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RESEARCH ARTICLE

Blend up: empowering LESLLA learners through blended learning

Annelies Jehoul
Centre for Language and Education, Faculty of Arts, KU Leuven, Belgium (annelies.jehoul@kuleuven.be)

Helena Van Nuffel
Centre for Language and Education, Faculty of Arts, KU Leuven, Belgium (helena.vannuffel@kuleuven.be)

Mariet Schiepers
Centre for Language and Education, Faculty of Arts, KU Leuven, Belgium (mariet.schiepers@kuleuven.be)

Abstract

Blended language learning has recently experienced substantial growth, offering numerous potential benefits such as increased learning opportunities and personalization. However, digital inequalities persist, particularly affecting vulnerable groups like migrants with limited education. While the integration of technology in adult education may pose additional challenges for these groups, online learning paradoxically holds the promise of enhancing their basic skills. This study addresses this apparent contradiction, focusing on blended learning in Dutch second language (L2) education in Flanders (Belgium) for L2 learners with emerging literacy and limited formal education, representing the most vulnerable subgroup of L2 learners. This group is referred to as LESLLA learners (LESLLA is an acronym for Literacy Education and Second Language Learning for Adults). Through a combination of a systematic literature review and a needs analysis of stakeholders, including LESLLA learners themselves, the study explores the benefits and challenges of blended learning for LESLLA learners. The study reveals that while many affordances and limitations for adult L2 learners in general also apply to LESLLA learners, the significance varies based on their characteristics, curriculum goals, and context. In order to realize the affordances, while also tackling the challenges, effective blended education for low-literate L2 learners requires (1) a thoughtful design of the blend, in which instructional design principles are integrated with didactic principles for L2 teaching; (2) effective teacher conduct; and (3) powerful policy of adult education centers. This paper outlines the characteristics of each component, offering insights to strengthen blended L2 learning experiences for LESLLA learners.

Keywords: blended language learning; LESLLA learners; low-literate adults; computer-assisted language learning (CALL); technology-enhanced language learning (TELL); blended learning model

1. Introduction

The increased use of technology in education has introduced significant flexibility for learners, allowing them to learn independently of time and place and in more personalized ways (Golonka, Bowles, Frank, Richardson & Freynik, 2014; Graham & Robison, 2007; Shea, 2007; Su & Zou, 2022). This flexibility is particularly beneficial for adult learners balancing educational pursuits

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with work and family commitments, reducing barriers to lifelong learning (Bowyer & Chambers, 2017; Dejonghe, 2018).

However, recent surveys highlight growing inequalities in digital access and skills, particularly for vulnerable groups, such as migrants and individuals with limited formal education (Agentschap Binnenlands Bestuur, 2022; Anrijs, Mariën & Ponnet, 2021; Eurostat, 2024). These disparities, intensified by the digital revolution and accelerated by the COVID-19 pandemic, have left vulnerable groups, such as literacy learners and second language (L2) learners, more at risk of exclusion as remote learning becomes more common in adult education. While this shift may limit their access to lifelong learning opportunities, paradoxically, integrating technology into education could also serve as a powerful tool to enhance their digital skills and promote empowerment (Warschauer & Liaw, 2010).

This study is part of a broader investigation into how technology can be integrated into blended education for diverse learners for whom blended learning potential presents additional challenges, focusing on L2 learners and low-literate adults across different subjects in Flemish adult education. Within this larger framework, our specific focus is on L2 learners with emerging literacy and limited formal education, representing the most vulnerable subgroup of L2 learners. This group will be referred to as LESLLA learners (LESLLA is an acronym for Literacy Education and Second Language Learning for Adults). While there is already considerable knowledge about blended learning, particularly for highly educated learners in higher education contexts, the literature clearly shows a lack of studies that focus on or involve LESLLA learners. This study addresses this gap.

In our research, blended education is conceptualized as a purposeful blend of location and time, delivery methods, pedagogical approaches, technologies, materials, and roles of learners and teachers (Palalas, 2019). While this broad definition can apply to various forms of blended learning, our study primarily focuses on the integration of technology. Before the COVID-19 pandemic, education for LESLLA learners in Flanders was largely classroom-based, with limited use of technology. During the pandemic, however, online remote learning became the norm. By comparing these two educational models, we aim to assess which forms of blended learning are most effective for LESLLA learners.

The central research question of this study is as follows: "In what way can centers and teachers in adult education effectively design blended education for LESLLA learners?" This central research question was translated into the following sub-questions:

1. What potential added value and barriers does blended education have for LESLLA learners?
2. How can teachers implement effective blended instruction for LESLLA learners? What are the characteristics of learning environment design and learner support?
3. What is the role of adult education centers in implementing effective blended instruction for LESLLA learners? What policies should centers adopt to achieve an optimal (blended) learning environment tailored to each learner and to support teachers in doing so?

This paper is structured as follows: Part 2 presents the methodology, which employs a mixed-methods approach, combining a systematic literature review and a needs analysis. Part 3 outlines the results, highlighting key findings about the experiences and challenges faced by learners. Part 4 provides the conclusion, summarizing the main findings and their implications for blended education for LESLLA learners. Finally, Part 5 engages in a discussion, reflecting on the significance of the findings and suggestions for future research. Here, we also introduce the Blend Up Model, synthesizing the results into an insightful framework for teachers.

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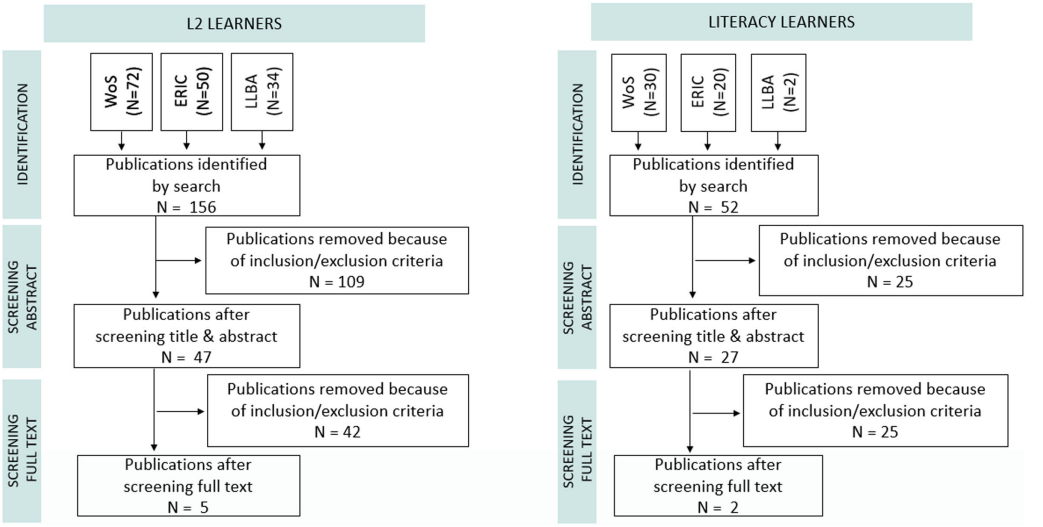


Figure 1. PRISMA flow diagram of the two systematic literature reviews.

2. Methodology

To assess how blended learning can be designed effectively for LESLLA learners, we adopted a mixed-methods approach combining a systematic literature review and a needs analysis in adult education centers in Flanders. This methodology allowed us to compare findings across both LESLLA learners and a broader population of adult learners, as well as to fill the gap left by the current knowledge base regarding blended learning for LESLLA learners.

2.1 Systematic literature review

To get a grasp of the potential benefits, challenges and characteristics of blended education for LESLLA learners, we conducted two separate research syntheses (cf. Cooper, 2017): one concerned with blended education for adult low-literate learners, and the other focused on blended education in adult L2 education. The literature search followed a three-step process:

1. Identification: Relevant search terms related to blended education and low literacy or L2 learning were used to identify potential studies.
2. Abstract screening: Titles and abstracts were screened using inclusion and exclusion criteria, which involved excluding studies that did not focus on adults or empirical research.
3. Full-text screening: The final selection was reviewed in full, with exclusion criteria refined collaboratively to ensure that studies aligned with the research focus.

An overview of the steps and the number of studies that resulted is shown in the PRISMA flow diagram (Figure 1; Liberati *et al.*, 2009). Search terms and inclusion and exclusion criteria are added as supplementary material to this article.

The systematic literature search ultimately identified two studies on blended education for low-literate learners and five review studies on blended education for L2 learners. The paucity of peer-reviewed studies on blended education for low-literate learners shows that very few

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peer-reviewed studies have been published to date that have examined blended education for low-literate learners. This contrasts with a much richer body of literature on blended L2 instruction, where five review studies (together spanning more than 3,500 single studies) were found.

To fill this gap, international studies produced during and as a result of the pandemic that offer insights related to one or more of the proposed research questions were also identified. These types of studies were specifically sought through the LESLLA community. A description of all included studies is provided as supplementary material to this article.

Another way to fill the gap of existing research on blended education for low-literate learners is the needs analysis, which will be described in the next section.

2.2 Needs analysis

To complement the literature review, a needs analysis was conducted as a collection of semi-structured focus groups, chosen to gather rich data from diverse stakeholders in an exploratory manner (Savin-Baden & Major, 2013). The main purpose of the needs analysis was to gain a better understanding of the nature, characteristics and value of potential benefits, issues and needs experienced in the context of blended education for LESLLA learners in Flanders.

The focus group conversations took place in 2021, during the COVID-19 pandemic, when online remote learning was widely adopted due to restrictions. This context provided an opportunity to collect recent insights into online and blended education. While the predominantly online instruction during this period did not fully capture the thoughtful implementation of blended education, it offered valuable comparisons with pre-pandemic classroom-based education. This contrast offered useful insights into how technology and remote learning could be effectively integrated into an effective blend for LESLLA learners.

Focus groups were organized across three levels:

1. Center level: Two focus groups with center leaders or coordinators.
2. Teacher level: Four focus groups with teachers from different educational contexts.
3. Student level: Eleven focus groups with LESLLA learners and other adult literacy learners.

To ensure a comprehensive representation of the diverse student population in adult education, we included literacy learners in various domains of education and learners of Dutch as a second language (DSL) with different educational backgrounds, participants from both urban and rural centers. Table 1 gives an overview of the participants.

In order for the focus groups with students to take place in a safe and familiar context without possible digital barriers, the choice was made to organize the conversations face to face, within the familiar setting of the classroom. All interviews, including those with non-native speaking students, were conducted in Dutch. Given the language diversity in the L2 groups, it was impractical to work with an interpreter. Therefore, a highly visual and low language methodology with cards and pictures was developed to overcome any linguistic barriers. Focus groups with coordinators and teachers were held online due to COVID-19 restrictions, which allowed for broader participation despite the constraints.

The data from the focus groups were collected, coded, and analyzed in four stages (cf. Saldaña, 2021). First, the focus group conversations were recorded, with notes taken during and after relistening. Key statements were noted in the report. Second, the reports were inductively analyzed through open coding. Third, axial coding was applied to group and organize the insights. This process helped identify connections across focus groups. Finally, theoretical coding was used to explore these connections further, integrating insights from the literature review. To ensure the

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Table 1. Overview of focus groups

Target group	Organization[a]	Course subject	No. of participants
Students	Ligo	DSL	9
	Ligo	DSL	5
	Ligo	DSL for literacy learners	7
	Ligo	Mother tongue literacy (for Dutch speakers)	5
	Ligo	Drivers' theory	3
	Ligo	Basic IT skills	6
	CVO	DSL	6
	CVO	Caregiving training for DSL students	6
	CVO	Postal worker (integrated vocational education)	8
	CVO	Chef training	2
	UTC	DSL	6
Teachers	Ligo	DSL & DSL for literacy learners	5
	Ligo	Not DSL (literacy, numeric literacy, drivers' theory, basic IT skills)	4
	CVO	DSL	5
	CVO	Vocational training	1
	UTC	DSL	4
Coordinators	Ligo	Combination of various courses	8
	CVO	Combination of various courses	7

Note. DSL = Dutch as a second language.
[a]Ligo, CVO (Centrum voor Volwassenenonderwijs) and UTC (Universitair Talencentrum) are the three types of adult education centers in Flanders. Ligo focuses on basic adult education, serving students who have attained at most a vocational secondary education diploma. CVO offers general adult education and caters to learners of all educational backgrounds. UTC are centers for higher-educated adults, with students holding at least a bachelor's degree.

coding reliability, two trained coders coded the initial two focus group discussions independently. Subsequently, a discussion of the coding process and results for the remaining focus groups was held to align interpretations and ensure consistency. Although a formal intercoder agreement procedure was not employed, these steps were taken to uphold the reliability and accuracy of the coding process.

3. Results

In this section, we present the findings of our study. The results address the following questions: the added value and challenges of blended education for LESLLA learners (RQ1 – Part 3.1), effective strategies for teachers in structuring blended courses (RQ2 – Part 3.2), and success factors for implementing blended education in adult education centers (RQ3 – Part 3.3). Each subsection first summarizes the systematic literature review results, followed by an integration of findings from our needs analysis.

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3.1 What potential added value and barriers does blended education have for LESLLA learners? (RQ1)

The literature review shows that many of the benefits and challenges of blended education for adult learners also apply to LESLLA learners. These can be categorized at three levels: context, student characteristics and course objectives.

3.1.1 Context

The context level includes the learner's entire learning environment, both at school and outside (home, workplace, etc.) and both physical and virtual. Blended education offers adult learners significant benefits at this level. It provides the potential to add additional practice opportunities and makes it possible for adults to combine classes with other responsibilities. Nedungadi, Devenport, Sutcliffe and Raman (2023) point out that many low-literate adults face significant contextual challenges, such as juggling work, childcare and transportation, making regular attendance difficult. Blended education can help address these difficulties by allowing learners to engage in home-based learning, offering the potential to balance education with their complex personal lives (Li, Kay & Markovich, 2018).

The needs analysis supported these findings, with learners appreciating the practical advantages of studying at home, though it was noted that LESLLA learners value in-person classes more than higher-educated L2 learners. While some LESLLA learners found peace and concentration in learning at home, others preferred the classroom environment for the teacher support and peer interaction it offers:

> I'm in the house, I watch Zoom, I read. The children in the school. Calm. (Student Ligo DSL for literacy learners | STUDENT>CONTEXT>REST>ADVANTAGE)

> Online lessons are good if you have children, for example you can bring them to and from school on time, or if they are sick. (Student Ligo DSL | STUDENT>CONTEXT>COMBI>ADVANTAGE)

> Some students share a small studio with different housemates. (Teacher Ligo DSL | STUDENT>CONTEXT>REST>DISADVANTAGE)

> For me, not good at home online. I like to come to class. I want to walk a bit, see. Understand a lot here in the classroom. (Student Ligo DSL for literacy learners | STUDENT>CONTEXT>REST>DISADVANTAGE)

In addition to practical benefits, blended learning also offers more and new language practice opportunities outside of the classroom (Li *et al.*, 2018). The opportunity to access learning materials anytime, anywhere is advantageous for language learners (Hughes, Lo & Xu, 2019). This is particularly beneficial for LESLLA learners, as they benefit from "intermittent learning" – incremental learning, where knowledge gets built during class as well as in other settings. Due to their varied responsibilities, LESLLA learners benefit greatly from informal and non-formal learning outside the traditional classroom context. Blended education allows for the integration of these different forms of learning, enabling low-literate learners to optimize learning across their entire environment (Nedungadi *et al.*, 2023; Vanek, Harris & Belzer, 2020). Several respondents in the needs analysis confirm this and emphasize that blended education encourages them to engage more with what they have learned outside of school, and to integrate and apply it in their daily lives:

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> Students learn how easy it is if you can also practice Dutch at home. That encourages them to work on it more at home as well. (Teacher Ligo DSL | STUDENT>CONTEXT>EXTRA-PRACTICE- OPPORTUNITIES>ADVANTAGE)

Besides benefits, challenges on the level of the learning environment were also mentioned in the literature, namely digital access and the occurrence of technical issues. More often than other adult students, LESLLA learners lack devices or a reliable internet connection, which hampers their participation in blended learning (Li *et al.*, 2018; Nedungadi *et al.*, 2023). As a result of their suboptimal circumstances, they tend to lack a quality learning environment at home, which acts as a barrier to participation in blended education. These challenges were also confirmed in the needs analysis:

> "What are you saying? What are you saying?" The quality is sometimes not good. (Student CVO DSL | STUDENT>CONTEXT>EQUIPMENT>DISADVANTAGE)

> Cannot log in, no sound, no image, ... (Teacher Ligo DSL | STUDENT>CONTEXT>EQUIPMENT>DISADVANTAGE)

3.1.2 Student characteristics

Student characteristics refer to added value and challenges related to the characteristics, needs and requirements of the target group. In this regard, the literature shows that LESLLA learners face unique challenges compared to other adult learners. While many adults prefer blended learning over traditional classroom instruction, LESLLA learners strongly favor face-to-face learning. This negative attitude to online learning may stem from limited access to technology, lower digital skills and low self-confidence in digital skills (Li *et al.*, 2018; Nedungadi *et al.*, 2023). Moreover, self-regulated learning (a process initiated by students to control their educational functioning; Vanslambrouck *et al.*, 2019) poses an additional challenge for low-literate learners. Their shorter educational background and potentially negative past educational experiences, stemming from limited opportunities, poor access to resources, and time constraints, result in low self-esteem and reduced motivation to learn (Nedungadi *et al.*, 2023).

However, blended education also offers significant opportunities for LESLLA learners to enhance their basic competencies, including digital skills. These skills are increasingly necessary in daily life, and by improving their digital literacy through blended education, LESLLA learners can access more opportunities and broaden their horizons (Harris & Adetunji, 2021; Nedungadi *et al.*, 2023; Spruck Wrigley, Vanek & Parshotam, 2021; Vanek *et al.*, 2020).

This duality – where digital vulnerability is both a barrier and an opportunity – was also evident in the needs analysis. The digital vulnerability of this target group may prevent learners from fully participating in blended education and consequently enjoying other benefits, such as practical flexibility. On the other hand, blended education offers a major added value for these digitally vulnerable learners by offering opportunities to stimulate and strengthen learners' digital skills and thus reduce digital vulnerability:

> Computer and smartphone is difficult for me. (Student Ligo DSL | STUDENT>SKILLS>BASIC IT>LOW-BASIC-IT-SKILLS)

> I learned to send a photo with WhatsApp. You had to do it, and that's how you learn. It was difficult, I sometimes had to ask friends for help. (Student Ligo DSL | STUDENT>SKILLS>BASIC IT>STRENGHTENING-BASIC-IT SKILLS)

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If you want to have a job, you need that too. (Student Ligo DSL for literacy learners | STUDENT>SKILLS>BASIC IT>STRENGHTENING-BASIC-IT-SKILLS)

3.1.3 Course goals and objectives

A last category of added value and barriers is related to the goals and objectives of the course: the curriculum and the need for specific infrastructure or material. Where the literature on blended L2 learning for adults in general highlights the added value of increased interaction opportunities through technology (Hughes *et al.*, 2019; Su & Zou, 2022), this does not hold true for LESLLA learners. For this target group, the opposite seems to be true. Li *et al.* (2018) suggest that for literacy learners, face-to-face communication and interaction with peers remain crucial, with classroom group discussions particularly contributing to learning.

This was echoed in the needs analysis, where LESLLA learners generally preferred face-to-face interaction and group discussions. However, the needs analysis did show that online contact between classes is often considered an added value even by LESLLA learners, provided an accessible and user-friendly tool is used. Additionally, for learners enrolled in vocational training or practical courses (such as cooking, caretaking), the school environment with access to the right infrastructure and material is crucial. Yet, even in these contexts, adding an online component to prepare for or process the face-to-face classes was seen as beneficial by both learners and teachers:

You can talk to the teacher and the group via the computer. But it is not the same as in the classroom. (Student CVO DSL | STUDENT>COURSE-GOALS>INTERACTION>DISADVANTAGE)

As a non-native speaker, it is more difficult to understand someone online than in real life. For example, it is more difficult to ask them to speak more slowly. And a voice sometimes sounds different online. (Student CVO Caretaking & DSL | STUDENT>COURSE GOALS>INTERACTION>DISADVANTAGE)

There is a big difference between talking to people face to face or online: taking the floor in a conversation is different, body language is different, and it is more difficult to work on pronunciation. That may play a lesser role in other subjects, but it is certainly very important in language subjects and NT2. You can do something about it online, but it is very difficult, especially with slow-learning NT2 students. (Center manager CVO | STUDENT>COURSE GOALS>INTERACTION>DISADVANTAGE)

In a vocational training course, you cannot do everything remotely anyway. You can do a little bit online, but it is very useful to see the materials and do it together in practice. (Center manager CVO | STUDENT>COURSE GOALS>INFRASTRUCTURE>DISADVANTAGE)

I had problems with listening exercises and then the teacher sent me extra things like songs and listening stories. (Student CVO DSL | STUDENT>COURSE GOALS>TAILORED>ADVANTAGE)

(In online teaching) you can differentiate more and work more problem and question-driven. The students can repeat and process at their level. (Teacher CVO DSL | STUDENT>COURSE GOALS>TAILORED>ADVANTAGE)

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3.2 How can teachers implement effective blended instruction for LESLLA learners? What are the characteristics of learning environment design and learner support? (RQ2)

To realize the benefits of blended education while mitigating the aforementioned challenges, a thoughtful course design is essential. In this study, course design is categorized into three main pillars: blend, pedagogy, and technology. Also the teacher support during the course plays a major role in the success of blended education for LESLLA learners.

3.2.1 Blend

The success factors for a quality blend identified in the general literature are echoed in studies on blended L2 education for LESLLA learners. These factors emphasize the importance of a purposeful blend, including analyzing the learner group, integrating remote and classroom components, making informed decisions about learner flexibility and autonomy, and using technology thoughtfully to add value (Hughes *et al.*, 2019; Li *et al.*, 2018; Marshall, 2021; Nedungadi *et al.*, 2023; Vanek *et al.*, 2020). The teachers and center leaders in the focus groups confirm this, highlighting that there is no one-size-fits-all blended approach that works for all LESLLA learners. Nevertheless, some recurrent concerns emerged from both the literature review and the needs assessment.

Taking into account the unique benefits and challenges of blended education for this group, Li *et al.* (2018) emphasize the crucial role of the face-to-face component for LESLLA learners to facilitate communication and collaboration with teachers and peers. Direct encouragement and support from the teacher in the classroom are particularly valuable for literacy learners and may be more challenging to provide online due to lower literacy and digital skills. A classroom setting also allows for more effective responses to learners' needs, enhancing learning outcomes. Therefore, a strong classroom component is typically required when designing blended education for LESLLA learners (Li *et al.*, 2018).

While the needs analysis confirmed the importance of face-to-face interaction, participants also recognized the necessity of incorporating technology, both in class and remotely. All actors involved stress the importance of online learning activities to work in an integrated way on learners' digital skills, which are essential in daily life to participate in society. They suggest introducing (guided) online learning activities in the classroom, in a safe learning environment. This could then be expanded to gradually incorporate more remote online activities, working towards independent home use of the digital tools:

> In my previous job I regularly worked with flipped classroom. But I now notice at Ligo that this is less self-evident. I think because it is a different profile. I think that depends on the group. (Teacher Ligo DSL | DESIGN>BLEND>F2F-AS-BASE)

> You can also work on digital skills in an integrated way in the classroom, it does not necessarily have to be done remotely. (Center manager CVO | DESIGN>BLEND>F2F-AS-BASE)

> With blended, you can first build up contact face to face and then you can gradually introduce things online, such as a Google Maps search in a training course for cleaning ladies. (Teacher Ligo DSL | DESIGN>BLEND>GRADUAL-INCREASE)

> First practice online in the class, only afterwards at home. (Student DSL for literacy learners | DESIGN>BLEND>GRADUAL-INCREASE)

> We need to practice a lot in class before it is possible for them to do it at home. (Teacher Ligo DSL | DESIGN>BLEND>GRADUAL-INCREASE)

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> The step-by-step approach is important. Always those small, small steps, repeat, repeat. From there, we can achieve a lot with low-literate learners. (Center manager Ligo | DESIGN>BLEND>GRADUAL-INCREASE)

3.2.2 Pedagogy

Effective blended language education is built on a solid pedagogical foundation, combining insights from both blended education and L2 education (Hughes *et al.*, 2019). Key principles include functionality, interaction, and personalization. For LESLLA learners, functionality is especially important – low-literate adults learn better when lessons are directly applicable to their lives. Blended education can support this by offering authentic tasks beyond the classroom, engaging learners in real-world applications (Harris & Adetunji, 2021; Nedungadi *et al.*, 2023; Spruck Wrigley *et al.*, 2021; Vanek *et al.*, 2020).

Furthermore, attention to interaction is crucial in blended education in general, but particularly in blended L2 education. Su and Zou (2022) suggest that to make online interaction successful, it is advisable to assign learners shared tasks, fostering interdependence and mutual accountability. However, LESLLA learners express a greater need for face-to-face interaction than fully literate learners. Face-to-face communication, interaction with peers, and group discussions significantly contribute to learning outcomes for this group and should not be overlooked (Li *et al.*, 2018).

The needs analysis confirms the importance of three didactic principles: fostering interaction, connecting the subject matter to learners' learning needs and living environment, and tailoring the task load and flexibility to suit learner profiles. Regarding the latter, teachers emphasized the need to carefully tailor the amount of online work to the learners' profiles, as LESLLA learners are often more concerned about the feasibility of online tasks, both in terms of cognitive load and time:

> Talking goes better in the classroom. (Student Ligo DSL for literacy learners | DESIGN>PEDAGOGY>INTERACTION)

> For example, we practiced a conversation to cancel your lesson by phone. And in a way that was also more fun, because it is like the situation in real life: with the phone and not just practicing in class. It also has its advantages. (Teacher Ligo DSL | DESIGN>PEDAGOGY>FUNCTIONALITY)

> We had to watch a lot of videos at home with questions: What did he do? What steps did he follow? I had to watch some parts several times. That took a long time, sometimes I was at the computer until 8 or 10 pm. (Student CVO Caretaking & DSL | DESIGN>PEDAGOGY>WORKLOAD)

3.2.3 Technology

For LESLLA learners, technology must be accessible and user-friendly. The literature highlights the importance of using tools that are suitable for people who have difficulty reading and writing, offer video and other audiovisual means, and emphasize intuitive interfaces with clear cues to guide user actions without relying on text (Nedungadi *et al.*, 2023; Vanek *et al.*, 2020).

Mobile-friendly tools and exercises offer great potential, as many LESLLA learners do not have access to computers, but do use smartphones. Additionally, mobile applications are particularly suitable for "intermittent learning," allowing learning in small chunks throughout the day (Li *et al.*, 2018; Nedungadi *et al.*, 2023). Furthermore, it is beneficial for LESLLA learners to familiarize themselves with tools that can be used in their daily lives. This can address other needs in daily life, such as assisting children, using transport, etc. (Harris & Adetunji, 2021; Nedungadi *et al.*, 2023; Spruck Wrigley *et al.*, 2021; Vanek *et al.*, 2020). A central, user-friendly

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platform to access all online learning materials also emerged as a key success factor (Vanek *et al.*, 2020).

Finally, teachers must ensure that technology use is meaningful and does not distract from language learning amidst the plethora of online language practice opportunities (Hughes *et al.*, 2019; Su & Zou, 2022).

The needs analysis confirms that the use of digital technology for LESLLA learners is not an end in itself, but should primarily add didactic value. The other success factors from the literature are also confirmed:

> Creating a powerful learning environment is the goal, not the combined learning or the learning platform itself. They are more a means to help realize that powerful learning environment. (Center manager Ligo | DESIGN>TECHNOLOGY>MEANINGFUL)

> WhatsApp is also a tool that they already know. That is something that I have never had to explain to the non-Dutch speaking students. (Teacher Ligo DSL | DESIGN>TECHNOLOGY>WELL-KNOWN)

> Easy programs like WhatsApp and Jitsi are good. Not too complex. (Student Ligo DSL | DESIGN>TECHNOLOGY>LOW-TEXT)

> We have always assumed: it has to work on a phone. I think that 80–90% of our students also work with a phone. (Teacher Ligo DSL | DESIGN>TECHNOLOGY>MOBILE)

3.2.4 Teacher practices

Supportive teacher practices are especially crucial for low-literate learners, even more so than for adult learners in general. This vulnerable target group needs thorough introductions to digital resources and consistent support throughout the course to ensure successful participation. The importance of a clear introduction, focusing on introducing new tools, and motivating students to work digitally should not be underestimated (Li *et al.*, 2018; Vanek *et al.*, 2020). Because digital tools and skills are often new to this vulnerable target group, a good introduction is necessary for them to successfully participate in learning activities. Continuous attention to building both digital skills and self-regulation skills throughout the course is also essential (Nedungadi *et al.*, 2023).

Additionally, immediate teacher support in the online environment, encouraging social interaction, and creating an affective climate are particularly important (Li *et al.*, 2018; Vanek *et al.*, 2020). Stimulating interaction and social contact are also crucial for low-literate learners. Due to past negative experiences, it is important to work on creating a "safe space" during the blended course, where learners can acquire tools and life skills to bring about positive change in the real world (Nedungadi *et al.*, 2023). Furthermore, motivating learners by allowing them to experience small successes can boost their motivation ("scaffolded incremental successes"; Nedungadi *et al.*, 2023: 386).

Lastly, it is important for teachers to evaluate the course: were the design and teacher actions successful, or are there opportunities for improvement? In this evaluation, the teacher can rely on their own assessment as well as incorporate the experiences of the students (Su & Zou, 2022).

The needs analysis echoes these themes, underscoring the importance of proximity and accessibility of the teacher, also in the online environment. According to the teachers, attention to a good start of the course, including familiarizing the course participants with the technology used, is essential. They claim that step-by-step guidance in building digital and self-regulation skills combined with creating a safe, stimulating, motivating and interactive learning environment are key to supporting LESLLA learners effectively:

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> Sometimes, I don't understand what this word or sentence. I ask the teacher on phone, but is difficult which word, which line. And here (in the class) if I don't understand it, teacher comes to me. (Student Ligo DSL for literacy learners | TEACHER>SUPPORT)

> You can't always intervene in case of mistakes, that creates too much noise. Sometimes feedback comes too late. (Teacher CVO DSL | TEACHER>SUPPORT)

> To familiarize students with the technology, we do a number of simple assignments together in the classroom. (Teacher CVO DSL | TEACHER>STRONG-START)

> Positive reinforcement of students is important. (Center manager Ligo | TEACHER>LEARNING-CLIMATE)

> Some teachers just talk to the computer, not to us. So telling something, that is not a lesson but actually a story or something, and we just had to listen. Sometimes we not allowed to say "Sorry, I did not understand well," 'cause she was so wuwuwuwu … We cannot say "Stop." But with some teachers there is actually an échange: "Did you understand? Yes, no? What do you think?", Say what I want to say, repeat, … But with some that was really a story, a story, … That was also really difficult. [So you thought it was better if you could exchange and interact?] Yes, voilà. (Student CVO Caretaking & DSL | TEACHER>LEARNING-CLIMATE)

3.3 What is the role of adult education centers in implementing effective blended instruction for LESLLA learners? What policies should centers adopt to achieve an optimal (blended) learning environment tailored to each learner and to support teachers in doing so? (RQ3)

The literature on blended education for LESLLA learners confirms the findings that also apply to adults in general: a research-based center policy that starts from the needs of students is a success factor for quality blended education (Hughes *et al.*, 2019; Vanek *et al.*, 2020). For centers to effectively address the needs of LESLLA learners, a differentiated and customized approach is necessary. Especially for these learners, opportunities for informal and non-formal learning and the various real-world settings in which they live their lives must be considered (Li *et al.*, 2018; Nedungadi *et al.*, 2023).

In doing so, both students and teachers benefit from a center that actively supports its staff in the development of blended education while continuously striving to improve their approach. The literature on L2 language teaching suggests that a team-based approach is more effective than individual efforts in providing blended education. When teachers are facilitated by their center to collaborate, it results in higher-quality teaching materials and better learning experiences (Hughes *et al.*, 2019).

In the needs analysis, teachers and center managers confirm that an effective center policy begins with a shared vision and a clear framework for blended education. From that framework, teachers expect the necessary support, while still maintaining a degree of flexibility that allows them to tailor their approach to their course and learners. The central vision on blended education should translate into a flexible, learner-oriented curriculum in which students can strengthen their digital and self-regulation skills along with the subject-specific skills. Also, the need for collaboration and exchange between teachers is emphasized in the needs analysis:

> It is difficult to formulate a vision already. We are still in the infancy of searching for "What do we need?", "What is a powerful learning environment in blended learning?" "What do you base that on then?" We still have too little insight into combined learning in non-corona times. (Center manager Ligo | CENTER>VISION)

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> After an initial period of experimenting, we listed some pluses and minuses and we said: "We are going to choose a few tools here and we are going to continue with them. And that does not mean that it has to be done that way, but those tools are there and there is clear support for them. If you want a different tool, you can certainly do so, but that support is not always there." (Teacher Ligo DSL | CENTER>FLEXIBILITY)

> We work one-on-one, but also with intervision moments with other teachers in which they exchange experiences. That is very much appreciated. (Center manager CVO | CENTER>STAFF-TRAINING)

A final success factor identified by participants in the needs analysis is the provision of the necessary ICT infrastructure and support, not only for teachers but also especially for students with a digitally vulnerable profile, who represent a significant portion of the target group. This aspect is seen as a necessary prerequisite rather than a success factor for effective blended education, because, as a teacher mentioned, "Without stable internet or a well-functioning device, there is no digital story anyway."

4. Conclusion

In this study, we explored in what way centers and teachers in adult education can effectively integrate technology into blended education for LESLLA learners. Through a systematic literature review and needs analysis, we explored the barriers and the added value of blended education for LESLLA learners (RQ1), which course design and teacher practices are best suited to realize an effective blend (RQ2), and how a center can support this blend with a quality center policy (RQ3). Our findings make several key contributions to the field.

Many of the benefits and challenges of blended learning described for adult learners in general also apply to LESLLA learners. The key benefits include practical advantages like reduced commuting, better integration with work and family, enhanced digital and self-regulatory skills, and more personalized content. Significant challenges include a lack of a quiet home environment with necessary digital access and infrastructure, insufficient ICT and self- regulation skills, and a need for face-to-face interaction and support. Given the complex personal contexts of LESLLA learners, blended education often presents greater barriers for them, including limited digital access, lower digital basic skills, and a strong need for face-to-face interaction. Because of this, the practical advantages of (remote) online learning are often overshadowed by these barriers.

There are, however, some apparent contradictions. These contradictions involve benefits that may resolve certain barriers for vulnerable groups but simultaneously create new challenges or exacerbate existing ones. For instance, while blended learning can offer opportunities to improve digital skills for digitally vulnerable learners, this same digital vulnerability can impede full participation in blended learning, limiting access to its practical benefits.

To overcome these barriers and unlock the potential of blended education for LESLLA learners, the research highlights the need for a purposeful combination of remote and face-to-face components, along with technology use tailored to the learners' specific needs. Key principles include fostering interaction, linking content to learners' context, and aligning task load with learner profiles. For LESLLA learners, a significant portion of the course is most effectively delivered face to face, as this mode supports the direct interaction and guidance they often require. Technology is most beneficial when it is accessible and meaningfully integrated in the course, enhancing rather than complicating the learning experience. The gradual introduction of remote learning can help these learners transition at their own pace, without overwhelming them. Only with thoughtful design can blended education help build digital literacy, embedded into the language course.

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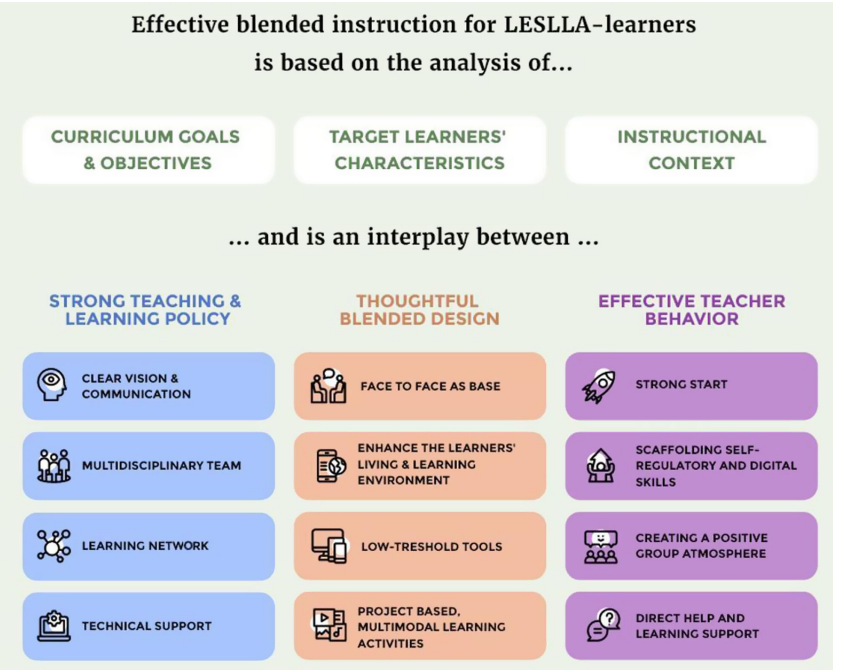


Figure 2. Blend Up, a model for effective blended education.

5. Discussion

In this study, we aimed to address key challenges and success factors in implementing blended education for LESLLA learners. The results of both the literature review and the needs analysis show that blended education for LESLLA learners consists of a complex interplay of factors, within which there are a number of apparent contradictions. What adds value for some learners (e.g. more opportunities to learn anytime, anywhere) may just be a challenge for others. And while blended learning sometimes creates barriers for learners (e.g. related to their digital skills), by overcoming those barriers, blended education may create more learning opportunities in everyday life.

The mixed picture of the added value and challenges reinforces the importance of a *purposeful* blend of face-to-face and remote learning, of traditional and technology-supported learning, tailored to specific learner needs, the course objectives and the context in which the course takes place. In order to provide effective blended education for LESLLA learners, the blended course design, the teacher actions and the center policies should be aimed at reducing the identified barriers as much as possible and maximizing the realization of the potential added value.

Our research identified several success factors crucial to effective blended education for LESLLA learners. These factors were derived from a comprehensive literature review and a detailed needs analysis. We consolidated these insights into what we call the "Blend Up Model" (Figure 2), a framework that highlights the added value and empowering potential of blended learning for LESLLA learners – provided it is tailored to their specific learning context, questions, and needs. The Blend Up Model and ensuing guidelines are to be found on http://blendup.be/. In the following sections, we elaborate on these success factors, focusing on center policy, course design, and teacher practices for this target group.

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5.1 The Blend Up Model

Effective blended education for LESLLA learners relies on a strong policy on the level of the center organization and coordination. This policy is grounded in a clear vision tailored to the target group and embraced by the entire team. Collaboration is central, with teachers and IT staff working together in a learning network that fosters the exchange of experiences and expertise, both within and across centers. In this multidisciplinary team, responsibilities (such as developing course material, teaching and technical support) are shared. Finally, the availability of technical support, both for students and teachers, is a prerequisite for a successful blended approach.

A second pillar of effective blended education for LESLLA learners involves a thoughtful blended design. This includes making deliberate choices in assembling the blend of learning activities, both online and offline, in the classroom or at home, in a group or individually. Given the challenges faced by LESLLA learners – including limited literacy, digital skills, and self-regulation, along with complex home situations – a successful blend often relies on a strong basis of face-to-face education. This approach helps to build digital skills while gradually introducing technology-based remote learning activities. These technology-based learning activities provide the students with the opportunity to learn to perform technology-based tasks in a realistic manner and can serve as a lever to expand the learners' living environment (e.g. they learn to use a public transport app in class, to practice their Dutch, and can now use this app also outside of class). For the blended design to be accessible for LESLLA learners, it is important to employ user-friendly and familiar tools and support project-based, multimodal learning.

The final pillar of the Blend Up Model discusses success factors for effective teacher practices. A strong start to the course is essential, allowing learners to become comfortable with the approach and tools while creating a safe learning environment. Throughout the course, attention is given to building learners' basic competencies, especially in digital skills and self-regulation skills necessary to follow the course. Another key aspect is fostering group cohesion and to provide learners with immediate "just-in-time" support and feedback to enhance learning. Both group interaction and offering teacher support run the risk of being less spontaneous in a blended course than in a fully classroom-based course and therefore require special attention to ensure their effectiveness.

5.2 Practical applications and limitations

This research makes a valuable contribution to the underexplored field of blended education for LESLLA learners. While much is known about effective strategies for blended education in education for higher-educated adults, the specific needs and experiences of LESLLA learners remain largely under-researched. Our study addresses this gap by giving a voice to these often overlooked learners. Through a needs analysis, we directly engaged LESLLA learners, utilizing visual aids to facilitate meaningful participation and to gather insights from their unique perspectives. This approach not only strengthens the research findings but also underscores the importance of tailoring blended education to meet the needs of vulnerable learners.

Moreover, the Blend Up Model offers a practical framework for designing effective blended education tailored to LESLLA learners, emphasizing a strong organizational vision, thoughtful course design, and effective teacher practices. Educators and institutions can apply the Blend Up Model to develop and refine their blended learning programs to overcome potential barriers and realize potential added value. The model's emphasis on purposeful integration, learner-centric design, and supportive infrastructure provides actionable guidance for creating effective and equitable educational experiences.

Despite its potential, this study and the ensuing Blend Up Model face certain limitations. The findings, while valuable in the Flemish context, may not fully generalize to other regions or learner populations, and the absence of detailed individual-level data restricts a deeper understanding of how various factors interact with blended learning outcomes for LESLLA

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learners. Additionally, the study primarily relied on self-reported data from learners and educators, which can introduce bias and affect the accuracy of the findings.

Future research should address these limitations by incorporating more granular data on individual learner profiles and focusing on the long-term effects of blended education. Comparative studies across different educational contexts, as well as longitudinal research, could further refine the model and enhance its practical application. Moreover, exploring ways to strengthen technological access and support systems in adult education settings will be essential in making blended learning both feasible and effective for the LESLLA learner population. While challenges remain, the Blend Up Model provides a promising and adaptable solution for creating blended learning experiences among this group.

Supplementary material. To view supplementary material referred to in this article, please visit https://doi.org/10.1017/S0958344024000363

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About the authors

Annelies Jehoul is a researcher at the Centre for Language and Education, a research center affiliated with the University of Leuven (KU Leuven) in Belgium. Her areas of expertise include adult second language and literacy learning, online and blended language learning and parent–school partnerships. Annelies combines research with the development of didactic materials for teachers and learners, and she provides teacher professionalization.

Helena Van Nuffel is a researcher at the Centre for Language and Education, Faculty of Arts, KU Leuven, Belgium. Her expertise includes second language acquisition and technology-enhanced language learning. She is currently involved in research and development projects on online and blended language learning.

Mariet Schiepers is director of the Centre for Language and Education (CLE), Faculty of Arts, KU Leuven, Belgium. Her main research themes are second language acquisition, literacy, and technology-enhanced language learning, with a specific focus on more vulnerable language learners, such as LESLLA learners. Mariet is also strongly committed to the valorization of the research of the CLE, by setting up professionalization programs and by developing didactic materials.

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