, and educational background.

Findings from BEF Alpha also draw attention to the role of institutional dynamics. Instructors emphasized that VR materials were often not adapted to learners' linguistic levels, which produced exclusionary rather than empowering effects. This observation resonates with broader critiques that adult education frequently positions migrants as "not yet" full citizens (Fejes 2019) or fails to acknowledge their prior experiences and identities (Morrice 2013). Schinkel's (2018) critique of "integration" discourses similarly underscores how institutional practices may inadvertently reinforce hierarchies of belonging and dependence. While CILIA-T provides fewer explicit insights into institutional dynamics, these findings highlight the importance of considering organizational contexts when assessing the inclusive potential of digital technology.

By critically integrating intersectionality with research on digital divides, digital capital, and digital literacy frameworks, this paper highlights the need for sustained institutional efforts to ensure that digital technologies contribute to inclusion rather than deepening existing inequalities.

6 Conclusion

6.1 Key findings

This paper examined how technology-enhanced practices in adult education contribute to empowerment processes of migrants and refugees when analysed through

an intersectional lens. Our findings show that digital technology opens important opportunities for language learning, career orientation, and civic engagement, thereby supporting empowerment. However, these benefits are not equally distributed. Instead, they are mediated by intersecting factors such as migration status, gender, age, and educational background.

In BEF Alpha, younger learners with prior schooling benefited more from VR-based simulations, while older participants and those with limited literacy faced greater challenges. In CILIA-T, participants with stronger educational and digital backgrounds were more likely to profit from the integration of civic content and technology, whereas others encountered barriers to full participation. In addition, limited institutional support within the examined U.S. adult education context, together with constraints such as childcare responsibilities and uneven digital preparedness, contributed to inconsistent attendance and unequal participation opportunities.

These results directly address our research questions: digital technology both empowers and excludes; there are intersectional differences in learners' experiences; and, in the case of BEF Alpha, institutional practices can reproduce power relations.

6.2 Theoretical contribution

By integrating intersectionality with research on digital divides, digital capital, and digital habitus, this paper contributes to a more nuanced understanding of how empowerment and exclusion unfold in adult education. We extend intersectionality theory (Crenshaw 1991; Sprung 2011) to the analysis of digital technology, showing how multiple dimensions of difference shape learning opportunities. At the same time, our findings confirm and expand digital divide research (van Deursen and van Dijk 2019; Reder 2015, 2025; Beach et al. *in press*) by demonstrating how institutional practices and learner heterogeneity interact to produce differentiated outcomes. In doing so, the paper advances theoretical debates in adult education by connecting intersectionality with digital inequality frameworks and by highlighting the ambivalent role of educational institutions in shaping opportunities for participation.

6.3 Implications and reflections for practice and policy

Although our case studies do not cover all aspects of practice and policy, the findings nonetheless point to several areas where implications can be drawn.

- *Didactic adaptation:* Both projects highlighted the importance of aligning digital materials with learners' linguistic and educational levels. In BEF Alpha, VR simulations often exceeded participants' language proficiency, while in CILIA-T systematic reviews and peer activities supported learners with limited digital or linguistic skills. These examples underline the need for pedagogical tailoring of digital tools.
- *Intersectional sensitivity:* The case studies show that learners' opportunities are not uniform but mediated by intersecting categories such as age, gender, migration status, and prior education. Effective programme design requires sensitivity to this

heterogeneity rather than assuming a homogeneous learner group. Therefore, support materials such as videos may be more effective than text-based instructions for learners who need additional help to refresh or develop basic digital skills.

Beyond these empirically grounded implications, our findings also resonate with broader research that stresses additional conditions for equitable digital participation. Challenges with VR integration and curriculum adaptation suggest that professional development in pedagogy and technology will be crucial for sustainable implementation (Schmidt-Hertha et al. 2017). Moreover, prior work emphasizes that institutional support (teacher training, curriculum adaptation, resourcing) and infrastructural equity (broadband, device access) are indispensable preconditions for digital inclusion (Helsper 2021; van Deursen and van Dijk 2019). While these points were not directly examined in this paper, they provide important directions for practice and policy that complement our findings.

6.4 Outlook

Future research should further explore how digital inclusion can be sustained over time and across contexts. Longitudinal studies are needed to understand the long-term effects of digital interventions on migrants' educational trajectories, labour market integration, and civic participation. Comparative research across different national and institutional contexts could illuminate how varying policies and infrastructures shape empowerment and exclusion. Future work should also explore how intersectionality can be operationalized in empirical studies of digital inclusion, for example by systematically examining how gender, age, literacy, and migration experiences intersect to shape digital empowerment and exclusion across contexts.

Finally, a forward-looking perspective invites us to imagine digital technology not only as tools for compensating deficits but as catalysts for equitable educational futures. By foregrounding inclusion and recognition, and by attending to intersecting categories of difference, technology-enhanced teaching and learning can become a lever for creating more just opportunities in adult education and beyond.

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Declarations

Conflict of interest S. Langer and A.Y. Durgunoğlu declare that they have no competing interests.

Ethical standards In both case studies, all participants gave informed consent. In BEF Alpha, adapted consent forms were developed for participants with limited language proficiency.

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