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Mobile Language Learning: The Medium is ^not the Message

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This paper repositions McLuhan's (1964/1965) extension theory of technology in the context of *mobile (-assisted) language learning* (MALL), and explores whether and how the medium (i.e., the mobile device) impacts the message (i.e., the target language) and the means by which it is taught in MALL. A survey of recommended commercial MALL apps generated four top-ranked apps, which were reviewed, then trialed in an autoethnographic study of learning Italian to explore how language, communication, and language pedagogy were theorized, enacted, and assessed in each app. On the whole, MALL apps were found to repackage outdated language teaching pedagogies, and failed to capitalize on the affordances of mobile connection apart from piecemeal incorporation of gamification strategies and social media links. The article concludes with a call for professional educators to harness, not just consume, mobile technologies towards informed design-oriented MALL pedagogies.

In a culture like ours, long accustomed to splitting and dividing all things as a means of control, it is sometimes a bit of a shock to be reminded that, in operational and practical fact, the medium is the message. This is merely to say that the personal and social consequences of any medium—that is, of any extension of ourselves—result from the new scale that is introduced into our affairs by each extension of ourselves, or by any new technology. (McLuhan, 1964/1965, p. 7)

McLuhan's vision of electronic media extending the individual into a technologically-mediated world was next to incomprehensible in the 1960s; today it is inescapable. In McLuhan's day, technologies extending the self were electric unidirectional mass media vehicles, such as the television, planted in a family room for social viewing. Contemporary technologies have evolved out of all recognition from McLuhan's time into mobile multifunction interactive devices, clustered on the individual. In today's world, the technological extensions through which we experience and participate in life are no longer something we can simply pull the plug on. We are all but ubiquitously connected to a parallel digital universe, the portal to which we hold in mobile devices tucked into purses and pockets.

Technological strides have resulted in powerful, portable computers that are woven into daily communication. Dynamic, interactive, multimodal literacies have evolved in the multimedia petrie dish of this new environment, and the Industrial era consumer of literate materials has in tandem morphed into an Information era *produser* (Bruns & Schmidt, 2011, p. 4), who is continuously collaboratively building and shaping Internet content. Increasingly, literate *produsing* is mobile.

This article repositions McLuhan's (1964/1965) extension theory of technology in the context of *mobile (-assisted) language learning* (MALL), which is a specific application of mobile

(m-)learning. I explore whether and how the medium (i.e., the mobile device) impacts the message (i.e., the target language), and the means by which the language is taught in MALL. The study includes an online survey of recommended MALL apps on the 2016-2017 digital marketplace, an autoethnographic study of learning Italian using the four top-ranked apps, and a literature search of the top *language course* (duolingo) and *flashcard - SRS system* (Memrise) to probe developers' epistemological intentions. My aim is to critically examine the kind of language learning experiences being packaged for global language learners, who are reportedly downloading commercial MALL apps and engaging in mobile language learning by the millions worldwide (cf., duolingo, n.d.).

LANGUAGE, MEDIATION, AND LITERACIES

Language is abstract until it is materialized, mediated by speech organs to make sound waves; gestures in the case of signed languages; orthographical and technical mechanisms, such as an alphabet and a pen, to create a written text. The mediation of communication has grown increasingly more complex with the emergence of digital interfaces. As Kern (2014) points out, "the hardware and the software we use filters and transforms what gets included in the signals transmitted between ourselves and our conversational partners" (p. 342).

In Ontario schools, language and literacy are conflated in the curriculum, taught as the subject, *English*, and described in terms of oral and written language skills; literacy is, thus, conceptualized as English written down. *Reading* and *writing*, which constituted two of the *3Rs* of 19th century schooling (plus arithmetic), described decoding and encoding texts created with 19th and early-mid 20th century technologies that privileged static alphabetic print and (monolingual) literacy in majority languages. In the digital era, language is more saliently a component in a suite of semiotic resources mediated by a variety of digital tools in environments with their own particular materiality, access and functionality.

The world on paper that dominated literacy education for centuries continues to be an indisputably invaluable repository of and for knowledge creation. However, times have changed. Rapid technological advancement in information and communications technologies over the past three decades has outmoded the validity and sufficiency of traditional literacy skills as meaningful templates to contemporary literacies. Even media literacy, developed to critique unidirectional legacy mass media, requires theoretical updating to be relevant in the context of social media environments where users are *produsers* (Bruns & Schmidt, 2011), actively collaborating in Internet content production.

Literacy today is mediated by rapidly-evolving technologies that enable fluid, agentive, multimodal compositions, social media engagement, global networking, multidirectional interactivity, collaborative authoring, remote game play, immersion in augmented and virtual realities, researchable cloud-based knowledge storage, and more. With the inception of mobile networking, literacies have been lifted from situated contexts and remixed in digital environments, giving rise to new grammatical conventions (e.g., Twitter); interactive, multimedia discourses (e.g., Snapchat); even new performatives (e.g., *like me* on Facebook). As such, individually measurable reading-writing-listening-speaking skills have given way to new forms of learning: cognitively-distributed problem-solving, using a digital toolkit enabling collaborative R/W authoring, plurilingual and multimodal design, ludic and production pedagogies, even post-human communication with chatbots.

What is *Technology*?

The purchase of new technologies far too easily forms the answer to questions about how to teach contemporary language and literacy in educational institutions. Dig below the surface, and *new technology* is a smokescreen for devices with processing capacities. This represents a superficial and impoverished understanding of *technology*.

Mitcham (1994) distinguished two traditions of technology: an "engineering philosophy of technology, which emphasizes analyzing the internal structure or nature of technology, and humanities philosophy of technology, which is more concerned with external relations and the meaning of technology" (p. ix). This bifurcated distinction signals the potential for serious miscommunication in educational discussions of technology. The engineering philosophy of technology is manifest in the common thinking that the purchase of a device or software program will functionally solve a social problem. Consider Lawson's (2008, 2010) elucidation of McLuhan's (1964/1965) extension theory of technology, where he distinguished two properties of technology in action: *causality* and *relationality* (Lawson, 2008). Technologies are intrinsically causal in that they harness and extend human capability. For instance, a ballpoint pen harnesses human handwriting skills, and tangibly extends this (complex) ability in an appropriate environment. This action is socially relational: the pen will only extend human capability if the person can write. The object, viz., the pen, does nothing on its own. Buying a pen is not, in itself, causative of literate communication. Thus, as Granger, Morbey, Lotherington, Owston, and Wideman (2002) point out, simply buying a digital tool will not solve an educational problem. Believing that tool purchase will direct learning is an instance of technologically-determinist thinking.

Education is a social project, so a humanities philosophy of technology that emphasizes the meaning of technology in users' lifeworlds is arguably more important than the technological functionality. Bijker (2010) takes a social constructivist approach to the ontology of technology, arguing that "technology comprises, first, artefacts and technical systems, second, the knowledge about these and, third, the practices of handling these artefacts and systems" (p. 64). In his analysis, societies are now "thoroughly technological and all technologies are pervasively cultural. Technologies do not merely assist in everyday lives, they are also powerful forces acting to reshape human activities and their meanings" (p. 67).

The dance between socio-cultural use and scientific intent is patently evident in the case of the smartphone: developers created a cellular telephone for mobile telephone use, but given cheaper rates, many users innovated texting protocols using the existing telephone keypad. Developers of the next generation of cellular telephones built in user-friendly software for texting, and so goes the socio-cultural - scientific innovation cycle.

If, as Bijker (2010) asserts, "a technological system comprises a combination of technical, social, organisational, economic and political elements" (p. 66), then educational approaches to technologically-mediated literacies are politically entwined in the shape of contemporary literacies. Schools take varied approaches to smartphone use in class from *bring your own device* (BYOD) programs, encouraging a home-school continuum in social media literacy practices, to outright banning of cellphones in class, cementing the brick-and-mortar boundaries of what counts as literacy and learning. In this way, we see that the smartphone, a mobile device built on historical, collaborative scientific experimentation, is continuously co-evolving with social practice and political sanction.

With a clearer sense of *technology* as a complex, reflexive scientific, socio-cultural, and

political phenomenon, I now turn to a more thorough discussion of mobile language learning, before describing my own autoethnographic foray, which will inform the remainder of the article.

MOBILE (-ASSISTED) LANGUAGE LEARNING (MALL)

Social communication is imbricated in digital environments that are increasingly accessible on-the-go. According to comScore (2017), mobile devices now dominate everyday online communication around the world. In the United States, mobile devices are used for 71% of digital communication; in Canada, 62%; in the United Kingdom, 61% (comScore, 2017, p. 4).

MALL is a riff on *computer-assisted language learning* (CALL), describing language learning mediated by mobile devices. MALL offers the individual user an exponentially growing range of purpose-built apps for self-access language learning. *Apps* are third party software applications designed for mobile digital devices at little or no cost (though paid surreptitiously via data sharing if not, and perhaps as well as, through financial subscription, on site advertising, and in-app upgrade purchase). App development is a booming multibillion-dollar industry that is barely a decade old (Louis, 2013). Apps for learning languages from English to Zulu are proliferating in the digital marketplace, downloadable to users on a cost-free, freemium and premium basis.

The term MALL, like its parent, CALL, fails to capture the inextricable fusion of digital technologies in contemporary social, economic, and political life. Technologies do not merely *assist*, they also *shape* learning, and they are shaped by social and political forces acting on learning (Bijker, 2010). Sharples, Arnedillo-Sánchez, Milrad and Vavoula (2009) describe the multifaceted nature of mobile learning not simply as mobile connectivity, but mobile thought communicated across devices (via online and cloud computing), location, social and conceptual space, and time zones. Mobile learning is part of a mobile lifestyle (Guo, 2014).

Kukulska-Hulme (2009) describes mobile learning designs as stretching across both formal and informal learning contexts, theoretically offering the potential for individualized learning that is situated, authentic, spontaneous, and informal. This description characterizes *design-oriented* learning, and contrasts with *content-oriented* transmission learning, which she asserts is typical of classroom language teaching. In practical fact, a broad spectrum of pedagogical approaches is used in classroom language teaching, many of which are not *transmission learning* (e.g., immersive and content-based approaches). Commercial MALL apps for language teaching, on the other hand, are constructed for *transmission learning* as programs built on a linguistic database and a proprietary pedagogy for predictable, user-friendly use. They are, in effect, teacher stand-ins, some, using chatbots to model speech.

Content-oriented MALL apps on the digital marketplace are designed and sold as stand-alone packages; they lack the flexibility of design-oriented learning, where teaching is customized for the learner. Alm (2016), a university lecturer of German and CALL, familiar with the terrain of language learning in digital environments, provides an excellent example of design-oriented m-learning in her autoethnographic quest to learn Spanish. After reprogramming her phone to use Spanish as base language, she threaded together MALL apps appropriate to her needs in her growing Spanish language competency. Thus, content-based apps were selectively used to design a personalized course of learning.

INVESTIGATING TOP-RANKED MALL APPS

Commercial MALL apps circumvent formal learning channels through direct marketing. Given that they shape public expectations for low cost direct learning opportunities, I felt it was important to investigate what popular MALL apps were selling. A multistage study of MALL apps was conducted to examine:

1. What MALL apps are most highly ranked in the 2016-2017 digital marketplace?
2. What theories of language and language learning are evident in top-ranked MALL apps?
3. What are the stated aims of the developer/s of top-ranked apps?

To answer the first question, I surveyed a host of online sites to determine their top recommended MALL apps (Lotherington, 2017). The results of this survey were then coded according to Lingua Lift's typology of MALL apps (Krzemińska, n.d.), and ranked for popularity.

The second question was answered in two stages of empirical research. A pilot MALL app study was conducted, in which eight volunteers expressed interest in roadtesting MALL apps that had been stratified according to Krzemińska's (n.d.) typology, for a total of up to three hours over a six-week period. The case study data, indicating user apathy and antipathy towards these MALL apps, led me to undertake a more in-depth study of Italian on the four top-recommended apps from the marketplace survey: duolingo, Babbel, busuu, and Memrise.

As I progressed through each app's lesson structure, I became curious as to who the developers were, questioning the theories of language and language learning apparent in the presentation of the content. I conducted a literature search of published research, supplemented by online sources to answer the third question, focusing specifically on the developers' aims in programming duolingo, the most popular *language course* on the digital marketplace, and Memrise, the top-ranked *flashcard - spaced repetition system*. These findings are described below, in turn.

Survey of Top-Ranked 2016-2017 MALL Apps

Using repeated Google searches with varying keyword combinations (e.g., second/ foreign + language teaching/language learning + best/top + app + 2016/2017), I embarked on a quest to find the top-recommended MALL apps on review sites of highest online traffic. The top five MALL apps were listed from best to fifth best, then sorted and weighted for frequency of rank. Four apps emerged as the clear front-runners. The other top-ranked apps turned out to be largely single mentions across the sample. The top five apps from six online review sites, proportionately weighted for frequency of rank are shown in Figure 1.

Figure 1. Top-ranked MALL apps weighted for frequency of rank

MALL Apps by Pedagogical Approach

LinguaLift offers a pedagogical typology of MALL apps (Krzemińska, n.d.), as follows:

- language courses;
- flashcards and spaced repetition systems (SRS);
- Q&A, chat and social;
- educational games;
- contextual reference.

This typology was used to code the four consistently top-ranking MALL apps from the online search. The results indicated that *language course* was overwhelmingly the most popular format, followed by *flashcard - SRS system*.

1	duolingo:		language course
2	Babbel:		language course
3	busuu:		language course
3	Memrise:		flashcard – SRS system.

The type, *contextual reference*, which referred principally to phrase books intended for tourism, was the least popular type of MALL app in my search, not occurring in the top five list of any best-of MALL apps listing. *Q&A, chat and social*, and *educational games* were also surprisingly unpopular, in spite of the documented affordances they might provide, such as multimodal composing, game role-playing, social media posting, and connecting language learners with fluent speakers of the target language instantly and ubiquitously.

Given the affordances of mobile devices to open immersion opportunities in 3D virtual worlds (Berns, Gonzalez-Pardo, & Camacho, 2013), to support augmented reality applications for language learners (Holden & Sykes, 2011; Pegrum, 2014, 2017), and to insert learners into goal-directed massively multiplayer online role-playing game (MMORPG) scenarios, their lack of popularity in the best-of MALL app survey was stunning. Sykes, Reinhardt, and Thorne (2010) highlighted MMORPGs as a new social landscape in language

learning. MMOPRGs, played in the target language, create an immersive context supporting situated, goal-directed language that Lee and Pass (2014) found to reduce learner anxiety due to lowered response time constraints. Peterson's (2016) meta-analysis of ten CALL studies on MMORPGs and second language learning found they offered both cognitive and sociocultural benefits for language learners.

The bulk of commercial MALL app purchasers, though, are likely to be *naïve* language learners (i.e., not experienced language teachers, applied linguists, or specialists in educational technology), so one conjecture is that MALL app purchasers follow an online consumer recommendation path similar to the one I tapped in my internet search of top-recommended MALL apps.

Learning L$_x$ on the Four Top MALL Apps

A pilot study was designed to roadtest a selection of top-ranked MALL apps. Six MALL apps were selected, representing top-ranked:

- language courses;
- flashcards and spaced repetition systems (SRS);
- Q&A, chat and social; and
- educational games.

Three weeks of language learning activity were proposed within a six-week period, each week requiring one hour (in total) during which the participant trialed a selected app to learn a language of his or her choice. Eight adult participants of varied ages, language learning experiences, and professional backgrounds, who were interested in learning a language, agreed to participate. Participants were asked to sign up for the language of their choice, using one of three top-selling *language courses* during week 1. The procedure was to be replicated in week 2 with the same language using another app, selected from week 2 options, which included a *flashcard - SRS system*, a *game*, and a *social chat* app. The continuation of the study into week 3 with any app not yet tried was subject to participants' interest.

Response was abysmal. In all but one case, the task was put off past the cut-off date of the study, which made me wonder how many people download a MALL app but never quite get around to using it. One participant, a middle-aged professional, who had some familiarity with Spanish, was highly motivated to learn Italian in order to network with colleagues in Italy. He tried out a (*language course*) app in week 1, and reported plaintively that the app was boring, and the time wasted, so he would not be continuing the study. Given participants' apathy, and, worse, antipathy towards the MALL apps, I conducted my own examination of the four top-ranked MALL apps to see if I could surmise why they had been so poorly received, which became the basis for this essay.

Italiano on MALL, and by Default, Deutsch

I downloaded all four top-ranked MALL apps, and picked a language of which I had limited knowledge: Italian. As an experienced language learner, knowledgeable about language, and language learning theories, technologically-aware, conversant and fundamentally literate in two other Romance languages (Spanish and French), and rudimentarily communicative in a smattering of others, I decided that I could probably whiz through the elementary lessons

and see how language and language learning were conceptualized in the MALL apps' sample, plus pick up some Italian along the way. This hubris was totally misplaced, of course, given the energy required to learn a new language, no matter how well or badly it is presented. I thus proceeded systematically through the accessible elementary units of each top-ranked app: three *language course*s, duolingo, Babbel and busuu, and the *flashcard - SRS system*, Memrise.

The Cost of Learning

A significant factor in both accessing and progressing through the material on each of these apps was the cost structure. Apps in the digital marketplace fall into three categories: *free*, *freemium*, and *premium*. Apps that are downloadable at no initial or upgrade cost, and no subscription fee, such as duolingo, are categorized as cost free, though as will be discussed, such apps are paid for in less visible ways. Freemium apps, such as busuu, Babbel, and Memrise are downloadable at no initial cost but then require either subscription or upgrade payment to unlock features, such as more advanced lessons or other languages. Premium courses, such as Rosetta Stone, are built on historically established commercial language teaching programs translated from legacy media. The fact that the purchase price of premium apps is not competitive with free and freemium apps may help to explain why no premium courses surfaced in the survey of top-ranked MALL apps.

As I progressed through each MALL app, I discovered its cost structure. Though duolingo did not have subscription or upgrade costs, it was riddled with ads that cost game points and impeded learning if the points were not purchased. Furthermore, and far more perniciously, duolingo mines users' information, so there are privacy concerns. Duolingo does provide a privacy policy online, but not on the app itself.

There were upgrade costs for Babbel, busuu and Memrise that kicked in very quickly in busuu, which would not provide me with access to Italian because I had embarked on a German course sometime in the past using this app, and only one language course is permitted for free per user. The purchase of a 1, 6, or 12-month premium subscription for $3.08[1] to $12.49 per month allowed study of up to 12 languages, more vocabulary, grammar, and test features as well as a social media connection and a certificate from McGraw Hill Education. Babbel required a subscription to unlock features, and move beyond elementary lessons. This was sold by 1, 3, 6, and 12-month subscriptions, ranging from $7.08 to $13.99 per month depending on the contract. Babbel, though, did allow me to download a second language, which I tested out by signing up for French. Memrise gave me more leeway in continuing along the free path, though the app kept flashing their pro version, which included 3 ($25.99) and 12-month ($84.99) as well as lifetime subscriptions ($139.99). Whether this cost of learning assures the maintenance of privacy is not clear, though Memrise provided an assurance of anonymity and confidentiality in its introductory getting-to-know-you segment.

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[1] It was unclear to me whether the prices quoted were in Canadian or American dollars. I completed all app-based language learning in Canada, where I am located, though, of course, apps can be used wherever there is network connection.

What Did I Learn?

My goals in this initial examination were twofold: to pick up some conversational Italian, and to discover what *language course* and *flashcard - SRS system* type MALL apps comprised in this era of mobile, interactive, multimodal R/W digital communication. I learned a trivial amount of Italian—too little, too disconnected and too decontextualized to use in any meaningful way apart from formulaic greetings (e.g., *ciao, buongiorno*) and politeness particles (e.g., *grazie, prego*). In truth, these simple usages could have been just as easily and certainly less painfully acquired through listening in public and checking spelling on a translation site afterwards. The quality, quantity and utility of Italian presented on all four apps was limited.

My research aim was to articulate the theories of language and language teaching underpinning popular MALL apps. In all of the MALL apps tested in this study, language was presented as a structural concept. Language teaching pedagogies were driven principally by grammar translation (duolingo, busuu, Babbel), which has been used for millennia (Kelly, 1969), and audiolingualism (Memrise), a behaviorally-driven language teaching approach from the early-mid 20th century.

In all four apps, language was traditionally parsed, prominently featuring vocabulary memorization, and presenting basic grammar in phrases to be memorized. Busuu and Babbel provided grammatical pop-up tips but there was little to no grammatical explanation in either duolingo or Memrise, both of which typically posted new material with translation but without explanation. My learning was, however, rewarded in terms of gamified points for drills accomplished on both duolingo and Memrise—implying that language learning is a scored game rather than a route to communication. Babbel was the only app that attempted to provide some degree of contextual support for the endless vocabulary and phrase drills; it accomplished this through gap-filling dialogues.

The flashcard app, Memrise offered an essentially audiolingual approach, where a word was presented in tiny labeled video clips, then repeatedly drilled until memorized. A strong undercurrent of audiolingualism also appeared in busuu and Babbel, both of which had flashcard segments that linked to audio clips.

Design differences were surprisingly superficial in the three apps classified as language courses, with busuu offering a social media connection to presumably fluent speakers, though how fluency or native speaker status was determined is unclear. I know that I did not fill in language background information anywhere. The primary purpose of the social media integration turned out to mean free labour, as it predominantly involved correcting other users' drills, which began appearing in my inbox shortly after I started learning German, Italian being unavailable to me due to the cost structure of the app. Specifically, I received a correction from a busuu user in Germany for a small exercise that could easily (and possibly more reliably) have been checked by a chatbot. Given that the site has a subscription structure, I was surprised at the reliance on crowdsourced labour for grammatical correction, given the linguistic expertise that could have gone into app development. Orsini-Jones, Brick, and Pibworth (2013) noted expert language learners' similar frustrations in using busuu: learners were confused by language variation in the social networking feature, haunted by cyberstalkers (which mercifully I did not encounter), and concerned about the poor quality of instructional materials (which I also experienced).

Given the general trends viewed in the four most popular top-ranked MALL apps for 2016-2017, I decided to do a more fine-grained study of two apps: 1) duolingo as a free *language course*, and the most popular language teaching app on the Internet, claiming to reach

over 100 million users (Protalinski, 2015); and 2) Memrise, being the sole top-ranked *flashcard - SRS system*.

Duolingo

Duolingo was co-founded by Carnegie Mellon computer science professor, Luis von Ahn together with his doctoral student, Severin Hacker (Orin, 2008; Siegler, 2011). In an interview with Orin, von Ahn claims an altruistic motivation for creating the app:

> I co-founded duolingo with the mission of bringing free language education to the world. Today, duolingo is the most popular way to learn languages online, with over 150 million users worldwide. One fact we're particularly proud of is that there are more people learning languages on duolingo in the US than there are people learning languages in the entire US public school system. duolingo is available for iOS, Android and Windows devices, as well as on the web. (von Ahn interview, Orin, 2008, para 6)

Von Ahn's stated mission to bring free and digitally accessible language learning to the world in his co-invention of duolingo is introduced in a somewhat different light in Siegler's (2011) account of the start-up's pre-release evolution, where von Ahn's starting point is: "How can you get 100 million people on the web translating everything into different languages for free?" Jašková (2014) explains that duolingo uses the same design principle as CAPTCHA, which von Ahn also co-created, and updated in reCAPTCHA (Orin, 2008; Siegler, 2011). CAPTCHA and reCAPTCHA are marketed as free tools for distinguishing humans from bots online, thus protecting websites from malware. CAPTCHA requires humans to decipher unclear text to enter a website, the results of which are simultaneously capitalized on for purposes of book digitization. According to Siegler (2011), von Ahn was trying to think his way out of how to get people to translate the web for free, but not enough people could interpret fuzzy print in more than one language. So duolingo was invented as a gratis language-teaching app to capitalize on language learners' data. This is part of the hidden cost of using the app.

Jašková (2014) describes duolingo as a grammar translation system with a lock-step progression that uses a gaming structure where advancement is built on mastery of elementary levels. Duolingo's curriculum is planned by algorithm, implementing addictive behaviors from matching puzzle games, such as *Candy Crush*, in its pedagogical design (Gannes, 2014). This kind of gamification, allotting points for matching exercises, is to be sharply distinguished from immersive role-playing games, where the learner is immersed in a digital world and must learn to communicate and act within that world.

The importation of a traditional grammar-translation approach into the single most popular language-teaching app on the market in 2016-2017 alarmed me, given the novel affordances of mobile devices. According to duolingo's promotional literature, the app serves "the richest man in the world and many Hollywood stars, and at the same time … public schools students in developing countries" (duolingo, n.d.). So how did it present Italian to one of those millions of learners worldwide, viz., me?

The first thing to say is that duolingo gave all instructions in English. My phone uses English as base language, though the texting facility is set to include French and Chinese keyboards, and my Siri interface is set to Canadian French. The app thus read me as an English speaker, and gave instructions in English. Why not Italian? Does a French speaker

also get a course in English with Italian vocabulary?

The app offered a start-up menu in icons: basics 1, basics 2, phrases (all in bright colors), followed by mixed thematic and grammar units: food, plurals, animals, food 2, and possession (greyed-out and inaccessible) before a yellow bar *test of 6 skills*, continuing on to more greyed out icons of apparently increased complexity, locked to direct access. The app is thus programmed in lock-step progression for the raw (English-speaking) beginner of Italian, who navigates the course requirements in English. I could find no route to beginning at more advanced levels on the app or skipping ahead. This might be to assure that translations requiring user corroboration of unclear real-world texts (to be used for digitizing books), which are incorporated in advanced exercises, cannot be accessed until beginner levels have been satisfactorily passed, presumably assuring a degree of language proficiency in the real task: deciphering illegible print on the web.

I followed the language course progression through basics 1 and 2, which the site tabulated in a bar below each icon. I wasn't always clear whether I had finished one section before moving on, given the not-quite-at-the-end indicator. I decided to sneak ahead to the test—a colored bar signaling access—after getting bored with single word repetition and teaching by testing, given that wrong answers, including unintended typos and unclear vocalizations cost mysterious heart health points. These I had to purchase after declining to watch two ads.

The exercises used to repetitively drill vocabulary and phrases included: dictation, word matching (English-Italian), gap filling, and translation both from English into Italian and from Italian into English. I received only a single grammatical tip over the course of my study. In sum, I found duolingo to be rigidly inflexible in terms of progression options, socially vacuous, and, frankly, boring. My learning focus was broken with irritating regularity. I was bombarded with extraneous ads; gamified points or, worse, demerits; duolingo birds cheering me on, and all nature of interruptions that detracted from the task of language learning. The result was high frustration and low reward.

I did not find the gamified points-earning elements motivating or supportive of my aims, which were to learn Italian, not to maintain a heart health meter, earn XP points, or receive formulaic congratulatory messages for miniscule achievements in memorization. The app's announcement that I was now 4% fluent in Italian had me simultaneously howling with laughter and terrified for millions of hopeful language learners believing that being able to verbalize a few semantically questionable sentences, e.g., "You eat sugar," learned totally outside of any social context, equates to a calculable degree of linguistic fluency.

The app was frustrating (though admittedly comical) to use for vocal practice (e.g., dictation and vocal repetition exercises) in that the microphone feature did not work well without a headset. Repeating words while in the backyard captured birdsong, children's play, traffic noise, and general street clatter, and cost heart health points in failed vocalizations. In other words, the built-in vocal exercises required a quiet location. The inflexibility of the microphone feature is not merely a quibble; the reduced utility indexes compromised mobility in what is intended to be mobile language learning. If, as Guo (2014) suggests, mobile learning is part of a mobile lifestyle, then duolingo as a representative MALL app is, in fact, significantly less mobile than theory would predict.

Memrise

The notion that flashcards are a valid strategy for language learning in the 21st century

reopens discussion on the place and utility of behaviorism in language learning. Lightbown, Spada, Ranta, and Rand (1993) explain, "According to behaviorists, all learning, whether verbal or non-verbal, takes place through the same underlying process, habit-formation" (p. 23). Bruner (2004) questioned the fit of behaviorism to the complexity of linguistic communication, noting that even Pavlov himself could not abide the idea that people learn as dogs do, by conditioned response to a physical stimulus. Yet, the popularity of top-selling *flashcard - SRS* language program, Memrise, makes clear that the question of whether and how behaviorism can plausibly account for language learning must be again raised.

The *about us* page for Memrise begins with the word *science*, which the online tool's creators state is the first of three important ingredients contributing to Memrise's methodology, along with *fun* and *community* (Memrise, n.d.). Memrise was launched in 2010, founded by Oxford University graduate and "Grand Master of Memory" (Barry, 2012, para 7), Ed Cooke who teamed up with Greg Detre, a Princeton University computational neuroscientist, specializing in the science of memory and forgetting (Nicklas, 2017). The app plugs the science of spaced repetition as the learning principle behind its MALL app. According to the apps' *About Memrise* screen, Memrise offers multiple subjects for learning from geography to pop culture, which positions languages as subjects on the Memrise app.

The spaced repetition memorization system is gamified in terms of points won for test scores, moving successful learners up levels with in-house labels, such as *Memtor*. There is also a crowdsourced mnemonic creation feature. Wu (2016), who used Memrise experimentally with American college-level students learning Chinese characters, asserts that Memrise's crowdsourced vocabulary feature, which "not only allows users to create their own lists, but also allows users to create their own "Mems" – mnemonic units such as animated gifs, images and unique explanations, and share them with other users" (Wu, 2015, p. 47), gives learners a sense of ownership in their learning.

In Wu's (2015) study, using Memrise helped students learn Chinese characters. This makes sense, given that Chinese logograms—whether traditional or simplified—require language learners to memorize stroke order and placement, at least to the point where Chinese radicals can be semantically recognized. Learners of Chinese who have an English language and literacy background would require far more memorization for literate study of Chinese than they would for study of Italian, for instance, where their pre-existing knowledge of the Roman alphabet can be mobilized.

Memrise's fundamental assumption is that languages can be learned through rote memorization of decontextualized vocabulary. That languages are viewed as subjects harks back to the 1970s, when early theories of *communicative competence* (Campbell & Wales, 1970; Hymes, 1972) were repositioning language from an abstract structure with forms to be learned towards a social medium with communicative functions to be put into social practice. According to Brown (2007), "Today virtually no one would agree that Skinner's model of verbal behavior adequately accounts for the capacity to acquire language, for language development itself, for the abstract nature of language, or for a theory of meaning" (p. 36). Nonetheless, the Memrise app is indisputably popular, so I *memrised* a programmed progression of Italian vocabulary.

Memrise opened with an introductory screen in English asking for my basic demographic data. The app assured privacy of information, but this made me wonder why my demographic details were sought. The flashcard system, as expected, drilled vocabulary items and phrases via oral and written repetition. Most motivating were the short video clips of real people of different ages and sexes (implying native speakers in situ as phonological

models) speaking the word or phrase to be memorized, though the social or grammatical context for the particular phrase or word was sacrificed to an Italian streetscape. As I progressed, the screens were increasingly punctuated with offers of premium upgrades for faster vocabulary learning. A *difficult words* feature was unlocked as an enticement, but the first word presented was *buongiorno* (good morning), which hardly qualified as difficult or even lock-worthy as I had already done countless repetitions of *buongiorno* in speech, and letter-sorting spelling. This one word apparently constituted the entire difficult vocabulary list, as I was then presented with a page offering a discounted upgrade.

As I graduated to little phrases, which were introduced without grammatical explanation, I became bored with the endless memorization task. The distractors used for multiple choice tests of drilled words and phrases were hopelessly poor—for example, *buongiorno* (good morning) offered: "in this day and age…, the laundry, Japan"—rendering the tests ineffective. The correction for incorrect spelling was more forgiving than duolingo's penalizing heart health meter, but I found the piecemeal, inflexible vocabulary memorization grounding the app's pedagogical design anything but intrinsically motivating, communicatively interactive, or constructive of proficiency in Italian beyond decontextualized words—likely to be confused in actual sociocultural context, (e.g., Do I say *prego* or *grazie* when the server brings food?).

MALL APPS AS MOBILE LITERACY?

Because I was focused on my own engagement with these apps, I did not explore when and where such apps were used by MALL consumers, which would have provided very interesting data on how apps intended as part of a mobile lifestyle are actually threaded into others' living literacies. I did find, however, that 7 out of 8 participants in my small app test case study downloaded a language app that they then did not bother to use for even up to one hour in a six-week period.

Neither duolingo nor Memrise were conducive to mobile use in my autoethnographic study of learning Italian. Duolingo ported across devices and time zones, but neither app could be used in a social situation, given the inherent requirements of vocalizations and oral drill responses that were just plain embarrassing in a public place, such as on a bus or in a waiting room. Moreover, verbal responses were distorted by environmental noise, so I could not even practice my Italian in a public place that offered a modicum of privacy, such as a park. In the case of duolingo, my progress was actually penalized when my vocal responses were distorted by background noise. I was, as such, limited in where I could comfortably interact with my MALL apps, and discovered that I had to carefully situate what was intended to be a mobile practice. The MALL apps examined in this study thus did not integrate mobile literacies, but were instead portable, pedagogically inflexible packages. This is a missed opportunity in m-learning.

CONCLUSION: THE MEDIUM IS ^NOT THE MESSAGE

Many people would be disposed to say that it was not the machine but what one did with the machine, that was its meaning or message. (McLuhan, 1964/1965, p. 7)

This sentence appears in the opening paragraph of the chapter entitled, *The medium is the message* (McLuhan, 1964/1965). Over 50 years after McLuhan's projection of the

technological extension of humankind, we live in a technologically-infused society in which hybridized online-offline multimodal communication is accessible on-the-go via wireless connection. Digital devices, though, must be operated by people to be useful: the device on its own is simply an object. Working with a device technologically extends the individual's potential, but it is indeed what one does with the machine that is the message.

What one does with the machine varies greatly in MALL. This essay examined how language, communication, and language pedagogy were theorized, enacted, and assessed in four top-ranked commercial MALL apps. The popular apps examined, viz., duolingo, Babbel, busuu, Memrise, are programmed to use the learner for profit, whether through marketable data-mining, product advertising, or financial subscription. In return, the learner receives an inflexible program that provides easily accessible though boring, thinly gamified, poor quality lessons, using dated, memory-heavy pedagogies, which are, admittedly, easier to program than a theoretically sound, professionally-orchestrated, communicatively interactive m-learning resource.

The second question motivating this study was whether language teaching in MALL environments had kept up with new paradigms of digital communication. How did the medium, i.e., the globally-connected mobile digital device, impact the message, i.e., the language and method by which it was imparted to learners? Overall, the results of the investigation indicated that top commercial MALL apps overwhelmingly offered dated grammar-translation courses (duolingo, Babbel, busuu), followed by, and including, flashcards (Memrise). Generally, the proprietary, self-contained content-based language teaching of all four apps embraced defunct pedagogies of the 1950s and 1960s, and structural models of language, rather than exploiting Web 2.0 communicative competencies (Lotherington & Sinitskaya Ronda, 2014); plurilingual, multimodal, collaborative textual creation (e.g., Lotherington & Paige, 2017); collapsed oral-literate spaces and networked publics (Stewart, 2016); or augmented reality applications (Holden & Sykes, 2011; Pegrum, 2014). Though apps liberally utilized gamification strategies in the shape of points won and lost for successful achievement tests, this in no way equates to the immersive gaming pedagogies of MMORPGs (Reinders, 2012; Sykes, Reinhardt, & Thorne, 2010) and 3D virtual worlds (Berns, Gonzalez-Pardo, & Camacho, 2013).

There was, however, some implementation of contemporary digital discourses and affordances. Memrise had a crowdsourcing vocabulary feature that kicked in at higher levels. Busuu utilized social media to connect learners of complementary target language backgrounds, though not particularly effectively or reliably. Memrise and duolingo used gamification strategies to motivate learners to continue, though these I found distracting to the project of language learning and supportive of an unnecessary winning and losing mentality. Multimodal presentation was in evidence in GIF-like video clips of words and phrases in Babbel and Memrise, though communicative feedback predominantly anticipated discrete skill responses. Sadly, this assessment echoes Godwin-Jones' (2011) evaluation of MALL in the early days, where "for the most part uses of mobile devices were pedestrian, uncreative, and repetitive and did not take advantage of the mobility, peer connectivity, or advanced communication features of mobile devices" (p. 7).

On the whole, the commercial content-based MALL apps explored in this essay offered poor instructional content, dull exercises, and inflexible, lock-step course progression— hardly the stuff of the century we live in, nor of the radically changing shape of language and literacy in the mobile, digital economy.

But What One Does with the Machine…

MALL apps are not substitute teachers. Design-based learning offers a course correction in the imperialistic march of technologically deterministic apps attempting to commercially gamify language learning. This requires teacher activism: teachers cannot afford to be pliant consumers in a marketplace where their professional authority is being side-stepped by app developers, whose (not always upfront) priorities to earn money and harvest information are shaping language pedagogy. In a straightforward iteration of design-based learning, teachers can strategically weave existing apps into customized language courses. Wu's (2016) use of Memrise for Chinese word memorization in an American college Chinese writing course shows how a flashcard app can be incorporated into a language course, used for specific purposes. Likewise, Alm's (2016) sophisticated design-based study of Spanish indicates how apps and technological facilities, such as the default language on a mobile device, can be threaded strategically to suit learners' growing proficiency demands.

A more dynamic and proactive design-based approach can be seen in the design of augmented reality (AR) trails for language learners, such as Holden and Sykes' (2011) *Mentira* AR trail for Spanish language learners in the United States, and Pegrum's (2017) AR trails for ESL learners in Asia. These AR learning trails model a progressive movement away from stale 20th century four skills paradigms. Pegrum's (2017) AR trails, for example, incorporate contemporary social media tools, multimodal communication, and production pedagogies (Thumlert, de Castell, & Jenson, 2015), such as video-making, that capitalize on a moving landscape. Design-based MALL puts into practice Kern's (2014) argument that "the dynamics of online language learning call for a relational pedagogy that focuses on how medium and context interact with language use" (p. 340).

Design-oriented approaches to MALL are mobile; they utilize professional understanding of living literacies and contemporary pedagogies. Language teaching professionals need to be aware of the affordances and limitations of mobile technological interfaces, social landscapes in the digital ecosphere, and the changing communicative competencies these demand. Teachers and teacher educators need to incorporate mobile devices in thoughtful, creative pedagogies to forge relational pedagogies (Kern, 2014), and to invest in agentive production pedagogies (Thumlert, de Castell, & Jenson, 2015). Policy makers and educational administrators need to recognize and work towards aligning curricular, teaching, and testing goals with contemporary communication skills and the technical media of this—not the last—century. This is particularly appropriate in the case of standards and assessment vehicles that currently have no space for innovative creative activity as part of the accountable success of learning. Finally, app developers need to be called out for their capitalistic hawking of poor pedagogies: their *users* are *learners* and they owe them sound theoretical validity, informed pedagogical practices, and contemporary language competencies.

Embracing apps uncritically invites technological determinism, and undermines theoretical and pedagogical relevance. We don't need nostalgic, impoverished pedagogies from a half-century ago; we need to build pedagogies that take advantage of new media affordances in constructive and imaginative ways. It is, in McLuhan's 1960s parlance, what we do with the machine that matters.

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