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From computer-assisted to technology-enhanced learning. Lessons learnt and fast forward toward (digital) literacy of LESLLA learners

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As a result of digitalization, societies are faced with new digital opportunities and challenges. Adult migrants with limited education experience, settling in highly literate and digitalized countries, are at risk of becoming socially excluded if they do not acquire sufficient L2 language, literacy and digital skills. This paper calls for the digital inclusion of LESLLA learners to enable them to actively participate in societies in which technology is rapidly changing the way we interact, live, work and learn. Based on previous research this paper suggests that technology-enhanced language learning can potentially enhance LESLLA learners' initial literacy acquisition.

Keywords: adult learner, late literacy, digitalization, technology-enhanced language learning, log files.

1. LESLLA learners encountering highly literate digitalization

Recently researchers have become more and more interested in LESLLA research (*Literacy Education and Second Language Learning for Adults*, see <https://www.leslla.org/>), thus adding up to knowledge on the development of L2 alphabetic literacy of adult migrants who are not literate in their first language (Bigelow and Vinogradov 2011; Tarone et al. 2009). This research trend has to some degree been accelerated by the ongoing forced displacement of large numbers of adults migrating from countries of low-literacy to highly literate countries (for recent research see Shapiro et al.'s 2018 overview of empirical studies investigating language and literacy education of refugee-backgrounds students in the US, Canada and Norway).

Settling in highly literate contexts poses a considerable challenge to adults who are not literate in any language. They are expected to

acquire oral and literacy second language (L2) skills simultaneously. Miller and McKenna (2016: viii) highlight that “never before has so much depended on literacy. [...] As knowledge increasingly becomes a product as well as a tool, the economic welfare of any nation will be ultimately and inextricably tied to the literacy of its citizens”. LESLLA learners are generally also required to have digital skills. The European Association for the Education of Adults (EAEA) emphasizes in the manifesto for adult learning in the 21st century that

Everyone now needs to have a sufficient level of digital competence in order to play an active part in society [...] Digitalisation has already changed and will continue to change our living circumstances, mobility, environments, communication and most other areas of life. This will also alter the skills necessary to manage these changes and the needs of learners to participate in society. (Ebner and Motschilnig 2019: 15)

Technology has become indispensable in many areas of human life as “the digital revolution has changed the way almost half the world lives and works, learns and socializes” (Zelezny-Green et al. 2018: 8). This development applies for most European countries, especially for Finland, declared the most literate country in the world (Miller and McKenna 2016), and ranked the third most digital country worldwide, following Norway and the United States (Business Finland 2018: 61). In the 21st century, literacy practices have become entrenched in digitalized environments. Reder et al. (2012: 48) stress that “digital literacy must be included into the scope of literacies needed by LESLLA learners and digital literacy instruction needs to be incorporated broadly into learning opportunities for LESLLA adults”. In order to avoid social exclusion and a digital divide, immediate action is urgently needed to reflect current and best practices and to envision future LESLLA learning and teaching (see Colliander, Ahn and Andersson 2018).

The growing digitalization can also provide alternative learning opportunities for low-skilled or low-literate displaced populations. Ideally, digital tools and solutions for displaced populations are “about supporting these people as they adapt to new environments which can be intimidating and overwhelming” (Zelezny-Green et al. 2018: 63). One example for such a digital tool is the free video-based

platform *Suomi taskussa* ‘Finland in the pocket’ (www.suomitaskussa.eu), available since 2017, created to support the integration of immigrants in Finland. The short, two-minute long educational videos, accessible via mobile devices, are intended to provide language practice starting with the beginnings of the Finnish language, gradually accumulating vocabulary and facilitating language skills needed to communicate in real-life, everyday situations immigrants are likely to encounter.

1.1. More CALL or MALL for late literacy learners? Let research TELL!

Researching technological tools, their integration and use in language learning and teaching is a relatively new research field; yet due to the growing digitalization, a very fast-paced and quickly evolving field with a long-standing tradition of creating acronyms for its specific subfields. During the last five decades, computer-assisted language learning (CALL) has become an established research area offering multidisciplinary insights into how computers can enhance language learning (Chun 2011: 663). The narrow definition of CALL refers to learning and teaching languages via one specific digital tool, the computer. CALL has also been defined more broadly as “the study and practice of teaching languages through digital media” including “a wide range of digital technologies such as tablets and smartphones” (Buendgens-Kosten and Elsner 2018: xiv).

By adopting a narrow definition, his paper emphasizes that the digital tool used in CALL is the computer, in contrast to mobile devices such as tablets and smartphones employed in mobile-assisted language learning (MALL). It has been suggested that “in view of the advent of alternative means of delivering electronic materials [...] the term CALL has outlived its usefulness and should be replaced with Technology-Enhanced Language Learning (TELL)” (Naeb 2015: 81). Nevertheless, at the time being both acronyms are used, often interchangeably. In this paper, the term TELL is used in a general sense, not representing a specific tool or device, but to refer to the study and practice of language learning with the help of technology.

Defining literacy, a multi-faceted concept, is a rather complex endeavor. It is important to note that literacy, despite its varying and evolving definitions, is always culturally and socially embedded. The dominant views and beliefs in a society determine the role and status of literacy. As a result, some learners “might not understand the usefulness of literacy since they have coped fine without it” (Sunı and Tammelin-Laine 2018: 39). Conversely, in highly literate countries, literacy is “seen not only as a basic skill but also as a prerequisite for becoming a full, active member of a society whose members depend on their reading and writing to protect their rights and exercise their civic responsibilities” (Sunı and Tammelin-Laine 2018: 39).

Inevitably, differing opinions on the necessity and importance of literacy, arising from the L1 socialization to literacy practices, are likely to influence learners’ reading development (Grabe and Stoller 2011: 53). Likewise, attitudes towards technology hold by LESLLA learners and teachers might differ and thus affect the pedagogical effectiveness of technological tools. Faux and Watson (2018: 27) claim that “instructors, administrators, and students alike have seen the value of using technology with LESLLA learners”. This paper questions the global applicability of this statement and encourages LESLLA teachers and educators to mediate the empowering function of digital and literacy skills in Western societies instead of focusing on (digital) literacy as an obligatory skill in highly literate societies. Attending literacy and language classes is for adults “often a luxury of time and resources” (Bigelow and Vinogradov 2011: 124). Similarly, van de Craats and Young-Scholten (2015: 129) stress that fewer instructional hours and the lack of individualized instruction are among the reasons why LESLLA learners’ initial literacy development is less successful compared to that of children. Technology can be harnessed to provide more additional instructional practice in a more individualized approach. Spruck Wrigley and Guth (2000: 68) highlight that often “adults enjoy the privacy that using the computer affords and appreciate being able to move through activities at their own speed”. Previous research with LESLLA learners in the Netherlands has revealed a positive correlation between individual CALL activities and oral test results (see Strube 2014) as well as individual CALL training time and reading scores (see Kurvers 2015).

While Suni and Tammelin-Laine (2018: 35) conclude that “including literacies for and through new technologies is [...] a realistic and a necessary part of literacy instructions”, most LESLLA research has tended to focus on emergent print literacy. Less attention has been paid to investigating digital teaching and learning methods in late literacy training. It needs to be established how initial late literacy acquisition could be supported with digital solutions. Our increasingly digitalized world expects emergent LESLLA readers to become literate in both traditional print as well as digital literacy. This often implicit expectation conflicts sharply with the lack of appropriate digital tools for language and literacy training of LESLLA learners, possibly defensive teacher attitudes towards the use of technology and an unfortunate lack of evidence-based knowledge on how LESLLA learners could learn best with digital interventions in literacy courses. Aberdeen and Johnston (2015: 109) appeal to the research community stressing that “the LESLLA field needs multiple evidence-based teaching methods [...]. We strongly encourage our colleagues to explore [...] any and all other methods that they find appropriate.”

The following section presents the author’s previous study investigating a CALL instructional tool, and is followed by an introduction to the author’s ongoing study, which explores opportunities and effects of TELL, particularly gamification, in the initial late literacy learning and teaching process of LESLLA learners.

2. Tracking LESLLA learners’ digital footprints in an online literacy training environment

The Digital Literacy Instructor (DigLin), a CALL application for initial literacy training of adult migrants with limited education experience, was designed and developed from 2013-2015 in a collaborative project with different European partners (www.diglin.eu). An online learning environment was created for four different alphabetic languages and tested with LESLLA students (for more information see van de Craats and Young-Scholten 2015). The main aim of this tool was to enable students to discover and decode the alphabetic code of their L2 at their own learning pace (Cucchiarini et al. 2015). The students’ software use was tracked by log files. This

objective, temporally accurate and unobtrusive documentation of user-computer interaction enabled a detailed, post-activity exploration of learner behavior (see Naeb 2015: 160-66 for a concise yet detailed account on log file data collection as a user behavior tracking method). Malessa and Filimban (2017: 157) found that CALL activities implemented in the DigLin platform had a positive and motivational effect on LESLLA learners' decoding development in Finnish and English (see Filimban 2019).

2.1. Lessons learnt by looking at log files and listening to learners

In Finland, seven learners (IA-IG), whose log files were analyzed, were also interviewed by Taina Tammelin-Laine (TL), the principal investigator of the Finnish team (for more information on the Finnish DigLin content and creation see Cucchiarini et al. 2015). Three participants had no formal education background and low-literacy in their L1 (Arabic, Somali). Three participants had had little education in their home country and were either non-literate (L1 Turkmen), low-literate (L1 Arabic) or literate (L1 Kurdish). The only male participant had had over 10 years of formal education in his home country Egypt and was literate in his L1 Arabic. The participants' L1 literacy proficiency was, however, merely estimated by their L2 Finnish teachers (Tammelin-Laine 2016).

The interviews, conducted in Finnish, English and one with an interpreter in Arabic, revealed what the participants thought about working with the software. Following Chapelle's (2001: 59) approach, Malessa (2016) explored the CALL appropriateness of the Finnish DigLin version using a combination of log-file and interview transcript data. The following sections report on benefits as well as limitations of DigLin, based on log file and interview data, and provide suggestions for future TELL implementations.

2.1.1. Learning opportunities

Malessa (2016: 46) found that the amount of different digital exercise tasks and available word sets in the Finnish DigLin offered sufficient

study opportunities. A total amount of 210-300 words (contained in 15 distinct word sets) could be practiced in seven different exercise types. The log files revealed not only what users did, but also showed what they did not do: “Sometimes the absence of activity can be as revealing as its presence” (Bruckman 2006: 1451). Previous studies have confirmed that learners do not always use every available option (Heift 2002: 296). In DigLin, learners did not employ all digital resources, including specific word sets, exercise types and help tools. Possible explanations include the technological (im)practicality of certain exercise types and the software’s design. Malessa (2016: 30) reasoned that the decreasing amount of completed words in a word set with a higher number was due to the layout design, presenting a list of words sets starting with the lowest number at the top of the list. Further, the log files showed that participants preferred the A-part of word sets and rather ignored the B-part (cfr. Figure 1). Based on the amount of log file entries, the data indicated individual exercise preferences and popularity of different exercise types (Malessa 2016: 27). While the objective log file entries provided a precise account for user preference, the subjective interview answers were not always that accurate: “Do you have a favorite exercise type?” (TL); “All of them are wonderful” (IA1). Furthermore, a discrepancy between the log file documentation and the individual report of one user on her preferred exercise type was detected. The interviews, however, complemented the log file entries, as they provided answers to why the users preferred certain exercises: “Why? What was good about them?” (TL), “It was easy to progress “ (IB1).



1A Vedä kirjaimet	1B Vedä kirjaimet
2A Vedä kirjaimet	2B Vedä kirjaimet
3A Vedä kirjaimet	3B Vedä kirjaimet
4A Vedä kirjaimet	4B Vedä kirjaimet
5A Vedä kirjaimet	5B Vedä kirjaimet
6A Vedä kirjaimet	6B Vedä kirjaimet
7A Vedä kirjaimet	7B Vedä kirjaimet
8A Vedä kirjaimet	8B Vedä kirjaimet
9A Vedä kirjaimet	9B Vedä kirjaimet
10A Vedä kirjaimet	10B Vedä kirjaimet
11A Vedä kirjaimet	11B Vedä kirjaimet
12A Vedä kirjaimet	12B Vedä kirjaimet
13A Vedä kirjaimet	13B Vedä kirjaimet
14A Vedä kirjaimet	14B Vedä kirjaimet
15A Vedä kirjaimet	15B Vedä kirjaimet

Figure 1. Screenshot of a list of word sets in the Finnish DigLin.

The difficulty of exercise types and/or word sets can be regarded as decisive factors regarding DigLin's learner fit. The tested version did not include different proficiency levels. Malessa (2016: 46) thus proposes an introduction of different language and literacy levels, graduated according to the learner's ability, to a future TELL application.

2.1.2. Learner fit and engagement

The log-file data indicated that students spent time on-task and were very engaged (Malessa 2016: 26). Based on the interview responses, the participants were generally satisfied with the learning content and its difficulty ("It is easy, simple – especially the beginning of the words how to write them taught me a lot. I used to learn the sounds and then write the words and from there I started learning how to write and read" [IE1]) as well as the digital implementation ("The program is very nice, especially that it has everything associated with the picture so this is something very good for us. At the same time, we are learning the sounds. I learn the word; I learn the picture and at the same time I am learning the sounds. Now I am learning every sound individually" [IF1]).

The testing sessions averagely lasted 60 minutes, but could also exceed two hours (Malessa 2016: 25). Sessions were thus very long, which was also declared by one user: "The time we were using it was very long. That was the only issue. Shorter time would be better" (IE2). Future research should be undertaken to investigate the effect of practice time spent in digital learning environment on LESLLA student performance and engagement.

One key pedagogical feature seen to significantly enhance learning development was the automated and corrective feedback provided by the system (van de Craats and Young-Scholten 2015). The interviewees' answers support the log file findings. One participant in particular underlined the importance of feedback regarding learner development and engagement: "The way it gives you feedback and the way that it corrects you, gives you the right answer, has helped me a lot and has also encouraged me and gained

me self-confidence as that has made me work more and more to improve my reading” (IA2).

Malessa (2016: 47) found that “incorrect correction, i.e., indicating the presence of an error without supplying the correct form” was not suitable for all learners, in particular struggling readers, as “the burden of correction” was placed on learners who were due to lack of necessary linguistic knowledge not able to self-correct (Sheen and Ellis 2011: 600). Malessa (2016: 47) suggests “explicit correction after a certain amount of wrong drags. Further “automatic advice could be provided if the user does not use provided help tools (in the form of a blinking button or a recorded advice in the user’s L1), but is not able to progress in order to prevent frustration and fossilization” (Malessa 2016: 47).

Extensive training is necessary for emerging alphabetic late literacy of adults that are, compared to young children, not in a position to spend a long time with grapheme-phoneme correspondences, word boundary identification etc. Consequently, extensive individual training, focusing on specific, often detailed features that are usually not possible to include in a repetitive, yet reasonable manner in a human-human or classroom interaction, can be enabled by CALL activities. The repetitive function that digital activities can assume was perceived by one user as beneficial: “Repetition has made me learn more and made me motivated” (IF2). The embedded sound features, endlessly repeatable, enabled the students to focus on details and this function was observed as being favorable for the learning development: “It has helped in hearing the small differences in the words like one sound different and the meaning of the word changes.” (IF3)

2.1.3. Meaning focus

Words chosen for the DigLin content were chosen mainly according to their usefulness for literacy acquisition and their “degree of simplicity” (van de Craats and Young-Scholten 2015: 3). Word frequency and relevance for adult migrants were viewed as less significant. Therefore, the learners’ attention was not primarily directed towards the meaning of the language. However, one selection

criterion was representability, thus “concrete basic words” with clear meanings were chosen (Cucchiarini et al. 2015: 98), which were then in turn accompanied by a real-life photograph. Drawings were not used as LESLLA learners understand photographs better than drawings (van de Craats and Young-Scholten 2015: 3). The importance of the words’ visual representation was also highlighted during the interview, see IF1 in 2.1.2. Malessa (2016: 47) recommends a separate L1-L2 vocabulary section. Furthermore, a personal progress tracker is proposed to enhance individual learning.

2.1.4. Authenticity

The participants announced that DigLin helped with the reading of words: “Yes [it helped] to read longer words” (IB2). The DigLin training was perceived as a facilitator of both vocabulary and pronunciation/perception skill acquisition: “It helped me a lot, especially in spelling and writing. Now I can read and write words. I really learned, especially pronouncing the words” (ID1). The tested DigLin software restricted word length to eight letters (Cucchiarini et al. 2015: 259). The rich Finnish morphology, however, notably lengthens words and longer words require more decoding practice, this was also noted by IF(4): “Long words are still difficult”.

The need for literacy practice on a sentence-level was stressed by several participants: “Of course we have to start from words and then come up with phrases and small sentences” (IA3); “If there would have been sentences it would have been better” (IE3); “The program helped a bit to read single words, but it would be good to have longer texts” (IG1); “More words we need in daily life” (IC1). It seems clear that the users were rightfully calling for more contextualized, authentic language and future applications should include sentences including phrases, questions and longer text.

2.1.5. Impact

Based on the interview data, the learners seemed to have had a positive learning experience with technology. Malessa (2016: 47)

advocates the integration of oral L1 instructions “that guide the learner through the program (e.g. click on the green button to hear the word, click on the grey button to see a picture)” to further enhance navigation in a digital environment. Many learners reported that they improved their digital skills during the DigLin training: “Now I know how to open computer; I know the difference between small and big letters and so on. I had no idea how to use computer before this” (IF5).

The computer training also enabled learners to become more independent learners: “I feel more comfortable with using computer [...] if you already have the computer you don’t need to ask anybody for any help. Sometimes when I go home, I ask my kids if they can help me and they become annoyed. I like working on the computer as I don’t need anybody” (IA4).

One user reflected on the advantage of having additional digital support: “The computer is very good. It is just like extra training. It teaches pronouncing, spelling. I already knew how to use computer but this helped even more. This is for me like an extra curriculum work. It is improving me. Computer is like an extra teacher” (ID2). The users emphasized the vital role of the human teacher in their digital training: “Small details I didn’t understand but if necessary, I have asked and was helped” (IC2); “It [DigLin] made me learn. Especially when the teacher was teaching with the program. It has made a difference” (ID3). One main benefit of TELL activities is that they facilitate “more individualized support for struggling students by freeing the teacher from tasks the CALL application can take on” and consequently enabling teachers to focus on human-human interaction and support (Malessa and Filimban 2017: 151).

2.6. Practicality

With regard to digital learning opportunities, it is necessary to investigate the fundamental issues of practicality and availability. Asked whether she used DigLin outside the classroom, one interviewee declared that “no I did not as I don’t have a computer at home” (ID4). Unfortunately, the tested DigLin version could only be accessed via computer, not by mobile devices. Consequently, even

though the participants could theoretically have accessed the software outside the classroom, in practice the Finnish DigLin version was almost exclusively used in class. In total, the software was used 163 hours in class compared to three occasions when it was tested after class by two users for 50 minutes (Malessa 2016: 26).

Future studies need to focus on the availability of TELL activities to digitally include low-skilled and low-literate users. The choice of technological device is crucial to ensure that learners are able to access TELL activities also outside the educational facility. The mobile phone is the most frequently used digital device available to nearly all displaced persons (Zelezny-Green et al. 2018: 60). Faux and Watson (2018: 28) highlight the practical benefits of using mobile devices with LESLLA learners: “Using fingers to navigate seems much more intuitive than using a mouse. They can just follow along or select with a finger instead of navigating with a mouse and then clicking.”

Regrettably, not all DigLin language versions including the Finnish one were developed further from their tested prototypes into fully-fledged versions nor are the initial DigLin versions available to the general public anymore. However, at present, there is a Dutch DigLin+ version on the market, based on the main principles of DigLin. DigLin+ includes sentences and short texts, as well as new exercise types (vocabulary memory games and other gamified tasks) and was developed by Jan Deutekom and Ineke van de Craats (https://www.nt2.nl/en/lesmateriaal/jeugd/diglin/100-363_DigLin-jaarlicentie). A DigLin+ English platform (<https://en.diglin.eu>) revised by Rola Naeb and Jan Deutekom as well as Spanish version (<https://test.diglin.eu/menu/24>) by Marcin Sosinski are currently freely available online.

3. Literacy and language development is serious business: we need serious games!

More studies methodically examining LESLLA learners' interaction with educational technology are necessary to develop evidence-based digital teaching methods. Currently, there is no published empirical research on LESLLA learners' literacy training with digital games nor

on the use of digital literacy applications in LESLLA classrooms in Finland. The author's current study explores initial literacy acquisition and TELL, particularly gamification. Gaming is seen to increase intrinsic motivation and thus bears potential for engaging emerging literates. In the light of positive findings on the impact of digital game-based practice on children's literacy acquisition in Finnish (see Ojanen et al. 2015), this study hypothesizes that also adult emerging Finnish readers could benefit from such a technology-based intervention.

Ekapeli 'First game', an evidence-based digital learning game, a so-called serious game, was designed for L1/L2 Finnish literacy intervention of children (see Richardson and Lyytinen 2014). For lack of technology-based literacy support tools specifically designed for LESLLA learners, Tammelin-Laine (2018) reported that some LESLLA teachers use the Ekapeli game in class (see Figure 2, the Ekapeli app on the left side is marked by a horizontal line before it). This observation was supported by findings of a web-based survey of adult late literacy teachers conducted by the author in 2019.

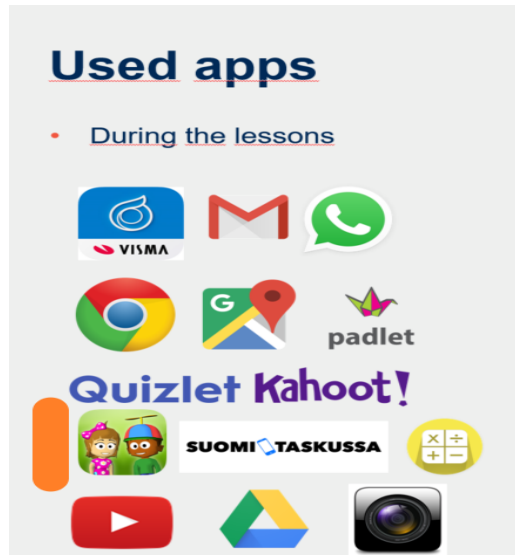


Figure 2. Screenshot of apps used in Finnish LESLLA classrooms (Tammelin-Laine 2018).

To date, there are no empirical findings on the Ekapeli game's actual pedagogical effectiveness with LESLLA learners. On the one hand, it is clear that "just like children becoming literate in an L2, older learner at the same level must also learn the basics of literacy (i.e., alphabetic, fluency, vocabulary, comprehension)" (Bigelow and Vinogradov 2011: 122). On the other hand, there are certainly also disadvantages and limitations of using children's materials with LESLLA learners, as pointed out by Faux and Watson (2018: 29).

This study's aim is to conduct literacy interventions with LESLLA learners in order to explore digital game practices, potential benefits or deficits that might even hinder late literacy development of adult learners. For this purpose, a new digital literacy support game, similar to Ekapeli and also mainly developed for children, will be tested with LESLLA learners. During the field-testing, the players' interactions with the game will be tracked by log files. Both LESLLA learners and teachers will be interviewed on their testing experience as well as their attitudes towards TELL to enhance interpretation and understanding of the log file data. This study intends to expand the body of knowledge on adult late literacy and digital learning and to provide results with, on and for LESLLA learners and teachers.

4. Outlook and log out: successful steps towards (digital) literacy

"Educating adult L2 learners who are emergent readers requires paradigm shifts in a number of areas" (Bigelow and Vinogradov 2011: 130), including teacher education, educational programs and facilities, educational practices and policies. At present, one of the most fundamental shifts needs to be towards digital inclusion to ensure that students acquire "the skills (language or otherwise) they need to get jobs, keep their jobs and participate in the community (in their children's school for example)" (Faux and Watson 2018: 27). Suni and Tammelin-Laine (2018: 35) also highlight the social impact of digital (literacy) skills, as "transnational relations depend on mobile technologies, and this is equally true for immigrants". Today, the question about technology use in LESLLA teaching is not *whether* to use digital devices but *how* to make best use of them.

Technology-based tools and activities have the potential to enhance digital literacy and inclusion of LESLLA learners. Naeb (2015: 83) states poignantly that “the integration of technology in language learning settings can be summarized in two respects: the technologies used and the reasons they are used”. Spruck Wrigley and Guth (2000: 69) warn that “deficit-oriented software, such as programs that begin teaching the alphabet without reference to context, can actually hinder literacy development by making adults feel less competent than they are” and further emphasize that “technology decisions are value decisions. Every time administrators and teachers choose a certain type of software [...], they make a statement about their beliefs about the nature of language, literacy, and learning” (Spruck Wrigley and Guth 2000: 80).

This paper explored the role and necessity of TELL for LESLLA learners and identified its potential for LESLLA learning, referring to the author’s previous CALL and ongoing TELL study. LESLLA learners’ digital literacy development is a complex phenomenon, with little research, but it is evident that the implementation of TELL cannot be “simply a matter of teaching learners to click and then putting them in front of computer-based learning materials that are nothing more than digital workbooks” (Reder et al. 2012: 49). This paper calls for a balanced blended learning approach, where the content of a digital learning platform is prioritized over its delivery device. It is essential that practitioners understand that technology is not a method, only a tool to deliver the method.

LESLLA education needs “teachers prepared to reach across the experimental and literacy abyss to educate them in ways that are thoughtful and effective” (Bigelow and Vinogradov 2011: 130). The most important aspect for researchers to study and teachers to implement is the pedagogy, not the technology employed in TELL. In order to successfully use TELL with LESLLA learners, teachers have a pivotal role, therefore, new teaching competencies are needed to take advantage of technology (Heift and Chapelle 2012: 565).

Further studies investigating the role of TELL for LESLLA teaching would be worthwhile. Moreover, it is important to have evidence-based teaching and learning material for LESLLA education, ideally lessening the workload of teachers, enabling them to work with individual students that need more help. Future learning

technologies need to meet the needs and interests of LESLLA learners. The omnipresence of technology should not be seen as a threat to LESLLA teaching but as a trump card for LESLLA learners, as they “have the opportunity to acquire knowledge and skills that have currency in the modern world. No longer are LESLLA learners primarily defined by their perceived “deficits” (lack of literacy, lack of L2 proficiency)” (Reder et al. 2012: 63). It is high time to value late (digital) literacy learners and under-valued LESLLA education.

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