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ARTICLE

The monolingual problem of computer-assisted language learning

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Abstract

This paper sets out to discuss the monolingual problem within computer-assisted language learning (CALL) research and CALL product development, namely a lack of knowledge about how CALL products and projects can support learners in using all their linguistic resources to achieve language-learning- and language-using-related goals, and a lack of CALL products and projects that realize this potential, or that support specific plurilingual skill development. It uses an analysis of CALL-related papers to demonstrate how far CALL is impacted by a monolingual bias that it inherited from language learning pedagogy. An analysis of articles from four CALL journals across 10 years shows that although the words *bilingual* and *multilingual* appear in these journals fairly regularly, terms such as *plurilingual*, *third language*, *tertiary language*, *L3*, *translanguaging*, and *translingual* are extremely rare. Also, only eight articles could be identified that use any of these eight keywords in their title. Trends across those papers are identified. In a discussion of existing CALL products and projects that incorporate more than one language, it is argued that while commercial products often include more than one language, this is frequently in a behaviorist or grammar-translation tradition, while innovative plurilingual products and projects tend to be non-commercial and often EU/EC-funded initiatives. The article argues that CALL research and product development can not only avoid this monolingual bias, but also actively contribute to our knowledge of how all linguistic resources can be used for language learning. It makes suggestions for relevant future research areas related to multilingual computer-assisted language learning (MCALL).

Keywords: computer-assisted language learning; multilingualism; plurilingualism; bias; multilingual turn

1. The monolingual problem of CALL

Sauro (2016) posits that computer-assisted language learning (CALL) has an "English problem". I would extend this claim to say that it also has a monolingual problem that arises from a widespread monolingual bias in research and development of CALL (cf. Ortega, 2017: 293–294). In this context, I define *monolingual bias* as a deficit in considering the full range of pre-existing languages of a learner, of languages used in a setting, or of (plurilingual) skills in the design of and the research on CALL. In other words, *monolingual* in this context does not deny the presence or relevance of more than one language (a spurious claim in language learning contexts), but points out a deficit in taking other languages besides the target language into consideration, akin to the use of *monolingual* in Gogolin's (1994) *monolingual habitus*.

The monolingual problem, in turn, is the consequence of this bias: A lack of knowledge about how CALL products and projects can support learners in using all their linguistic resources to achieve language-learning- and language-using-related goals, and a lack of CALL products and projects that realize this potential, or that support specific plurilingual skill development (cf. Council of Europe, 2018). In other words, I do not wish to imply that CALL, with its focus on (foreign, second, or

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heritage) language learning, is ever "monolingual" in the sense of being limited to the study of monolingual individuals in monolingual settings. Instead, I use the term "monolingual" to refer to a perspective limited to only one language (i.e. the target language) at a time.[1]

John Gillespie, in the 2018 installment of his traditional EUROCALL talk "CALL Research: Where Are We Now?" (Part III), states that CALL "is not just about grammar and basic skills" but "about developing the knowledge and understanding of language within human multilingual culture" (Gillespie, 2018). At the same time, in his lists of most published, less published, absent, or almost absent topics in CALL research, multilingualism, multilingual practices, or multilingual goals do not even appear. This is also reflected in the structure of key professional organizations within CALL. EUROCALL, for example, has seven special interest groups, and CALICO eight, none of them focusing explicitly on multilingual aspects of CALL. Levy, Hubbard, Stockwell and Colpaert (2015), in their analysis of CALL Research Conference themes mention "video annotation" (a potentially multilingual practice) and "translation", but merely as examples of "Dedicated tools" within the "Technology" category, a category that was allocated only very low priority by CALL experts in a vote at the end of the conference (Levy *et al.*, 2015: 2). Ortega (2017) reported that she "did not uncover a single published CALL article with 'multilingual(ism)' or 'bilingual(ism)' in the title" (294). Key contemporary handbooks on CALL (Chapelle & Sauro, 2017; Farr & Murray, 2016; Thomas, Reinders & Warschauer, 2013) include no relevant key terms in their tables of contents and only three in their indices.[2] That this monolingual bias is not a new phenomenon is hinted at by the fact that these concepts do not play any role – literally do not appear at all – in historical overviews of CALL (Bax, 2003; Davies, Otto & Rüschoff, 2013; Hanson-Smith, 2003; Reiser, 2001a, 2001b[3]).

1.1 Notes on terminology

This paper takes a plurilingual perspective. *Plurilingual* is used to describe "a communicative competence to which all knowledge and experience of language contributes and in which languages interrelate and interact" (Council of Europe, 2001: 4), including knowledge and experience gained within the family, at the school (EURYDICE, 2012), while traveling, or in daily life:

> From this perspective, the aim of language education is profoundly modified. It is no longer seen as simply to achieve "mastery" of one or two, or even three languages, each taken in isolation, with the "ideal native speaker" as the ultimate model. Instead, the aim is to develop a linguistic repertory, in which all linguistic abilities have a place. (Council of Europe, 2001: 5)

To adopt Gogolin's (1988) terminology, both life-world languages (lebensweltliche Mehrsprachigkeit) and foreign languages (fremdsprachliche Mehrsprachigkeit) feed the plurilingual competencies of a speaker. For many language learners and language users at the early stages of their own linguistic biographies, not only does retrospective multilingualism (languages learned/acquired already) deserve to be considered, but also what the future holds in language experience and formal language instruction (prospective multilingualism).

[1]This paper has been written from a Eurocentric perspective. Europe's specific linguistic situation and European language policy impacts both the linguistic experience of people within Europe and the goals of language education. To fully understand this problem and its challenges, perspectives from other contexts and from researchers and practitioners steeped in different sets of biases will be essential.

[2]Thomas *et al.*'s (2013) index includes one entry on "bilingual identity" (chapter 3); Farr and Murray's (2016) includes two entries on "multilingualism" (chapters 14 and 26).

[3]The historical overview by Otto (2017) mentions "multilingual" four times, referring once to the Web as a "vast digital multilingual repository of authentic media" (17), and thrice to specific tools (the game "Who is Oscar Lake?", the authoring tool "Hot Potatoes", and the "Athena Project") that can be used to learn different languages (multilingual in the sense of "versions for learning different languages exist/can be created").

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In contexts where the exact theoretical background is less relevant, the paper also uses the term *non-monolingual* to refer to any context, medium, or person that/who includes or has access to more than one language, or *multilingual* when a more positively phrased term is desired.[4]

2. Monolingual language teaching and its critique

CALL does not exist in a vacuum. It is impacted both by technological developments as well as by developments within didactics and linguistics. As CALL derives much of its underlying theory from related disciplines such as (instructed) SLA (e.g. Hubbard 2008; see also Chapelle, 1997), it has also inherited some of the biases of these disciplines (cf. Cook, 1997; Kachru, 1994), which in turn are impacted by the societal and educational context (cf. Gogolin's, 1994, monolingual habitus). The purpose of this section is to show how, over the decades, researchers and practitioners have chipped away at a monolingual bias in language instruction more generally. It attempts to show how some concepts and critiques have developed over time, without attempting to give a complete historical overview.

Historically, language teaching was not always conceptualized as monolingual (cf. Howatt & Widdowson, 2004: 18 ff.). The idea that language instruction should be monolingual, and indeed that a language teacher does not need to be able to speak any language except the target language, is closely connected to the "direct method" (Howatt & Widdowson, 2004: 210 ff.) and still influences communicative language teaching, task-based language teaching, and content and language integrated learning instruction today, from the design of textbooks to a widely reported preference for native speaker teachers. The monolingual bias is so ingrained that it often becomes invisible. As Cook observes: "Recent methods do not so much forbid the L1 as ignore its existence altogether. … the only times that the L1 is mentioned is when advice is given on how to minimize its use" (Cook, 2001: 404). Of course, a monolingual bias should not be equated with a monolingual classroom. Several studies show that even when teachers aim at a monolingual classroom, non-monolingual practices find their way into their teaching practice (Gierlinger, 2015). These are seen, though, as deviations from the ideal, as intrusions into optimal language teaching, which is viewed as monolingual.

In language learning contexts, three lines of critique can be used to challenge the monolingual bias. First, there are negative arguments, or, in other words, a critique of the arguments brought forward in defense of a monolingual bias (e.g. Cook, 2001). There are positive arguments, which focus on how a non-monolingually biased approach helps to achieve traditional language learning outcomes (e.g. Butzkamm, 1973; Cummins, 2008). And third, positive arguments that point out how a non-monolingual approach helps to achieve plurilingual language learning outcomes. In this section, I will focus on the second and third category.

An early critique of the monolingual bias was published by Butzkamm (1973), who criticized the dominant monolingual perspective in foreign language teaching at secondary schools in Germany in the late 60s/early 70s. Butzkamm, drawing on the philosophy of language, psycholinguistics, and practical experience, suggests that a dogmatic monolingualism should be replaced by an enlightened monolingualism that refutes "monolingualism as general teaching principle, as a rule with exceptions only in the case of emergencies" and instead includes specific bilingual learning and teaching approaches (Butzkamm, 1973: 175; translation by the author). In other words, instead of aiming at a monolingual classroom and failing, it would be better to design teaching that includes limited amounts of non-target language use. In the English-speaking world, one of the key critiques against a monolingual perspective stems from Cummins (2008).

[4]When this term is used as a key term in the study presented in section 3, its usage might differ. *Multilingual** might be used as a term contrasting with *bilingual**, with the second involving exactly two languages, and the first involving more than two languages, or as term contrasting with *plurilingual**, in which *plurilingualism* refers to an individual, and *multilingualism* to society (e.g. Council of Europe, 2001: 4). In this paper, these distinctions are not intended.

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Cummins, focusing on second language learning, especially in bilingual/immersion programs in North America, pointed out that monolingual approaches ignore prior knowledge and interdependency of proficiency across languages (Cummins, 2008: 67).

When Butzkamm originally worked on the concept of enlightened monolingualism, he focused exclusively on the role of German as the language of education in Germany. Today, critiques of the monolingual bias incorporate the fact that significant numbers of learners in many regions already possess plurilingual competencies when starting foreign language instruction in their first foreign language and that learners are not limited to studying only one foreign language. The most powerful critiques and concepts, therefore, do not just take into account the role of the first language (L1) or of the dominant school language, but the whole linguistic repertoire a learner brings into the classroom or to the computer. As Hammarberg (2009) points out, "The fundamental theoretical aspect of the study of L3 competence, use and acquisition is the insight that humans are potentially multilingual by nature and that multilingualism is the normal state of linguistic competence" (Hammarberg, 2009: 2; italics in the original). The move toward a perspective that both acknowledges multilingualism as a frequent and normal condition of human existence, and that views linguistic heterogeneity as an element of diversity that deserves inclusion in the classroom is referred to as "multilingual turn" (Conteh & Meier, 2014: 1 ff.; cf. also May, 2014).

Work on bilingualism, historically marked by a deficit perspective, has long turned toward identifying relative advantages of (often: early) bilinguals for further language learning. These studies show that regarding aspects such as language awareness or executive control, individuals with some types of linguistic biographies score higher than students with other kinds of linguistic biographies (e.g. Bialystok, 2009; Jessner, 2006). Focusing only on early bilingualism as a source of linguistic resources would not result in a full picture, though. A range of studies also demonstrated that any previously learned or acquired languages – including contexts beyond early bilingualism – are connected with benefits for further language learning (e.g. Odlin & Jarvis, 2004; Singleton & Aronin, 2007). In addition, many studies have looked at what conditions have to be met to allow learners to profit from pre-existing linguistic resources (Marx, 2008; Singleton & Aronin, 2007).

Another vector for a critique of the monolingual bias is to look critically at the assumed purpose of language learning. Individual learners differ in their reasons to study a language. On the institutional and educational policy levels, too, the purpose of language teaching and what constitutes a successful language learner are subject to change. In the history of formal language teaching, changes in teaching method are often associated with changes in the goal of language learning.

In 1996, the New London Group pointed out that literacy today needs to reflect changes in the use of technology as well as enable learners to navigate linguistic plurality, including "the code switching often to be found within a text among different languages, dialects, or registers" (New London Group, 1996: 69). The Common European Framework of Reference for Languages (CEFR) companion volume (Council of Europe, 2018) as well makes explicit that there are specific plurilingual competencies that go beyond a "two solitudes" (Cummins, 2008) understanding of language(s): plurilingual comprehension (Council of Europe, 2018), communication building on a plurilingual repertoire (Council of Europe, 2018: 161f.), and some forms of mediation (Council of Europe, 2018: 103 ff.). It acknowledges the fact that some linguistic practices are not possible without at least two sets of linguistic resources interacting: from mediating between two friends without a shared language, to code-switching while telling a joke (also cf. Candelier *et al.*, 2012). In North America, where the CEFR is not as frequently used, practice based on concepts of translanguaging is comparable in perspective (Canagarajah, 2013; García & Kleyn, 2016).

These critiques, discussed for more than half a century, did not remain theoretical considerations only, but directly and indirectly led to a wealth of concepts and materials (e.g. within the Mehrsprachigkeitsdidaktik discourse: Hufeisen, 2011; Meissner & Reinfried, 1998; within the L'éveil aux langues discourse: Candelier, 2003; within the tertiary language learning discourse:

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Cenoz, Hufeisen & Jessner, 2001; Hammarberg, 2009; Hufeisen & Lindemann, 1998; Hufeisen & Neuner, 2004; Jessner, 2006; within intercomprehension discourses: Doyé, 2005; Klein, 2004; or within translanguaging discourses: Canagarajah, 2013; García & Kleyn, 2016).

Some trends and theoretical developments arrive in CALL later than in the rest of foreign language pedagogy, (instructed) SLA, or related disciplines. Egbert and Hanson-Smith (1999) describe, in early CALL history, a "return in CALL to an earlier pedagogical model" (22), and how CALL "has, interestingly, replicated this 50-year development [within TESOL] in a foreshortened or accelerated manner, retracing the entire pedagogical history of TESOL methods in only about 12 years" (26). Non-adoption of specific theoretical trends might, at specific times in the history of CALL, have been due to "the limitation of early technology; another reason was that computer programmers were not particularly knowledgeable about how language learning worked" (22). The limitations of the technology have lessened, and experts for language learning and acquisition dominate the CALL discourse, yet not all discourses from these related disciplines reach CALL discourses in a timely fashion. If we have inherited the monolingual bias from non-CALL, we can also inherit a critique of this bias. Yet, while the monolingual bias certainly impacts CALL (as argued in more detail below), the growing critique is only slowly reaching CALL (but cf. Ortega, 2017, for a key voice in transporting this critique into CALL).

3. Non-monolingual topics in CALL journals

In this section, I will investigate the posited monolingual bias by (a) quantifying the frequency of certain keywords within top CALL journals, and (b) quantifying articles with those keywords in their titles and subjecting them to a more detailed analysis of key ideas and themes contained therein.

3.1 Methods

For this paper, articles published over 10 years in the journals *Computer Assisted Language Learning* (*CALL*), *ReCALL*, *Language Learning & Technology* (*LL&T*), and *CALICO Journal* from 2009 to 2018 were analyzed. These journals were chosen because of their high visibility and impact within a European CALL context.[5] For the purpose of this study, research articles, review articles, commentaries, and editorials were included, and books/software reviews, corrigenda, in memoriams, calls for papers, supplementary material, etc., excluded.

In a first step, R with the stringr package was used to quantify articles containing the words *bilingual*, *multilingual*,[6] *plurilingual*, *third language*, *tertiary language*, *L3*, *translanguaging*, *translingual* (in different permutations) at least once. All searches (except for L3) were case insensitive.

These keywords were chosen as each of them can be used to highlight non-monolingual aspects of CALL. While we can discuss, for example, "foreign language learning" in a way that limits the perspective at hand to one language only (i.e. the target language), these terms are frequently used to highlight the complexities of non-monolingual settings, non-monolingual language users, non-monolingual materials, or non-monolingual goals. The first seven keywords were chosen because they reflect a broad range of ways of speaking about non-monolingualism and forefront different aspects of non-monolingualism (e.g. differences regarding the number of languages, different theoretical stances). The keyword *translingual* was added at a later stage, after it was identified

[5]While there are certainly publications on CALL that involve non-monolingual topics published in non-CALL journals, the focus of this article is on the monolingual bias in CALL as a discipline and a community in which CALL-specific journals play a key role.

[6]For the key term *multilingual*, the combination *Multilingual Matters* (i.e. name of the publisher) was explicitly excluded from the search.

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as a keyword in the title of a relevant article. It should be noted that the usage of some of these keywords differs, so that the same keyword might be used in different senses in different papers.

In a second step, papers that contained one of the keywords in their title were identified. Those papers were read to identify themes and trends contained therein (type of study, population, and context studied) and to provide short summaries.

3.2 Results and discussion

Table 1, Figure 1, and Table 2 summarize the findings.

Table 1 and Figure 1 both show that the keyword *bilingual** (also encompassing, e.g., *bilinguals*, *bilingualism*) is surprisingly frequent in this corpus and found in more than a quarter of all papers. This keyword, however, is used in many contexts where the focus is entirely on one source language and one target language, while the learner may still be viewed as monolingual-per-default, for example, *bilingual dictionary*. In fact, the expression *bilingual dictionar** appears in 5.16% of articles in this corpus.

Figure 1 shows that, although there is variance in how many articles per year use these keywords, the proportion of keywords remains fairly similar over time, with *bilingual* and *multilingual* making up the majority, and only very small numbers of articles using any of the other terms.

According to Table 2, a reader of *ReCALL* can expect three to four articles per year that at least mention the words *multilingual*, *plurilingual*, *third language*, *tertiary language*, *L3*, *translanguaging*, or *translingual*. Naturally, this does not imply that these articles focus on any of these aspects – only that at least one of these words appears at least once.

To put these findings into perspective, all articles were viewed and those articles that contained at least one of the keywords in their title were identified. In the total corpus, only eight articles out of 1,047 (or 0.76%) contain any of the keywords in their title. Table 3 shows their distribution across journals and time, and Table 4 provides key facts and summaries.

One notable pattern that emerges from Table 4 is the large number of case studies, with five out of eight papers being identified as case studies. Three studies look at formal learning contexts, such as school or university courses (Kulavuz-Onal & Vásquez, 2018; Priego & Liaw, 2017; van Deusen-Scholl, 2018), with the rest discussing informal or non-formal social media practices (informal Facebook practices: Chen, 2013; Schreiber, 2015; non-formal blogging: Melo-Pfeifer, 2015; not applicable: Lew & Szarowska, 2017; Ortega, 2017). Most studies look at adults, often university students (Chen, 2013; Lew & Szarowska, 2017; Schreiber, 2015; van Deusen-Scholl, 2018; non-university adults: Melo-Pfeifer, 2015), with only two studies looking at any school context (Kulavuz-Onal & Vásquez, 2018; Priego & Liaw, 2017), and no studies looking specifically at younger learners (primary age or below). Although some papers argue that what has been observed in informal contexts or with adults can and should inform teaching practice at schools (e.g. Schreiber, 2015: 83 f.), the amount of multilingual CALL studies with a school focus published in these four journals is very limited. This is not to say, of course, that such studies do not exist, just that they are not published in these four journals (cf., e.g., Alvarez, 2018; Brunsmeier & Kolb, 2018; Cutrim Schmid, 2018; Dausend, 2018; Elsner & Buendgens-Kosten, 2018; Kirsch & Bes Izuel, 2019; Lohe, 2018).

Non-monolingualism is conceptualized or becomes visible in those studies in very different ways. The study by Melo-Pfeifer (2015), for example, discusses blogging in the target language and interactions with other language learners blogging in the same target language. Although she does not discuss any "surface" non-monolingual practices (e.g. code-mixing, use of more than one language for negotiation of meaning, etc.), her analysis is based on the notion of plurilingual competence, understood here as "the interconnection of social and affective repertoires (attitudes, motivations, social representations on languages and the people), linguistic and communicative resources (such as the knowledge on different languages and semiotic resources) and cognitive

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Table 1. Percentage of articles containing specific target words

	All
bilingual*	27.03
multilingual*	17.48
plurilingual*	1.62
third language*	0.76
tertiary language*	0.29
L3*	1.62
translanguaging*	0.86
translingual*	1.24
any of the above	38.68
any of the above (except bilingual*)	20.15

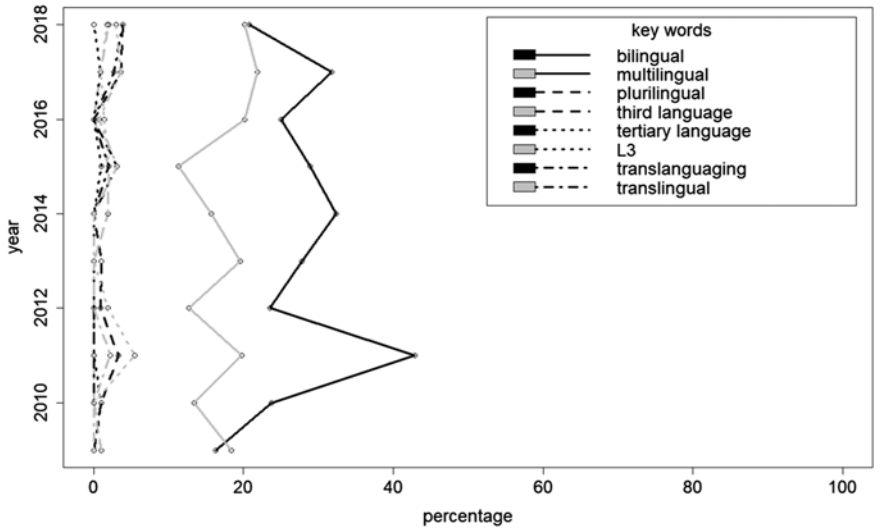


Figure 1. Overview of keywords per year

and verbal abilities (such as the ability to connect diverse verbal data, interpret and relate it)" (Melo-Pfeifer, 2015: 220).

Other studies look at "surface" non-monolingual practices, especially examples of networked multilingualism (Androutsopoulos, 2015) on Facebook (Chen, 2013; Kulavuz-Onal & Vásquez, 2018; Schreiber, 2015). Networked multilingualism – that is, "multilingual practices that are shaped by two interrelated processes: being *networked*, i.e. digitally connected to other individuals and groups, and being *in the network*, i.e. embedded in the global digital mediascape of the web" (Androutsopoulos, 2015: 188) – is a well-established research area, although often the focus is on informal practices outside of language learning settings.

Two studies look at telecollaboration (Kulavuz-Onal & Vásquez, 2018; Priego & Liaw, 2017). Non-monolingual aspects are inherent in CALL telecollaboration/virtual exchange, be it in tandem settings (individuals/groups learning each other's languages) or in lingua franca settings,

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Table 2. Percentages of papers including one of the target words (per journal)

	CALICO	*CALL*	*LL&T*	*ReCALL*
bilingual*	31.35	26.79	28.11	20.95
multilingual*	21.03	11.01	23.70	16.19
plurilingual*	2.38	0.89	2.41	0.95
third language*	0.40	0.89	1.61	0
tertiary language*	0	0.30	0.80	0
L3*	1.98	2.38	1.20	0.47
translanguaging*	0.79	0.30	2.01	0.48
translingual*	1.59	0.30	3.21	0
any of the above	44.05	35.12	41.37	34.76
any of the above (except bilingual*)	23.02	14.59	26.91	17.61

Table 3. Number of papers including one of the target words in their title (per journal)

	CALICO	*CALL*	*LL&T*	*ReCALL*	All
2009	0	0	0	0	*0*
2010	0	0	0	0	*0*
2011	0	0	0	0	*0*
2012	0	0	0	0	*0*
2013	0	0	1	0	*1*
2014	0	0	0	0	*0*
2015	0	1	1	0	*2*
2016	0	0	0	0	*0*
2017	1	1	0	1	*3*
2018	1	0	1	0	*2*
All	**2**	**2**	**3**	**1**	***8***

but these aspects are not necessarily emphasized in research and practice.[7] Kulavuz-Onal and Vásquez (2018) analyse language policies and multilingual practices of students and teachers in a virtual exchange using Facebook, while the students in Priego and Liaw's (2017) case study used telecollaboration to create multilingual (= parallel text) digital stories, although the focus of the article is on the creation of the English-language version only.

Three articles cannot easily be grouped with other articles. Lew and Szarowska (2017) discuss a popular form of non-monolingual language learning resource: bilingual online dictionaries. In their discussion, they consider the role of the L1 in the design of bilingual online dictionaries (e.g. including Polish grammatical labels in English-Polish dictionaries). Van Deusen-Scholl

[7]Potentially, all of the task types listed by O'Dowd and Waire (2009: 167 ff.) can be realized with a focus on non-monolingual processes (cf., e.g., Kulavuz-Onal & Vásquez, 2018), and many with a focus on non-monolingual outcomes (cf., e.g., Priego & Liaw, 2017).

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Table 4. Overview of papers containing relevant keywords in their titles

Article	Journal	Year	Keyword	Kind of paper	Summary
Chen (2013)	*LL&T*	2013	multilingual	Empirical paper: Case study analysis	Chen presents a case study of the Facebook practices of two Chinese graduate students in the US, focusing on their constructions of identity.
Melo-Pfeifer (2015)	*CALL*	2013	plurilingual	Empirical paper: Case study analysis	Melo-Pfeifer reports on a project in which learners of Portuguese created a shared blog in their target language, discussing its potential for different communicative practices and for developing plurilingual and intercultural competencies from a co-actional perspective.
Schreiber (2015)	*LL&T*	2015	multilingual	Empirical paper: Case study analysis	Schreiber presents a case study focusing on the multilingual Facebook practices of a Serbian hip-hop artist and university student.
Priego & Liaw (2017)	*CALL*	2017	multilingual	Empirical paper: Case study analysis	Priego and Liaw use activity theory to analyze a telecollaboration project in which students from two different countries created multilingual (= parallel text) digital stories. Their analysis of degrees of group functionality and of contradictions between groups does not touch on issues directly related to the multilingual nature of the products created.
Ortega (2017)	*CALICO*	2017	multilingual	Argumentative paper/literature survey	Ortega discusses how multilingualism and social justice can inform research interfaces for SLA and CALL. She lists relevant questions "that might be asked under a multilingual turn for CALL-SLA" (298), and develops an "equitable multilingualism" checklist for new research.
Lew & Szarowska (2017)	*ReCALL*	2017	bilingual	Empirical paper: Criterion-based evaluation of resources	Lew and Szarowska present an evaluation framework for online bilingual dictionaries and apply it to a selection of popular Polish-English online dictionaries.
Van Deusen-Scholl (2018)	*CALICO*	2018	multilingual plurilingual	Empirical paper: Questionnaire data	Van Deusen-Scholl uses questionnaire data to report on the varied backgrounds and motivations of learners taking videoconferencing-based courses to study heritage languages at three US universities.
Kulavuz-Onal & Vásquez (2018)	*LL&T*	2018	translingual	Empirical paper: Case study	Kulavuz-Onal and Vásquez conduct a discourse analysis of the interactions between two EFL classes in a teacher-created Facebook group, focusing on participants' violations of the "English only" rule.

(2018) discusses the relationship between choice of language course (videoconferencing-based courses of less frequently taught languages) and heritage language background of the learner. She argues for the need of a plurilingual turn in heritage language acquisition. Finally, Ortega (2017) presents arguments and a research agenda for SLA-CALL research that takes multilingualism and social justice into consideration.

3.3 Conclusion

The analysis shows that although *bilingual* and *multilingual* appear fairly frequently in the corpus, the other keywords are very rare. When looking at titles, which serve better at identifying papers focusing on a topic in contrast to just mentioning an aspect in passing, only eight papers could be identified that used one of the keywords in their titles. This supports the posited monolingual bias in CALL. This bias, of course, is just a bias – not a complete exclusion of this topic from CALL discourse.

This study looked at only four CALL-specific journals, and did not consider edited volumes, non-CALL journals, or conferences (such as the CALICO 2017 conference with its theme "Multilingualism and Digital Literacies"). New trends may first become visible at conferences, and may result in edited volumes before becoming visible as trends in high-status CALL-specific journals. Yet, at the current moment, as a consequence of the monolingual bias, research on non-monolingual CALL remains invisible as a trend, at least on the level of CALL history, key journals, and key professional organizations.

4. Non-monolingual design in CALL products and projects

When we talk about the monolingual problem in CALL, it does not suffice to talk about research contexts only. Another form this monolingual problem takes is related to a bias in CALL product development. Quantifying a monolingual bias in product development is more difficult than doing this for research, as there are no generally recognized repositories for CALL products and projects. A survey of CALL products and projects would ideally not only include whether more than one language is included in the product/project, but also how it is included and which function it serves. This paper does not attempt such a systematic survey, but merely presents some general observations regarding CALL products and projects.

Several popular CALL products today are bilingual: Duolingo is, as is Rosetta Stone and similar products. A myriad of (language) learning apps (e.g. Anki, Quizlet, Memrise) and drill-and-kill games support bilingual vocabulary memorization techniques. Indeed, these products use more than one language, but they do this by following a historic understanding of language learning (e.g. grammar-translation, behaviorism), rather than a contemporary understanding of language learning pedagogy. It is the author's subjective impression that while products and projects with an explicit multilingual or plurilingual perspective exist (cf. Table 5 for examples), these are usually non-commercial products developed through public funding (often: EU/EC funding) to explicitly address an existing gap in product development. Plurilingual design does not happen accidentally. Plurilingual design, when it occurs, is intentional and often the key agenda of a project. Only rarely are, for example, affordances for multilingual practices included outside such, usually non-commercial, projects.[8]

It is important to note that looking at a CALL product as it "comes from the box" only tells half the story. An app, a piece of software, a media bundle with reading pen are used by learners, often cooperatively or collaboratively, leading to the potential for enrichment with additional languages

[8]One of the few examples may be the Lang-8 language learning blogging community, in which learners used the relatively free blogging format to blog bilingually, which was then hard-coded into the software, so that the affordances reflected actual community usage patterns (Buendgens-Kosten, 2016).

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Table 5. Overview of CALL projects and products with an explicit multilingual or plurilingual perspective

Project	Type of project	Short project descriptions	Further resources and project website
3M-project (Meer kansen Met Meertaligheid)	SIA-funded	Developing an innovative approach for multilingual education in primary school, with a focus on Dutch, English, and Frisian, plus languages related to migration, including a digital interactive learning platform with multilingual material	http://3mproject.nl
Beelinguapp	Commercial product	App with bilingual texts (text and audio) in many genres and language combinations	https://www.beelinguapp.com/
EU·DO·IT (European Digital Online-Game for Intercultural Learning and Translanguaging)	Erasmus+	Dialogue-based language learning platform with translanguaging support	Buendgens-Kosten, Lohe & Elsner, 2019; http://eudoit.eu/
FanTALES (Fanfiction for the Teaching and Application of Languages through E-Stories)	Erasmus+	Multilingual digital storytelling inspired by fanfiction practices	https://www.fantales.eu/
Français interactif	UT Liberal Arts Instruction Technology Services; Center for Open Educational Resources and Language Learning; U.S. Department of Education Fund for the Improvement of Post-Secondary Education	French language learning website including videos featuring non-native speaker and non-monolingual speech	Blyth & Dalola, 2016; http://www.laits.utexas.edu/fi/home (archived via https://archive.org)
GALANET	Socrates/Lingua	Platform for multilingual learning situations; chat project utilizing intercomprehension between Romance languages	Melo-Pfeifer, 2014; http://www.galanet.eu (archived via https://archive.org)
iTEO	University of Luxembourg; Ministry of National Education, Childhood and Youth	Storytelling app supporting multilingual storytelling practices	Kirsch & Bes Izuel, 2019; https://wwwfr.uni.lu/research/fhse/dhum/multilingualism/projects_and_publications/iteo_examining_the_use_of_the_app_iteo_for_teaching_and_learning_languages_in_preschools_and_primary_schools
MElang-E (Multilingual exploration of languages in Europe)	Erasmus+	Multilingual serious game in which secondary school students can explore languages in Europe, including English as a lingua franca.	Buendgens-Kosten & Elsner, 2018b; https://www.culture.gouv.fr/Sites-thematiques/Langue-francaise-et-langues-de-France/Ressources/Ressources-pedagogiques-et-sensibilisation/Romanica
MuViT (Multiliteracy Virtual)	Comenius	Multilingual digital storybooks	Elsner, 2014; https://www.uni-frankfurt.de/44712109/ContentPage_44712109
Romanica	République Française, Ministère Culture	App with gamified intercomprehension activities	https://www.culture.gouv.fr/Sites-thematiques/Langue-francaise-et-langues-de-France/Ressources/Ressources-pedagogiques-et-sensibilisation/Romanica

and multilingual practices even for a monolingual product or project (Brunsmeier & Kolb, 2018; Cutrim Schmid, 2018; cf. also Gee's (2008: 24) distinction between "game" and "Game"). The monolingual bias may limit attention to these factors, though, and risks that the potential of this remains untapped by product developers and understudied by researchers.

5. Multilingual CALL

Above, I have argued that work on non-monolingual CALL may exist, but does not constitute a visible trend or a coherent approach within CALL. Perhaps one of the contributing factors to this relative invisibility is the fact that studies on, for example, multilingual computer-mediated communication (CMC), or subtitling, or bilingual dictionary use, are perceived primarily as studies on CMC, or film use, or dictionaries. What connects these studies – viewing the presence and use of more than one language as prerequisite for language learning, goal of language learning, or tool/resource in language learning – remains in the margins.

The CALL community, like many academic communities, has a penchant for puns and acronyms. On a certain level, it seems obvious to joke about the proliferation of –ALL acronyms like MALL, BALL, or ICALL. Yet these and other labels serve an essential function: They provide a focusing lens that allows us to view research on seemingly disparate areas as being related. One way to tackle the monolingual bias is to create a label that subsumes work that does not subscribe to this bias, or that actively counters this bias.

Just as Garret argues that CALL is "not shorthand for 'the use of technology' but designates a dynamic complex in which technology, theory, and pedagogy are inseparably interwoven" (Garrett, 2009: 719–720), it can be argued that multilingual CALL (MCALL) is more than the mere existence of more than one language in a CALL. Buendgens-Kosten and Elsner (2018a) tentatively define MCALL as

> the study and practice of language learning with digital media in non-monolingual contexts or settings or using non-monolingual media. This may involve the use and/or activation of native language(s), previously studied language(s), heritage language(s) or dialect(s). Multilingual CALL can be multilingual due to the multilinguality of learners, due to the multilinguality of group of learners (including telecollaboration or CMC settings) or due to the multilinguality of teaching material/tasks. (xiv)[9]

This definition is intentionally broad, encompassing a wide range of practices already part of standard language teaching and learning practices, such as subtitling or digital bilingual dictionaries. The intention of this term is not to single out the most cutting-edge (plurilingualism/translanguaging-inspired) work on MCALL, but to provide a focusing lens for "work that *actively* and *consciously* works on the interstices of multilingualism and CALL" (Buendgens-Kosten & Elsner, 2018a: xvii).

The history of CALL is closely intertwined with the technological options available for realizing CALL. This fact can hold CALL back, but it can also inspire CALL. In the remainder of this section, I will try to suggest how we can use emergent technologies to change how we think not only about CALL but also about multilingual CALL.

Digital tools can function as an enabler in MCALL contexts by bringing diverse L1s into the classroom: Even if the teacher does not have a good command of all their students' L1s, or if a speaker lacks literacy skills in (one of) their L1s, multimedia tools can support learning activities involving a wide range of languages (cf. Buendgens-Kosten & Elsner, 2018a: xv). Today, specialized tools exist that include text in multiple language versions and allow learners to practice

[9]In this definition, multilingual is used as a general label referring to non-monolingual settings or media, and not as a term contrasting with plurilingualism, as suggested in the CEFR (Council of Europe, 2001: 4).

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receptive code-switching (Bündgens-Kosten & Elsner, 2014); for example, the MuViT storybook, bilingual story apps (e.g. Beelinguapp), or projects utilizing reading pens to add acoustic information in multiple languages to a picture book (Dube & Gürsoy, 2018). In all of these, the languages available have to be prepared ahead of time, either by the teachers themselves, or by the app producers (possibly with the help of translation software). Some teachers already utilize the fact that online platforms like Wikipedia, although not intended for language learning, provide articles on the same topics in multiple languages (Alvarez, 2018). In the future, even more flexibility might be provided by on-the-fly addition of languages, for example, through tools such as Google Translate, which allow learners to photograph a segment of a book or worksheet and to be provided a translation of this into a language of their choice. The technology necessary to do so already exists and is moving into broad use (cf. auto-translations on social media platforms), and existing quality issues will most likely diminish over time.

Adaptivity, including learning analytics, might be another area that is promising for CALL and MCALL alike. Adaptivity should include adapting to all the linguistic resources a learner brings to the table. A rather basic example for this might be the EU·DO·IT platform (Buendgens-Kosten, Lohe & Elsner, 2019; http://eudoit.eu), where learners of a range of target languages can choose a support language, and the material then includes an increased number of cognates, loan words, internationalisms, as well as shared structures, between the target language and the support language. In the case of EU·DO·IT, though, this is still very basic, allowing only three support languages from three language families, with all translanguaging support hardcoded in the textual materials. The next logical step would be to include more support languages, to allow one learner to use several support languages, and react flexibly to what the learner finds and does not find useful for their learning.

A further potential avenue might be virtual reality. Virtual reality, like more traditional virtual worlds, is not bound to copy reality. Sometimes, though, this is the intention – for example, to help a learner of the local variety of French to prepare to visit a local coffee shop (see, e.g., Papin, 2018). In those instances, the same effort that is used to replicate the environment could be extended to the linguistic environment, by replicating – to a certain degree – the linguistic landscape and soundscape of the actual place. Ideally, even linguistic practices such as code-switching, code-choice, linguistic accommodation, etc. – always in the ways typical of a specific location – might be included. Within such sociolinguistics-informed virtual reality, learners indeed could develop their "knowledge and understanding of language within human multilingual culture" (Gillespie, 2018).

CALL product development is essential, as it allows us to push the limits of our understanding of what is conceptually possible, and to empirically test our assumptions about how changes in design (e.g. making a design more multilingual) impact learning. This way, CALL is in the position to not only inherit a critique of monolingual approaches from its related disciplines, but also contribute to theory building in these areas through developing and studying tools and tasks using multilingual and multilingual-sensitive digital environments.

6. Conclusion

Hlas (2018) encourages the field of foreign languages to identify its "Grand Challenges"; that is, "difficult yet solvable problems facing our field" (46). If one of the "grand challenges" of CALL is the provision of language learning options for ever growing, and ever more heterogeneous, target groups, or adapting teaching to the always evolving language needs of learners, then MCALL could be one of the pathways through which we could contribute to solving these challenges.

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