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Ed.D Thesis

Exploring the use of MALL with a scaffolded multi-sensory, structured language approach to support development of literacy skills among second-chance EFL learners at a technological-vocational secondary school in Israel

Fern Levitt

Supervisors:
Principal supervisor: Dr. Jo Westbrook
Second supervisor: Dr. Nigel Marshall

University of Sussex
Dept. of Education & Social Work
Centre for International Education
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Abstract

This thesis describes a qualitative mixed-methods study carried out in a vocational-technical secondary school with second-chance adolescent learners of English as a Foreign Language (EFL) in a peripheral area of Israel. The learner population was characterized by complex, socio-economically disadvantaged family backgrounds and a high rate of learning disabilities. The study investigated the effects of a Mobile-Assisted Language Learning (MALL) intervention to support the development of basic EFL literacy skills by students who lacked solid foundational English skills. The intervention provided an interactive educational software application, The English Club™, on iPod Touch devices to scaffold learning and review of letter sounds and rules of English, integrate them into words and texts, and practice reading, writing and comprehension. Learners developed literacy skills depending on the level they reached in the application. The English Club follows a scaffolded Multi-Sensory Structured Language (MSL) approach, adapting for struggling EFL learners the Hickey Multi-Sensory Method (Combley, 2001), developed by Kathleen Hickey of the British Dyslexia Institute. Printed books containing the material complemented the use of the MALL. The English teachers at the school chose the learners who participated and determined how to integrate the intervention into their English classrooms. An investigation of the teachers' roles was included in the study.

The methodology was primarily action research with case studies of individual learners and teachers. Pre-intervention and post-intervention data on learners' English knowledge, skills, attitudes and opinions and on teachers' attitudes and opinions about use of this MALL intervention was generated via skills assessments and semi-structured interviews. As a participant-teacher-observer, I observed the intervention's use in classes and in sessions with individual students.

Changes in skills, attitudes and opinions were analyzed in the framework of Vygotsky's theories of language acquisition and the Zone of Proximal Development as elaborated in Scaffolding Theory. Theories of motivation, literacy and second language acquisition, and how struggling learners experience these, have provided additional lenses for analysis. My goals in performing this study were to understand in depth the whole picture of the intervention, both its effects on students' English skills and attitudes, and the factors that shaped these outcomes. The study's findings contribute to an understanding of the ways in which delivering a scaffolded MSL approach to literacy education via MALL can contribute

to addressing the world crisis in literacy acquisition, and issues that must be addressed for this type of intervention to be effective.

Findings showed that learners who actively engaged in the intervention made significant progress in their English literacy skills, increased their confidence in their ability to learn English and thus their willingness to engage in learning, and demonstrated increased awareness of the connection between their own investment of effort and learning. This success was shaped by many factors, including variation among individual learner profiles, the degree of teachers' support for the intervention, increasing students' motivation to invest effort, minimizing disruptions to the students' learning routine, and maximizing access to charged, working devices and to books. The individual MALL delivery platform enabled an untrained, inexperienced but committed teacher to provide the benefits of this scaffolded method, appropriate to her learners' needs, in multi-level English classrooms and to provide a solution for students returning from extended absences to catch up with missed classwork.

Recommendations for policy and practice include use of such scaffolded MSL MALL applications with struggling language learners in conjunction with printed materials and closely accompanied by committed teachers, who do not have to be highly trained in specialized methods to support learning by struggling students. Schools engaging in such interventions need to ensure that the devices will be fully available for use during learning hours, minimize disruptions to the class schedule, and maximize students' use of the MALL app and books in class, during free time at school, and at home. If necessary, extrinsic rewards should be offered to overcome students' learned helplessness.

To my children and grandchildren,
whose language development has fascinated me daily
and who have provided me the delightful opportunity
to participate in, observe and better understand the process
of how humans learn oral and written language

My thanks to the research participants who
welcomed me into their school
and enabled me to complete this study.

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List of abbreviations and acronyms

ADD – Attention Deficit Disorder

ADHD – Attention Deficit Hyperactivity Disorder

Bagrut – Israel Ministry of Education High-School Matriculation exams and qualification

CALL – Computer-Assisted Language Learning

CAS – Critical Analytical Survey

CBS – Israel Government Central Bureau of Statistics

EFL – English as a Foreign Language

ELL – English Language Learning (Learner)

ESL – English as a Second Language

L1 – native language, mother tongue

L2 – second or additional language

L1-50 – Levels 1-50 of The English Club intervention materials

LD – Learning-disabled

MALL – Mobile-Assisted Language Learning

MDG – United Nations Millennium Development Goal

MoE – Israel Ministry of Education

MSL – Multi-Sensory Structured Language

OCR – Optical Character Recognition

RQ – Research Question

SDG – United Nations Sustainable Development Goal

TPCK – Technological, Pedagogical, and Content Knowledge

ZPD – Zone of Proximal Development

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Chapter 1: Context and Rationale

1.1 Rationale

This research investigated the potential of a new Multi-sensory Structured Language (MSL)-scaffolded Vygotskian Mobile-assisted Language Learning (MALL) tool to effectively address the literacy-acquisition needs of struggling language learners. The study explored the use of the tool with adolescent English as a Foreign Language (EFL) learners, though the principles can apply to learning any phonetic language (Abadzi, 2014). Scant research has investigated whether this new platform can effectively deliver a proven literacy-acquisition approach, helping learners to read, write and comprehend from the most basic to a more advanced level, and which factors support learners' successful use of such a tool over a substantial period of learning.

Literacy acquisition for struggling learners is an urgent need, the solutions to which are pressing but evasive. Addressing this need increases social equity and will help open the rich world of English literacy, and possibly literacy in other languages, to learners who would otherwise have little probability of accessing it. Literacy is an important skill in the modern world, a powerful form of cultural capital and an economic asset providing many life advantages:

> (L)iteracy is defined as 'the ability to understand, evaluate, use and engage with written texts to participate in society, to achieve one's goals and to develop one's knowledge and potential' (OECD, 2013a). Literacy is conceived as an activity with a purpose and social function (UNESCO, 2016, p.281).

Literacy is a continuum. But even when literacy instruction is available, learners are not equally gifted in language learning. Even after years of classroom instruction, many learners find it difficult to master basic literacy skills in their first language or in additional ones. UN Sustainable Development Goal 4.5 notes the need for equal access to education for people with disabilities and Goal 4.6 states, "By 2030, ensure that all youth and a substantial proportion of adults…achieve literacy" (UN, 2015, p. 21). SDG Goal 4 sharpens and concretizes the earlier UN Millennium Development Goal 6 for universal enrollment in primary school that recognized the importance of literacy skills to citizens of the modern world (UN, 2001, p. 56), but did not address the issue that enrollment does not ensure successful learning outcomes. Many students today do not attain even basic literacy skills in their first language (Pritchett, 2013; UNESCO, 2014). Among those who often do not master literacy and other skills at the desired grade level are learners with special

educational needs. These learners require specialized attention and instruction to enable them to acquire literacy. Differential instruction, tutoring of individuals or small groups and adjusting curriculum to the learning needs of students are suggested approaches to ameliorate this problem, but these approaches often remain unimplemented as they require more extensive teacher training and a higher teacher-student ratio.

Freire (1998; & Macedo, 2013) emphasized the importance of empowering learners with skills in the dominant language of their society. Literacy in English, the current lingua franca, enables learners to participate in the global conversation and knowledge economy (Warschauer, 2000). In Israel, the research context, English as a Foreign Language (EFL) is a required school subject for this reason, but English is the second or third language studied by most public school learners, and many learners experience difficulty in acquiring English literacy, largely because the character set, writing direction and vocabulary is unfamiliar to them (Kozulin & Garb, 2004). EFL learning is further complicated for learners with specific language learning challenges. The 10% drop in standardized EFL testing results in recent years (MoE/RAMA 2016) has triggered renewed attempts to improve EFL learning of the population, with increased emphasis on spoken English, for both normative and special education students (MoE, 2016). Israel's complex post-colonialist attitude toward English and its socio-economic class role cause many to view EFL studies for struggling learners as a luxury, in direct conflict with the Israel MoE's positioning of English as a core subject required for a full high school matriculation diploma (*Bagrut*) (Psychometrics, 2014). Struggling English learners from low SES backgrounds typically do not have access to the private tutoring that would help them attain the skill level required for even the most basic English Bagrut exam. Therefore, inability of struggling learners to pass the basic EFL Bagrut is a barrier to obtaining a full Bagrut high-school diploma that would qualify them for better employment opportunities and tertiary education.

Different learners require different approaches to literacy instruction to optimally meet their learning needs, but often, educational systems teach to a theoretical average student. This reality does not provide an appropriate education for the estimated 30% of learners with specific organic language learning issues (Marks & Ainley, 1997; Hempenstall, 2005; Orton-Gillingham, 2012), or those who, due to environmental factors, need a specialized literacy-learning approach (Owens, 2010).

Multi-Sensory Structured Language (MSL) approaches to literacy instruction, which include systematic phonics and explicit teaching of rules of language, have been found to be extremely effective in meeting the learning needs of reading-challenged students (Chall, 1983; NRP, 2000; Shaywitz, 2003). Optimally, all struggling literacy learners would have access to MSL-trained literacy teachers. However, it is costly and complex to train all language teachers in approaches particularly appropriate for challenged learners, when whole-language or whole word literacy-teaching approaches more rapidly meet the needs of students with no specific challenges. Resource-strapped schools often lack trained personnel and sufficient teaching hours to allow teachers to work with smaller groups of struggling learners or to individually tutor students. Multi-level classrooms, in which students of the same age and grade have widely varying Zones of Proximal Development (Vygotsky, 1978) and skill levels, therefore require differential instruction to successfully scaffold student learning (Bodrova & Leong, 2007). This challenges teachers, who would need well-developed classroom management skills to work with differentiated ability-level groups according to individual needs (Diller, 2007). Grouping and instruction of learners by level, including the term "remedial," is itself contested (Dunne et al., 2011). These concerns complicate the implementation of differential teaching approaches to address learning needs of students who are underprepared to meet grade-level expectations.

This study addresses a serious research gap regarding the potential of MSL-scaffolded MALL to provide an economical alternative delivery mechanism for specialized literacy instruction when trained teachers and funding for teacher training are unavailable. The current study was prompted by a gap in the literature regarding use of MALL with this learner population and my desire to explore the use of this tool to address educational problems I have observed in my professional practice and found corroborated in the literature (examples below), summarized as:

- Teachers and parents are often unaware that effective MSL approaches to compensatory language teaching exist or do not have access to teachers knowledgeable in these methods, (e.g. Bronfenbrenner, 1986; Connolly, 2004; Kozulin & Garb, 2004; Kieffer, 2010 & 2011; Menahem, 2011);
- Not enough language teachers are trained in MSL techniques that support struggling learners, (e.g. Carreker, 2010; Goldfus, 2012; Roffman, 2012; Fuchs, 2017);
- There are insufficient resources for one-on-one instruction by trained teachers, the most effective way to improve literacy outcomes for struggling learners (e.g. Bloom, 1984; Schwartz et al., 2012; Belland et al, 2015);

- Intervention to address reading problems is most effective when it occurs early (Otterloo et al, 2009; Snowling et al., 2000; Shaywitz, 2003; Reid, 2011) , but the heterogeneous, multi-level classrooms in Israel, where EFL classes are not typically grouped by ability and skill level until junior high school, and teachers are not generally skilled in managing multiple learning levels in class (see Diller, 2007) do not support language learners at their own levels and paces (e.g. Ayalon, 2004; Davidovich-Weisberg, 2013; Hellerstein-Yehezkel, 2013);
- Learners need to hear the target language spoken by accurate speakers, also away from the classroom, (e.g. Carter, 2001; Mitra et al., 2003; Al Riyami, 2016);
- Paper materials and cards are clumsy to manage and get lost and damaged,
- Making mistakes in public (e.g. in class) is humiliating to learners, (Lavoie, 1989; Levine, 2003; Dunne et al., 2011);
- Learners who have experienced failure are not confident that their efforts will result in success, thus are often unwilling to engage seriously in further attempts at language learning (e.g. Stanovich, 1986; Gambrell, 2011; Klauda & Guthrie, 2015).

One MSL approach for teaching beginning literacy skills to English learners is the Hickey Method (Combley, 2001), developed in the U.K. by Kathleen Hickey, past director of the British Dyslexia Institute, and adapted for EFL learners in Israel (see Appendices 10-18). After experiencing the effectiveness of this method with my own students and those of teachers I trained, I observed that the main limiting factor in reaching more learners who need this approach was the amount of teacher training required.

The recent development of mobile digital technology in the form of smartphones and tablets provides potential new avenues for providing the MSL approach. Mobile phones have rapidly become widespread, relatively affordable and available in the majority of the developing world (Sanou, 2016) and provide a vehicle to deliver literacy instruction and a platform for practice that can reach many learners where trained teachers in MSL approaches are unavailable (Trucano, 2010; Kalemis, 2011; Trucano, 2013). Laptop computers may also provide an affordable, accessible and widespread platform by which to support learners with such an approach (Hutchison et al., 2012; Chen, 2013). In 2007, when the first smartphone became available, its screen was precisely the size of the colored flashcards Hickey teachers handwrite for learners. This was the catalyst for my creating an iPhone application called *The English Club* (ported also to Android devices since this study). It enables the EFL learner to read, write, spell, pronounce and comprehend the most

common and important English words. Using technology as a vehicle was intended to increase access to an effective learning approach.

However, the use of technology in education is not a panacea (Warschauer, 2002; Selwyn, 2010a & b; Byrd & Caldwell, 2011; Baroudi & Marksbury, 2013; Kam, 2013) , and the literature on the use of MALL for supporting EFL learners (see Levitt, 2013b) reflects important debates about educational technology use generally. Kam (2013b) reports that a co-panelist at a conference asserted that technology has never been proven to improve educational outcomes, a very basic debate on which Kam says we will have to "agree to disagree." Debates about the efficacy and effectiveness of educational technology in general are the backdrop against which use of MALL needs to be evaluated. Among educational-technology commentators are many who advise sober and objective evaluation of the use of educational technology (e.g. Gater and Wood, 2014, Selwyn, 2010b, 2010a & 2011, Schacter and Fagnano, 1999, Stevenson, 2011), and caution against an overly enthusiastic belief in its powers. Some claim educational technology has been hyped and romanticized (Lefebvre, cited by Selwyn, 2010b, p. 12). Skepticism about technology use, including m-learning, in education, raises questions including: does it add anything? can't teachers do the job better? aren't printed sources better than digital technology? doesn't it distract from learning? isn't private industry pushing technology for their own profit motives? is use of edtech cost-effective for the developing world? and more. Issues around the impact of educational technology informed my research questions. The effectiveness of each educational technology intervention must be explored in depth, as posited by DFID's Gater and Wood (2014):

> …more independent research is needed to understand the effectiveness (or lack thereof) of edtech interventions for learning… we need to rigorously evaluate programmes in different locations and different contexts, in order to learn from what we are doing and apply interventions that work in other situations. To understand the minutiae of exactly which component of an intervention works is more valuable than simply concluding that it does work, as it may not be the technology itself which is making the difference, but the comprehensive package of training, management and resources around it (p.1).

This call for research on underlying components of edtech interventions suggested to me a critical realist approach enacted through action research. Gater and Wood's call encouraged me that such a study in my field of practice would provide a substantial contribution to knowledge. This study grew from that impetus.

1.2 Substantive Aims

The substantive aims of this research were:

- to explore the effects on struggling EFL learners of an intervention involving MSL-scaffolded MALL, accompanied by teachers and books with the same MSL approach,

- to understand how the intervention affected these learners in terms of their skills, attitudes, and motivations, and

- to explore the factors that shaped these outcomes, including the teacher's role in implementing the educational intervention.

The intervention employed in this research can be described by the following technical, pedagogical, and content knowledge (TPCK) specification (Mishra & Koehler, 2006; Angeli & Valanides, 2009; Koehler & Mishra, 2009):

Technology: iPod Touch 4 mobile devices containing a multimodal, interactive MSL-scaffolded MALL application, *The English Club*. The devices were individually assigned to each participant and remained in their possession for the duration of the study. The learners and teachers also used printed books containing the same material.

Pedagogy: explicit, scaffolded MSL instruction following the Hickey Method, building from letter-sound correspondence and English rules to word-reading (regular and exception words) to short meaningful texts, incorporating illustrations and animations to enhance comprehension.

Content Knowledge: *The English Club* (Levitt, 2017a), a set of MSL-scaffolded materials incorporating the most common English words. The 50 levels of material contain about 1,000 vocabulary words and 40 rules of English, learned individually and in meaningful connected texts, accompanied by illustrations to illuminate meaning. (See Appendices 11-18.)

1.3 Research Questions

The research questions (RQ's) for the current study grew out of the literature and my professional practice and were motivated by Gater & Wood's (2014) above call for edtech research. These questions guided the intervention design, including teacher, MALL and printed book components; the data generation methods and the analysis of findings.

Overarching question: What are the factors shaping the effectiveness of 'The English Club' approach, curriculum, and MALL EFL app in the context of classes of non-readers or weak readers in a high school for second-chance adolescent learners in a peripheral part of Israel?

RQ1: How does the use of this MSL-scaffolded MALL app and content affect the skills, motivation, confidence, and attitudes toward EFL learning of non-reader or weak reader adolescent EFL learners with a history of failure?

This question explores the outcomes for the learners, both cognitive language skills and affective outcomes, of using the intervention and aims to develop insight into the factors that influence these outcomes.

RQ2: How does use of the MSL-scaffolded MALL intervention affect the EFL teacher in terms of their role, their practice and their classroom management in the context of a multi-level class of struggling adolescent non-readers or weak readers with a history of failure?

This question acknowledges that MALL apps, used in a school setting, influence the teacher's role. As MALL provides some teaching tools previously otherwise provided, it affects the way the teacher manages, teaches, motivates, plans, and evaluates her classes.

RQ3: What are teachers' views on using a pre-determined and self-contained EFL curriculum delivered via MSL-scaffolded MALL in classes of non-readers or weak readers with a history of failure?

This question explores teachers' reactions, opinions and perceptions about using this new tool with their struggling learners, and factors they see as influential, e.g. their opinions about how it meets learner needs, perceived differences from other printed materials, tradeoffs with constructing the curriculum themselves, and differentiation of their multi-level classes.

RQ 4: How do school decision-makers weigh the costs and benefits of alternative solutions that might improve English learning outcomes, including resource allocation for investment in digital technology, and evaluate the cost-benefit tradeoffs of edtech solutions?

This question seeks to foster insight into how the MALL intervention is adopted, viewed, and evaluated as part of the wider school setting, and what factors are pertinent to this process.

1.4 Overview of Research Approach and Intervention

I investigated this intervention through a mixed-methods action research study emphasizing qualitative methods. I sought to develop an in-depth understanding of the salient factors that shaped and influenced participants' English learning, how individual and combined intervention elements affected students' learning of English skills and their attitude toward English learning, and the intervention's effects on their English teachers' role.

Though planned for a full school year, the school was unable to commence the intervention until almost two months into the year. The intervention and research continued through the end of the school year (7-8 months). As this was action research, involving the spiraling cycle of planning, implementation, observation of results, reflection, and adjustments in the intervention (Kemmis, 1993; McNiff & Whitehead, 2011), developments during the school year caused adjustments to the intervention and contributed to an understanding of how to implement such an intervention effectively.

Participant learners were selected by their English teachers, who chose the non-readers or false-start readers (who, despite having studied English, were not able or confident enough to read even simple texts) in their classes. I provided each participant learner and teacher with an iPod Touch 4 mobile device, limited to use of the English-learning app in order not to distract the learners, together with a charger, cable, and earphones.

1.5 Context: Research Setting

The research was conducted in the context of a vocational/technical secondary school for second-chance (struggling or with a history of academic failure) ninth and tenth-grade learners (ages 13-17) in a peripheral area of Israel (see Appendix 24 for background on the role of English in Israel). The school was relatively small (250 students) with learners aged 13-19 attending from ninth or tenth through twelfth grades for three to four years of high school. Students are referred to this school when they have failed at least seven subjects in their previous schools. These learners have a high incidence of organic, diagnosed learning differences/disabilities, a record of academic failure in the school system, and a high

incidence of complicated and disadvantaged family backgrounds such as parents in prison, drug rehabilitation, or coping with psychiatric disorders. Some students come from homes without financial or organizational resources, and the school attempts to meet their academic, emotional, social, nutritional and transportation needs, e.g. all receive a hot lunch in the school cafeteria.

A high proportion of the students from this school do not sit for the Israeli high school matriculation exams, or Bagrut, but instead earn a credential attesting to completion of 12 years of schooling. This is pertinent to the current study because Israeli educational policy, resource allocation and teacher and student motivation are largely shaped by the expectation of whether the student will sit for Bagrut exams, and if so, at which skill levels (see Appendix 24).

The respected full high school matriculation diploma in Israel is typically earned at age 18 after 12 years of schooling and having passed the required Bagrut exams. Most exams range from 1-5 units of credit, with 1 the lowest and 5 the highest skill level in the subject. To obtain a full Bagrut diploma, learners must pass exams or complete comparable projects totaling 21 units, including at least the minimum-level 3-unit EFL Bagrut. Bagrut-track students usually have four weekly hours of English studies. Some of the research participants were expected to receive the less-demanding Technological Bagrut, granted to students who pass 15 units of Bagrut exams in subjects Hebrew, math, citizenship, and a technical profession (e.g. electronics) or a diploma that attests only to 12 years of schooling for those more academically challenged. Two hours per week of their EFL studies are funded by the Ministry of Welfare, and headmasters can add EFL hours at their discretion.

Addressing all the needs of the research participants was beyond the scope of this research, as theories of human beings' hierarchy of needs (Maslow, 1943) and the New Educational Environment approach (Sulimani, 2002) assert that, for learners to be sufficiently emotionally available for learning, their basic and psychological needs first need to be fulfilled. I explored those factors within the school environment itself that shaped the intervention's outcomes and effectiveness.

This school was a highly suitable context in which to investigate the intervention. The research participants were weak or non-readers who were not expected to take the English Bagrut at any level, as it is rare for learners who arrive at this school with such a significant lag in English skills to be sufficiently motivated to close the gap. As allocation of teaching

resources stems from expected 'return on investment,' the weakest learners are often assigned the least experienced English teachers. This greatly reduces the likelihood that learners will close the gap in English skills in time to attempt the matriculation exam.

The technological-vocational high school research setting

Spolsky & Shohamy (1999b) noted that "In the Israeli system, there are… 90 vocational schools (with about 15,000 pupils) supervised by the Ministry of Labour and Welfare" (p 82). This number has grown substantially. The network of technological /vocational high schools to which the researched school belongs (alias the TECH network) today has 128 middle and high schools, with a total enrollment of 40,000 (citation of TECH's website withheld to protect anonymity). The school where the research took place belongs to this network (see Chapter 3).

1.6 Thesis Structure

The remainder of this thesis is structured as follows:

Chapter 2 presents key concepts and theorizations guiding the research. Scaffolding Theory underpins my understanding of language and literacy learning and how learners acquire these skills in their native language (L1) and additional languages (here summarized as 'L2'), the issues for struggling learners, and the use of MALL technology in achieving these goals.

Chapter 3 presents the research methodology which combined action research and case study approaches and grew out of a critical realist approach to qualitative research.

Chapter 4 contains findings regarding human and environmental factors found to be significant to English-learning outcomes, and Chapter 5 contains findings relating specifically to the use of this MALL educational technology to achieve learning goals.

Chapter 6 discusses the conclusions of the research, its significance and contribution to knowledge, implications for policy and practice, and reflection on my own development as a researcher.

Chapter 2: Literature Review

Overview

This chapter reviews the literature on aspects of literacy development related to the learner population of this study, and the potential for supporting such literacy development through Mobile-Assisted Language Learning (MALL). The sub-topics related to this study guided my selection of literature and scaffolded the structure of this review. The topics, detailed below in my conceptual framework for the thesis, intersect at the nexus of this research, shown in Figure 1. The first section discusses how literacy sub-fields are viewed through the lens of Vygotsky's social constructivist approach to education and language, and his formulation of the Zone of Proximal Development, elaborated by subsequent researchers in Scaffolding Theory. Scaffolding theory is drawn on to explore both the necessary factors for learners to succeed in language and literacy acquisition, and how this success encourages motivation to actively engage in further literacy-learning activities that promote additional learning progress, with language learning viewed as a spiral of increasing skill level.

The next section discusses theories of reading development, with an emphasis on literacy in the learner's native language, L1. The third section discusses language learning difficulties that may disrupt the smooth process of literacy acquisition, and pedagogical approaches to overcoming them. Following this is an examination of how literacy acquisition differs when learning literacy skills in a language that the learner does not know and did not grow up understanding or speaking it (referred to here as L2), and a discussion of the double challenge when learners with language difficulties learn literacy skills in a language they do not speak nor understand. The following section examines the components and dynamics of motivation integral to effective learning efforts, particularly those specific to L2 learning, and the risk of learners reaching a state of amotivation. Last are discussions of the potential of multimodal MALL (Mobile-Assisted Language Learning) platforms, and their affordances that influence their usefulness as a mediating tool to scaffold and motivate language learning for L2 learners, the Hickey Method and how it addresses the reading issues in this chapter, and the relationship between these issues and social justice.

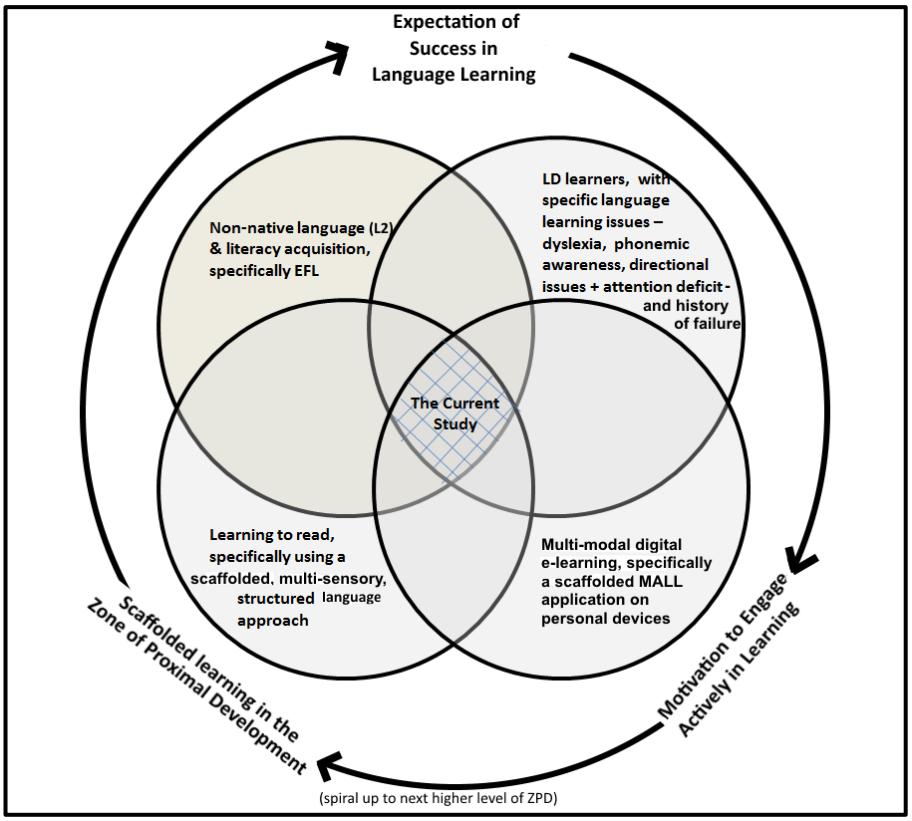

Figure 1: Conceptual Framework: The Nexus of Fields in the Current Study

Reading has many sub-components, and theories regarding them contribute insights that combined, as conceptualized in the above diagram, provide synergy in addressing the literacy problems raised in Chapter 1, in the tradition noted by Perfetti & Stafura (2014):

> The progress of 20+ years in reading research has been guided by specific problems and flexible frameworks more than by the testing of precise theories (p. 22).

2.1 Literature Review Methodology

This review's goal was to provide a theoretical framework for the research. To that end, literature was included that illuminated above-mentioned sub-topics, stemming from the research questions. I searched for literature addressing the overlap between literacy-learning, L2 learning, language-learning difficulties, use of educational technology to address these areas, and language-learning motivation, according to the steps outlined below. Some publications addressed only one of these topics, and some the intersection of several, but none addressed precisely the combination of sub-fields of interest in this study. I therefore adopted Pawson's (2006, et al. 2005) critical realist approach by examining the collective wisdom of many pieces of applied research, identifying the elements of relevance, seeking patterns in the factors influencing outcomes, and assembling a synthesis to create a

new conceptual framework. Concurring with Pawson, I have attempted to synthesize insights from the topic areas.

This literature review was conducted systematically. First, I revisited the literature discussed in my Critical Analytical Survey (CAS) (Levitt, 2013b) on the potential of MALL in literacy development for struggling EFL learners. I had then performed a systematic search through the Sussex Online Library, focusing on 2003-2013, of education subject guide databases for the intersection of search terms specifying technology, English, and level. A more extensive review of literature on reading theory ensued, and publications since my CAS were located by re-searching on all sub-topics in Figure 1, focusing on 2010-present. All literature was critically evaluated for research rigorousness, who performed it and where, research population, and type of study. I examined both classics by acknowledged, extensively-cited experts and limited-scope action research projects. Research surveys provided an overview of studies performed and remaining gaps. All literature reviewed was in English, with the entailed bias.

2.2 Vygotsky's Social Constructivism and Scaffolding Theory

Basic principles underlying Vygotskian social constructivism provide an overarching theoretical framework through which to view literacy education, premised on his view of how social (interpersonal) and cultural interactions construct the mind and thought. Language is central to cognitive development and thought (Vygotsky, 1986), and is both a means of understanding instruction and sometimes, as in the current research, the learning target itself. Vygotsky was especially interested in language and speech as being tools for thought:

> On the one hand, they are a psychological tool that helps to form other mental functions; on the other hand, they are one of these functions, which means that they also undergo a cultural development (ibid., p.xxx).

Language is evolving, as it develops in the context of the culture in which it is used, and in the interplay among cultures. Vygotsky's ideas on how language has given humans a unique tool with which to think, to communicate (including transmission of cultural knowledge), and to act on their thoughts- what he termed "higher mental functions" - have been the basis for much research since (e.g. see Hedegaard, 1990 ; Wertsch & Tulviste, 1992 ; Emerson, 1996).

Human caregivers begin talking to infants and attaching meaning to their gestures and utterances long before children express themselves through conscious language. Instinctual behavior, what Vygotsky called 'lower mental functions,' such as a caregiver's response to a hungry, crying infant, support the infant's emotional development:

> Vygotskians emphasize the importance of direct interactions between a child and an adult. They see the adult as the carrier of the cultural tools necessary for the child's future development (Bodrova & Leong, 2007, p.113).

The earliest development of language evolves through exchanges around objects, linking gestures to language, supporting and describing object-oriented and instrumental activity, supporting symbolic substitutions, and the use of language in make-believe play. By modelling language for the child, adults and peers provide socially-transmitted knowledge of the way language is used in the child's culture. This knowledge is the basis for the child's active and passive phonological language use, and this oral knowledge precedes the learning of reading and writing in L1 (Vygotsky, 1987).

Language gives us tools with which to think and to communicate with others and with ourselves and to construct our concept of reality, and language itself shapes our thinking. How we express what we think about differs among languages and cultures, therefore, in learning a new language, we must also adjust to new ways of thinking. Children construct knowledge at their current stage of development, with learning sometimes leading development, which is socially situated and culturally transmitted through guidance by knowledgeable experts:

> Vygotsky isolated four stages of "internalization" [of speech]: the natural or pre-intellectual stage, the state of naïve psychology, the stage of egocentric speech, and the so-called ingrowth stage (Emerson, 1996).

When the child internalizes or appropriates speech, they often engage in egocentric speech, or private talk aloud, the "direct outgrowth (or, better, ingrowth) of speech which had been from the start socially and environmentally oriented" (ibid., p. 131). This stage can be observed, e.g. in three-year-olds who talk aloud to themselves while attempting to solve a problem or perform a task (Vygotsky, 1986, pp. 16-17), with inward-directed speech allowing them to communicate with themselves and regulate their behavior and thinking (Bodrova & Leong, 2007). As development progresses, children tend to internalize that conversation, using language silently to structure their thought when attempting tasks and solving problems. Transmitted, supported acquisition of knowledge thus occurs at two different levels, firstly between people and then within the individual, as the learner

internalizes and integrates skills and information supporting "independent performance" of tasks to which they are first exposed by another person in the context of "assisted performance" (ibid.):

> Each function in the child's cultural development appears twice: first on the social level and later, on the individual level; first, between people (interpsychological), and then inside the child (intrapsychological) (Vygotsky, 1978, p.57).

Vygotsky observed that the use of physical and mental tools as mediators of the learning process is unique to humans. Language is a universal tool in all human cultures, enabling us to represent our thoughts in a symbolic form that extends our thinking, and necessary for the 'higher mental functions' that characterize humans (Ratner, 1991). Vygotsky proposed that psychological tools and their complex systems, acting as mediators to support humans in performing higher mental functions e.g. scaffolding new information, focusing attention, remembering, and calculating, include:

> language; various systems for counting; mnemonic techniques; algebraic symbol systems; works of art; writing; schemes, diagrams, maps, and mechanical drawings; all sorts of conventional signs; and so on (Vygotsky, 1981:p.137).

In this study, I seek to extend Vygotsky's concept of tools as mediators of learning, as Anderson (1993) did with computerized Intelligent Tutoring Systems, to MALL applications.

Of particular relevance to the language learning discussed here is Vygotsky's conception of the "zone of proximal development" (ZPD):

> [T]he zone of proximal development…is the distance between the actual developmental level as determined by independent problem-solving and the level of potential development as determined through problem-solving under adult guidance or in collaboration with more capable peers (Vygotsky, 1978, p.86).

ZPD learning requires a more experienced expert to guide a learner through a graduated, sequential series of learning tasks that may be recursive and circular (Tharp & Gallimore, 1988), each just enough of a stretch from learners' current skill level to challenge but not discourage them:

> (W)hat is in the zone of proximal development today will be the actual developmental level tomorrow – that is, what a child can do with assistance today she will be able to do by herself tomorrow (Vygotsky, 1978, p. 87).

Though he did not himself use the word, Vygotsky's view of the role of assistance in supporting learning in the ZPD became the basis for Scaffolding Theory. This metaphor was first employed by Wood, Bruner, & Ross (1976):

> The intervention of a tutor…involves a kind of "scaffolding" process that enables a child or novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts. This scaffolding consists essentially of the adult "controlling" those elements of the task that are initially beyond the learner's capacity, thus permitting him to concentrate upon and complete only those elements that are within his range of competence. (ibid., p.90).

Scaffolding is often done through one-on-one tutoring, a proven, effective means of promoting skill development. Bloom (1984) compared learning outcomes of individual tutoring to that of classroom teaching and concluded that about 98% of learners, taught individually, outscore the average of a class taught as a group. Educators face the challenge of effectively scaffolding instruction for groups as well as for individuals. Wood et al. (1976) applied scaffolding to literacy skills.

The Vygotskian approach encourages tutors and teachers to use language during tutoring to model the use of private speech, the increasingly internalized use of language in thinking through how to solve problems. Tutors can model the use of private speech for problem solving by conversationally naming aloud the steps that can be used to break down a problem, and then encouraging learners to themselves speak aloud an explanation of the steps of solving it. Labelling and describing actions aloud through language makes them verbally explicit, and ties language to actions to increase the chances that the learner will remember and internalize both the words and actions. Having the learner explain the process they are then using in performing a task checks their grasp of concepts and strategies (Bodrova & Leong, 2007).

Wood et al. (1976) noted the importance of the tutor's understanding of both the task and the learner's needs and performance characteristics, including cognitive development related to the task and affective needs. Tutors control frustration (making problem solving less stressful and risky with the tutor's support than otherwise) and avoid evoking learners' expectation of failure that discourages them from attempting tasks they believe beyond their capability. Wood & Wood (1996) suggest that frustration is controlled by neither leaving tutees to struggle with more complexity than they can handle, nor underchallenging them: "Quality teaching requires a sensitive and differentiated response to individual children" (Owens, 2010, p.118).

In the decades following the introduction of the 'scaffolding' metaphor, other researchers extended it by emphasizing the learner's active participation and engagement (Oxford, 1990; Klauda & Guthrie, 2015) and the need for 'contingent instruction' (Wood & Wood, 1996) whereby the amount of support offered fades as the learner develops independence.

Literacy engagement, the focus of this research, incorporates facets of time on task, affect, depth of cognitive processing, and active involvement (Guthrie, 2004). Vygotsky's concept of language as acquired through interaction with more knowledgeable experts and of the use of scaffolding to transmit this knowledge underpin my understanding of how to best support struggling EFL learners. These principles unify the rest of this chapter.

2.3 Literacy Theories

This section examines three of the overlapping areas of literacy depicted in the conceptual framework shown above in Figure 1: how learners acquire basic literacy, how this process differs for challenged learners, and how it differs for L2 learners. The section ends with an examination of the combined challenge, at the intersection of those areas, when struggling learners attempt to acquire literacy in a language they do not understand.

2.3.1 Reading Acquisition

Reading theories address how learners, typical and challenged, learn to read and write. Much of the literature addresses how learners acquire literacy skills in their native language (L1) (e.g. Goswami, 2008; Carlisle et al., 2010; Bowers et al., 2010, Dutro & Collins, 2011), with related sub-fields for learning to read in additional languages (L2) (e.g. Geva & Yaghoub, 2000 & 2006; Sparks et al., 2011; Dixon et al. 2012) and for struggling readers (e.g. Gough, 1996; Muter & Snowling, 2002; Connor, 2014). Though reading theories focus on interpreting written symbols (reading), the other language skills are closely related, and a fuller view of literacy situates reading in the context of all four multi-level language skills (see Table 1 for a simplified overview). These reinforce each other through various sensory channels to the brain. Individuals may display problems and/or strengths in any of these areas when learning to read. For literacy learning to be effective, it must systematically address all the language skills, at both the sensory or mechanical level (hearing-phonological; seeing-decoding symbols; touching-writing, encoding sound into symbols; speaking-pronunciation) and at the meaning level (comprehension and expression of meaning, receptive and productive) (Chall, 1967, 1983).

	Written Symbols	*Oral / Auditory - Speech*
Input	**Reading** • Decoding • Comprehension	**Hearing/Listening** • Phonological (phonemic) processing • Comprehension
Output	**Writing** • Encoding (forming letters, spelling) • Expressing meaning	**Speaking** • Pronouncing words • Expressing meaning

Table 1: Relationship among and Levels of
the Four Language Skills related to Literacy Learning

2.3.1.1 The Simple View of Reading: Decoding + Comprehension

Reading is a multi-level process, with the two most basic stages, decoding and linguistic comprehension, proposed by Gough & Tunmer (1986) in a balanced approach that recognizes the importance of both (Florit & Cain, 2011). "Decoding" or "phonological recoding" (Tunmer & Hoover, 1993) is the ability to accurately sound out text from its written form. "Comprehension" is the attribution of meaning to language's written or phonological form. Critics of literacy-teaching approaches based on the Simple View are concerned that schools place excessive emphasis on teaching of code-based skills, which are more easily observed and measured, and neglect essential, more extensive language skills requiring longer, more gradual gestation (e.g. Westbrook, 2009; Dickinson et al., 2010). Comprehension at more advanced levels involves not only word reading and vocabulary knowledge but background knowledge, ability to infer, and activation of comprehension strategies (Cromley & Azevedo, 2007). In addressing the language-learning issues of beginning learners (emergent readers) like those in the current study, I have adopted the Simple View as a useful model of how struggling L2 learners acquire beginning reading skills, while acknowledging that these early steps are insufficient for acquiring reading comprehension skills at more advanced levels.

Written language employs symbols (graphemes) to encode (represent in symbol form) spoken sounds (phonemes). Emergent readers first learn to associate sounds with written symbols – letters– that represent them. Once they can retrieve from memory the sound

that each grapheme represents, they can recreate the letters' sounds, blend them into words, then into textual strings of increasing length – connected phrases, sentences, paragraphs, whole texts – thus "reading" the text (Gough & Tunmer, 1986; Stanovich, 1986; Gough, 1996; Kuhn et al., 2010; Roffman, 2012). The ability to hear, isolate, and identify language sounds (phonological awareness) is critical to reading acquisition (Stanovich, 1986) and learners differ in this ability (Olson et al., 2014). Weakness in this area contributes to reading disabilities (Ganschow & Sparks, 2001; Kuhn et al., 2010; Snowling & Hulme, 2012a, 2012b).

Reading's first stage is learning to decode graphemes individually, then blend their sounds so that words are pronounced accurately, and, if their meanings are known, recognized:

> A beginning reader must at some point discover the alphabetic principle: that units of print map onto units of sound (see Perfetti, 1984). This principle may be induced; it may be acquired through direct instruction; it may be acquired along with or after the build-up of a visually-based sight vocabulary - but it must be acquired if a child is to progress successfully in reading. Children must be able to decode independently the many unknown words that will be encountered in the early stages of reading. By acquiring some knowledge of spelling-to-sound mappings, the child will gain the reading independence that eventually leads to the levels of practice that are prerequisites to fluent reading (Stanovich, 1986, p.363).

In English, an orthographically deep language, though many words follow regular patterns, "irregular" or "exception" (sight) words need to be memorized (Ziegler et al., 2010). Researchers argue the usefulness of teaching spelling and decoding rules and patterns in English (see Gates & Yale, 2011). Some (e.g. Clymer, 1963/1996; Johnston, 2001) claim that English contains so many exceptions to regular phonetic patterns, having 1,120 ways of writing 40 sounds (Hempenstall, 2005) that teaching patterns is of limited use. However, analysis of the "Top 500 Most-Used (English) Words" (Harwell, 2001) indicates that the vast majority follow patterns that can be taught to beginning readers (Combley, 2001).

Multi-Sensory structured language (MSL) approaches (e.g. Orton-Gillingham's Language Enrichment (LE) program (Ritchey & Goeke, 2006) the McGuiness Method (McGuiness, 1997) and the Hickey Method (Combley, 2001)) advocate explicitly teaching the regular sounds of letters and combinations, spelling, syllabification, and morphological patterns, and, in parallel, common irregular/exception/sight words. These provide English learners with tools (Vygotsky's "mediators," Bodrova & Leong, 2007) for spelling and decoding, enhancing comprehension by "facilitating the efficient and accurate storage and retrieval of vocabulary information" (August, 2011, p.20). Joshi et al. (2008) claim "linguistically explicit spelling instruction improves spelling of studied words and novel words" (p. 8) and

assert that 50% of English words are completely regular, 34% mostly regular, and only 4% completely irregular. Dolch (1948) composed a list of 220 sight words that comprised half of all printed English children's book text, which are often taught to beginning readers (see MoE, 2013; Graves et al., 2014). Morphological instruction particularly benefits readers of less ability (Bowers et al., 2010) and strengthens skills in orthography, phonology, and word comprehension (Carlisle, 2010).

Practice increases automaticity in decoding, characterized by effortlessness, autonomy, lack of conscious awareness and speed (Kuhn et al., 2010). Fluency and comprehension develop with increased automaticity and accuracy as learners progress from reading words to connected texts of increasing complexity (Samuels et al., 1992). Reading aloud supports fluency development, providing pronunciation practice with irregular words, connecting written and oral language, and strengthening word recognition and comprehension (Hempenstall, 2005).

2.3.1.2 Comprehension

Comprehension is reading's ultimate goal and deepens progressively, as automaticity frees the reader's attention, from literal understanding of words, sentences, and texts to deeper levels (Lesaux et al., 2006; Schmitt et al., 2011; Graves et al., 2014). Comprehension involves knowing the meanings of words (vocabulary knowledge), understanding sentence structure (syntactical knowledge), and understanding the subject (Stanovich, 1986) and these abilities differentiate more and less skilled comprehenders (Perfetti & Stafura, 2014), with variation among learners both in areas of knowledge and in the functioning of the various regions of the brain that process them (Hruby & Goswami, 2011).

Lovett et al. (2008) assert that first-language English students commence reading instruction with an estimated oral vocabulary of 5,000-7,000 words. Extensive reading increases vocabulary. Stanovich's (1986) examination of the "Matthew Effect" observed:

> Vocabulary grows from learning word meanings in context during reading … General and syntactical knowledge is also largely acquired through reading itself…. Many things that facilitate further growth in reading comprehension ability - general knowledge, vocabulary, syntactic knowledge - are developed by reading itself. …Such feedback effects appear to be potent sources of individual differences in academic achievement (p.364).

Negative experience in reading causes learners to avoid the very practice that would improve their reading comprehension.

Comprehension requires both accurate, automatic decoding skills and language knowledge:

> Decoding skills are underpinned by phonological abilities, whereas broader oral language skills (vocabulary, grammar and pragmatic abilities) underlie reading comprehension. The outcome of an individual's literacy development depends upon the status of the phonological and broader oral language skills that they bring to the task of reading (Snowling & Hulme, 2012b, p. 599).

When decoding skills are sufficiently developed, the learner turns attention to the meaning of what she is reading. Extensive reading develops comprehension at increasing levels.

As with fluency, there is a causal connection between vocabulary knowledge and reading comprehension. Texts are at an appropriate level of difficulty for the reader when they contain from 95-98% words that are understood (Schmitt et al., 2011). Scaffolding learning of vocabulary, syntactical and general knowledge in the context of increasingly complex texts helps learners to gradually increase their reading skill without overwhelming them (Kahn-Horwitz, 2016). Vocabulary knowledge is enhanced by reading words in context, as demonstrated by Nagy et. al. (1985) and by integrating formal, in-class learning and informal learning whereby students investigate language both individually and socially (Wong et al., 2012).

Pictures and visuals strengthen comprehension and enhance text meaning in this increasingly multimodal world, where literacy has extended to multiple media beyond text (Brice Heath, 2000; Kress, 2003; Westbrook, 2009; O'Neil, 2011). Inference-making, connecting ideas and information not mentioned explicitly (Cain & Oakhill, 1999) is a weak aspect of comprehension in unskilled readers. Poor comprehenders may be weak both in making inferences at all levels, local (coherence and gap-filling) and global (Kispal, 2008). Westbrook (2009) suggests reinforcing inference-making by providing readers with supplemental texts containing relevant, targeted general knowledge. Scaffolded discussion of text, guiding learners' attention to elements they overlooked, asking inferential questions, and supporting learners' formulation and answering of such questions (Persoff, 2016) supports attainment of deeper levels of comprehension.

In summary, reading instruction must reinforce ever-deeper levels of comprehension, from word meaning through literal and inferred comprehension at deepening levels. Reading instruction addressing comprehension, to be effective, should be in the ZPD, targeting the needs, skills, abilities and knowledge level of the learner at that point in their development.

2.3.1.3 Writing Reinforces Reading

Writing, a literacy skill in its own right, complements and reinforces reading. Issues in developing writing skill parallel those in reading, with the same cognitive processes

activated (Anderson & Briggs, 2011). Writing, too, occurs at multiple levels, starting from "encoding" sounds-to-letters, through combining letters into words, and words into connected texts that express the writer's meaning. Increased automatization of writing frees the learner's attention for expression. Word-writing, vocabulary and syntactical knowledge are foundational skills in composing and writing texts, reciprocal with reading (Clay, 2002). A firm grasp of a word's spelling also reinforces its meaning (Ehri, 2005). Spelling may be strengthened by the physical act of writing (or typing) the word, as "Proficient spelling in most alphabetic languages … may be reinforced through writing movements that bring kinaesthetic codes to bear" (Snowling & Hulme, 2012a, p.597).

In orthographically complex languages, including English, the same phonemes may be encoded using multiple graphemes. Learners with strong visual memory spell words correctly, obviating the need to learn patterns, but learners without this ability may have difficulty in creating text conveying meaning, and learning rules can improve skills. Spelling may remain difficult for very dyslexic learners (Reid, 2011). Rule knowledge makes spelling more predictable (Weiser & Mathes, 2011; Roffman, 2012; Wanzek & Roberts, 2012). Some spelling patterns are typically taught to both L1 and L2 English learners, but many are most commonly taught in MSL systems (Ritchey & Goeke, 2006; Carreker et al., 2007; Roffman, 2012). Irregular words require memorization.

In summary, at the word-level of writing, an important benefit of mastering spelling is improvement in reading skills, both decoding and comprehension. Systematic, explicit instruction in spelling supports both writing and reading skill development, at multiple levels of decoding/comprehension and encoding/expressing meaning.

2.3.2 Challenged Language Learners

Problems in language-and literacy learning can be due to organic factors, environmental factors, or both. This section will examine the sources and effects of impaired or delayed language and literacy development.

Reading difficulties occur in learners with profiles other than those with genetic dyslexia (Olson et al., 2014). Environmental factors that may contribute to reading difficulties include low socio-economic status (SES) backgrounds, ineffective reading instruction, quality reading instruction for which the learner was unready developmentally, lack of stimulation in early childhood resulting in deficits in linguistic or cognitive areas, abusive homes resulting in emotional issues, or a combination of these (Hruby et al., 2011;

Roffman, 2012). SES (including family educational level) affects language acquisition by determining the environmental influences to which the learner has been exposed, the learner's opportunities to use language (L1 or other), the parents' educational level and language stimulation of the learner during development of language awareness, e.g. Hoff & Tian (2005) posit that maternal education levels are a key factor in differences related to SES in children's language acquisition. They point out that:

> Children who are slower than average in acquiring language do not necessarily have any impairment in the mechanisms responsible for language acquisition. They may only have less supportive language learning experience (ibid:p. 276).

Language skills, in the Vygotskian view, affect not only spoken language ability but the available tools and skills for thinking and learning, which have implications for further skills development such as literacy learning. For example, among immigrants to Israel whose parents may not be literate in any language, but who have to learn academic EFL as a third language for admittance to tertiary education:

> [S]tudents from lower socio-economic status groups who do not experience English as part of their immediate environment have particular difficulty with the EFL matriculation exams (Kozulin & Garb, 2004, p. 66).

For these complex reasons, many students worldwide are not attaining even basic levels of literacy in their first language (Pritchett, 2013; UNESCO, 2014). Consistent estimates are that 30% of learners in the population at large have language-learning issues and are at risk of failure to achieve acceptable levels of literacy (Marks & Ainley, 1997; Hempenstall, 2005; Orton-Gillingham, 2012), with the rate higher for low SES learners (Owens, 2010):

> Too many children in America fail to achieve proficient reading skills and the rate is particularly troubling, close to 60%, for children living in poverty and who belong to underrepresented minorities (Connor, 2009, p.77).

2.3.2.1 Developmental Language Difficulties

Developmental language problems affect learners along a continuum, and are not limited to a specific disorder. Learning disabilities (LD), dyslexia (poor decoding skills/good reading comprehension (Sparks, 2015)), dysgraphia, weak memory, poor phonemic awareness, and RI (reading impairment, or problems in comprehension) interfere with the acquisition of literacy skills (Ganschow & Sparks, 2001; Snowling & Hulme, 2012b). Secondary co-morbid effects of reading failure include avoidance mechanisms and low self-esteem (Lyytinen et al., 2007). Some effects can be remediated through appropriate instruction.

Learners of all intelligence levels may struggle with reading (Sparks, 2016). Stanovich (1994) asserts that poor readers respond similarly to educational treatments, and their needs should be addressed as a group, as the same approaches are effective for struggling readers, regardless of the cause of their difficulty (Leafstedt et al., 2004; MacDonald & Figureado, 2010; Snowling & Hulme, 2012b). Macaruso et al. (2006) found that low SES learners benefit from language-learning approaches similar to those benefitting learning-disabled learners. To prevent a downward spiral, all struggling readers require prompt and appropriate instructional intervention (Morris et al., 2000; Amendum et al., 2011).

Because their initial difficulty in decoding makes reading unrewarding, poor readers tend to avoid it, setting off the Matthew effect with a vicious cycle by which the very readers who need more practice do not engage in sufficient reading to develop decoding automaticity, let alone comprehension (Stanovich 1986). Benner et al. (2010) agree that the gap between skilled and weak readers grows over time without effective intervention and observe that:

> if intervention is delayed until 9 years of age (the age at which most children with reading difficulties receive services), approximately 75% of children experiencing reading problems will continue to have such problems in high school and throughout their lives (ibid., p.86).

2.3.2.2. Addressing Literacy-learning Difficulties

Cummin's (2012) analysis of PISA results and a meta-analysis of reading studies (Berkeley et al., 2010) indicated that a combination of extensive exposure to print and active, engaged reading with comprehension instruction can overcome barriers to reading achievement including learning disabilities, economic, home and family disadvantages. More positive reading experiences can break this downward cycle.

Scaffolded MSL reading instruction is effective in addressing language-learning challenges and secondary affective and behavioral effects (Chall, 1967, 1983; NRP, 2000; Shaywitz, 2003; Hempenstall, 2005; Kuhn et al., 2010; Snowling & Hulme, 2012b). These approaches emphasize both decoding and comprehension skills:

> The main ingredients of a teaching approach to promote word-level decoding skills is one that combines training in phonological awareness with training in letter–sound knowledge and in which these two skills are reinforced in the context of reading... Such an approach goes beyond the contemporary emphasis on systematic 'phonics' by ensuring that children have adequate phonological awareness skills and by ensuring that what is taught is practised in context which, in turn, can provide a vital bootstrapping resource for children who have significant phonological difficulties (Snowling & Hulme, 2012b, p.28).

These MSL approaches involve all the language skills and senses, with explicit instruction in letter-sound correspondence, orthographic rules of spelling and decoding, word

segmentation and blending skills, morphology, vocabulary and comprehension of words in context. The multi-sensory techniques of these scaffolded approaches have been demonstrated to strengthen reading skills for poor readers (Rosenthal & Ehri, 2011). Improvement in remembering letter sounds has been demonstrated when phonological training reinforces the letter name and sound (Cardoso-Martins et. al, 2011). Brain imaging "indicates the anatomical result of development in response to successful instructional experiences" (Hruby et al., 2011, p.157).

A representative MSL program used widely in the U.S. is Language Enrichment (LE) of the Orton-Gillingham Institute that explicitly teaches skills of phonemic awareness, decoding, word recognition, fluency, vocabulary, spelling, and writing. The significant and long-term benefits of instruction via LE were measured by Carreker et al. (2007) in their study of reading comprehension among 3rd-5th grade mono- and bi-lingual learners, some of whom had received LE instruction from trained teachers in 1st and 2nd grades. They found:

> evidence that the [positive cycle of the] Matthew effect may be associated with specific teaching pedagogies, especially early direct implementation of multisensory linguistically informed language arts instruction (p. 212).

Abadzi (2014) likewise suggests that similar structured phonics approaches can be effective for all struggling learners to support literacy learning in any phonetic language.

However, when programs that may be effective for struggling learners are universally imposed by educational policy, as in the case of the Rose Report (2006) in the U.K., lack of balanced attention to all elements can create a backlash. Some researchers question the centralized policy emphasis in the U.K. and U.S. on the structured phonics approach, e.g. Wyse (2003), Oakhill et al. (2005), Wyse & Styles (2007), and Wyse & Goswami (2008), and have extensively critiqued systematic phonics programs as implemented in the National Literacy Strategy in the UK. Even researchers who acknowledge the benefit to decoding from structured phonics reiterate that decoding skills facilitate but do not alone provide comprehension:

> The findings of the Reading First Impact Study … illustrate the fact that a predominant emphasis on decoding, to the neglect of reading comprehension, may benefit decoding skills but result in no improvement in comprehension…Other variables such as vocabulary knowledge assume increasing importance for reading comprehension as students advance beyond the primary grades (Cummins, 2012, p.1977).

In summary, learners may not experience smooth acquisition of reading skills for organic/hereditary or environmental reasons, or both. Ideally, all learners with reading problems would receive early scaffolded instruction appropriate to their type of difficulty

and level of skill. MSL methods reinforce and practice all language skills using all the senses, and have been demonstrated to effectively support struggling learners in developing literacy skills. With appropriate instruction and sufficient practice, learners with reading difficulties can become proficient readers.

2.3.2.3 Co-morbidity of behavioral issues in learners with language learning difficulties

Learners with reading problems often experience related attention disorders (Attention Deficit Disorder (ADD) and Attention Deficit Hyperactivity Disorder (ADHD)) and other behavioral disorders (BD) (Maughan et al., 1996; Snowling & Hulme, 2012a). Learners' negative reading experiences are related to subsequent reading avoidance behaviors (Csizer et al., 2010; Carris et al., 2011; Calhoon, 2013; Connor et al., 2014). This makes it difficult to engage challenged readers' attention and cooperation toward improving their skills.

For these challenged readers, scaffolded, explicit instruction has also been found effective. Benner et al. (2010) concluded:

> (E)xplicit instruction procedures were more effective than other methodologies used to improve the reading skills of children with BD. [These] procedures … include teacher-directed instruction, frequent low-level questions, teacher feedback, lessons with a scope and sequence, simple and conspicuous instructional strategies, mediated scaffolding, and judicious review of instructional material (ibid., p. 87).

Frustrating reading experiences have far-reaching implications:

> Children with delayed acquisition of fluent and accurate reading typically face negative consequences such as development of avoidance behaviour towards learning in general (Lyytinen et al., 2007:109-110).

Fear of further failure can be as paralyzing to learners as the learning disabilities underpinning their discouraging experiences. Oakes et al. (2010) found that an intervention for increasing reading skills, that included behavioral support, was effective for learners with behavioral challenges, but that it was difficult to reverse the effects of negative reading experiences on motivation. Melekoglu (2011) found that though a structured reading program provided significant gains to both struggling and typical readers, struggling readers experienced no significant gains in motivation.

Reversing learners' negative affective associations with earlier frustrating reading experiences is, perhaps, the biggest challenge to remedial reading teachers. Strong understanding of scaffolding, including attention to learners' affective needs, is required to

address the negative attitudes and behaviors of learners discouraged by past reading failure (Allington, 2013).

2.3.3 How learning to read and write differs in L2

Many issues of literacy acquisition in an L2 parallel those for learning literacy skills in L1, with some differences. Factors contributing to reading ability and skill (decoding automaticity, semantic knowledge, and metacognition) apply in both L1 and L2 (Kahn-Horwitz et al., 2006) and reading ability in L1 is a good predictor of ability in other languages (Ganschow and Sparks, 2001). When learning to read in an unfamiliar language, important language abilities include:

> (a) Phonemic coding ability—the capacity to analyze unfamiliar sounds so that they can be retained,
> (b) grammatical sensitivity—the capacity to determine the functions words fulfill in sentences,
> (c) associative memory—the capacity to form associations between verbal material, and
> (d) inductive language learning ability—the capacity to make generalizations and induce rules from language material (Sparks et al, 2011, p.254).

Given differences in learner aptitudes, how does literacy learning at the foundational level differ when the learner does not know the language in which they are learning to read, and when the new language employs an unfamiliar character set and, possibly, direction?

Transferability of language skills from L1 to other languages depends largely on similarities and differences between the languages' characteristics, and "each writing system provides the mind with different tasks to perform, so the mind responds by developing different strategies to work with the different input" (Birch, 2007). Languages may be logographic, syllabic, or alphabetic, with alphabetic languages differing in such characteristics as level of transparency or opaqueness (regularity and predictability of spelling) and inclusion of vowels or only consonants in the alphabet, each system triggering the development of different cognitive strategies. Hebrew is a consonantal alphabet with optional diacritics above, below, and alongside letters for beginning readers, while the use of vowels is always mandatory in English. Skilled Hebrew readers are able to read fluently without vowels (though slower than skilled English readers), and disambiguate words spelled the same way from context.

Thus, the alphabetic principle of the two languages allows some transference (e.g. "m" and the Hebrew letter mem "מ" both sound like /m/) but differences require the learning of new skills and strategies. Hebrew L1 learners of EFL have difficulty even remembering to use vowels in English – for some of which there is no parallel sound in Hebrew (e.g. short

a). Strategies for processing phoneme-grapheme correspondence differ between Hebrew and English (Ben-Dror et. al, 1995) though despite the different character sets and directions, there are more similarities between these two alphabetic languages than there would be between a logographic or syllabic language and either of them. Still:

> Since Hebrew and English are so different – different alphabets, direction of reading, word length, tense system, etc. – students cannot easily transfer their L1 skills as a basis for mastering English (Kozulin & Garb, 2004, p.66).

Thus, the L2 learner must develop new skills, strategies, and knowledge to become a proficient reader and writer of the new language.

Interaction of decoding and comprehension differs somewhat for beginning readers in L1 and L2. Second language learners have less stored phonological knowledge to support decoding and comprehension, and may not comprehend the text at the most basic vocabulary level, let alone at the sentence syntax, paragraph or text level (Downing, 1974; Lipka, 2005; Kahn-Horwitz et al. 2006 & 2016; Verhoeven, 2012; Bowyer-Crane et al., 2016). Thus, compensatory strategies supporting reading acquisition in L1 are not available when learning to read in L2. Rules about word patterns and meanings assist language learners in decoding/encoding unfamiliar words, and thus are more essential for L2 learners, who cannot use stored phonological knowledge in reading and understanding text (Roffman, 2012).

For readers who already have somewhat mastered reading skills in a language they understand, top-down reading enhances comprehension (Westbrook, 2009, p.23). An L2 learner requires scaffolding of morphemic, word, sentence and paragraph levels within a text, to build comprehension bottom-up. At some point, the learner understands enough of the words in the text to allow inference from context. This requires knowledge of a very high percentage of the words (Schmitt et al., 2011). For struggling beginning learners, explicit vocabulary instruction (including translation and explanation in L1) can support learning and avoid the frustration of lack of understanding experienced by some of these learners[1] e.g. Bowyer-Crane et al. (2016) compared reading interventions for beginning readers and found that ELL learners still had lower levels of reading comprehension than

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[1] Note a participant's description of her earlier English-learning expereinces in section 4.1 "I didn't understand, they would talk to each other and I didn't understand" (baseline interview with Pansy, Nov. 16, 2014).

L1 struggling learners after two years of schooling in the U.K. August et al. (2005) stress the importance of insuring that beginning L2 learners know the meanings of basic words.

The roles of translation and L1 use when teaching beginning L2 learners are disputed, however, as some researchers assert that these detract from the holistic nature of language learning and that vocabulary is better learned incidentally and from reading in context (e.g. Krashen, 1989). ELL's immersed in English-speaking countries may have good opportunity to learn English from their environment (in and out of formal educational frameworks), and researchers have been critical when these opportunities are not exploited:

> [I]nstructional approaches that hone discrete, isolable reading skills and tasks significantly limit the potentially meaningful ways that students and teachers can utilize reading, language and literacy…these approaches overemphasize "lower-level" skills, including a focus on unit-based analyses of language, vocabulary instruction, decoding and fluency, and simultaneously draw students away from participation in social systems that facilitate expanded interpretations of the world" (Pacheco, 2010, p. 294).

The experience of L2 or EFL learners living in a non-English-speaking environment, with teachers who may themselves not know a great deal of English. differ from those of ELL's in English-speaking environments. Krashen (1989) recommended reading for vocabulary acquisition, in response to which Day (1991) asserts that "the evidence for second language students learning vocabulary while reading is not as well established as it is for first language learners" (p. 541). Differing approaches are warranted for teaching learners with different combinations of environmental and home language exposure, language-learning ability, age and skill levels (Dixon et al., 2012), as there are "differences between L2 learning in maximal versus minimal input settings…the sociocultural and interactional challenges and opportunities differ in ways that can massively impact outcomes" (ibid., p. 6). As mentioned, use of translation and L1 are a disputed area, with some researchers now calling for a more modulated assessment of their use in certain learning situations (e.g. Cook, 2010). The minimal input setting, combined with the minimal English knowledge of both learners and the actively-participating teacher in the study, have led me to adopt the approach of providing translation of both words and texts in the app, and encouraging the use of L1 as the primary language of instruction.

There are similarities between the reading acquisition process of beginning L2 learners and that of LD learners, and sometimes ELL (English Language Learning) learners, often immigrants in English-speaking countries, are misdiagnosed as being LD because of their limited English vocabulary comprehension (August et al., 2005; Klingner et al., 2006;

Hoover, 2016). To an even greater degree than in L1, weak decoding in L2 damages comprehension. By automatizing decoding and encoding, more of the reader or writer's attention is freed to attend to meaning. Kahn-Horwitz (2016) and Roffman (2012) advocate equipping EFL teachers with linguistic knowledge to enable them to more effectively scaffold the acquisition of decoding and encoding skills by their students.

August et al. (2005) stress the importance of acknowledging and remediating L2 vocabulary deficits of ELLs, and using efficiently the typically limited time available for working on vocabulary-strengthening beyond rote memorization. Laufer (1989, 1992) and Hu & Nation (2000) found better comprehension as vocabulary coverage increased. Schmitt et al. (2011) conclude that 98% of vocabulary must be understood by second language learners for an academic text to be comprehensible. Vocabulary, syntactical and morphological knowledge is needed to support comprehension in an L2.

A common approach to teaching new vocabulary to beginning L2 learners is to begin with oral vocabulary for concrete word categories. As decoding and comprehension of basic vocabulary progresses, this is employed in connected texts and to explicitly teach grammar and sentence syntax. Once L2 learners have sufficient reading skills, they can read increasingly challenging texts, e.g. leveled simplified classics books. Extensive reading has the same benefits and Matthew effects for L2 learners as for L1 learners (Sparks et al., 2011).

Cummins (2012) differentiates between ELL's earlier stages of literacy acquisition and skills required for higher levels of comprehension and writing. While vocabulary knowledge and reading are mutually reinforcing (Nation & Coady, 1988), and solitary reading is an important factor in the construct of literacy engagement, engagement in additional literacy-strengthening activities - instructional conversations around reading, strategy instruction, and activation of prior knowledge – can assist ELL's in achieving comprehension (Guthrie & Alvermann, 1999; Guthrie, 2004).

Reading in L1 is typically taught at the beginning of primary school, and materials for basic reading instruction in L1 easily match learners' beginning skill level with content of interest. Creating engaging instructional reading texts suited to older beginning language learners is more challenging, given their limited language knowledge and skills (Lovett & Steinbach, 1997).

2.3.4 Combined challenges: How challenged learners learn to read in EFL or L2

Beginning L2 learners evidence a normal distribution of reading ability and variation in language acquisition (Ganschow & Sparks, 2001; Hoover, 2016). While some EFL learners enjoy the rhythm, rhyme, charm and humor of authentic English texts for L1 beginning readers (e.g. Dr. Seuss Beginner Books), and easily absorb orally-taught, thematic groups of vocabulary words (see Israel MoE, 2013), some do not have strong abilities in sub-component language aptitudes important for reading, detailed previously (Sparks et al., 2011) and cannot keep up with expected EFL class level.

Teaching beginning L2 literacy skills to struggling readers is largely researched in the context of ELL by immigrant learners in English-speaking countries. Many common approaches for teaching beginning L2 literacy are ineffective for learners with language-learning problems (Ganschow & Sparks, 2001). However, Carreker et al. (2007) found that trained teachers with linguistically-informed knowledge of reading subskills created a positive, long-term Matthew Effect cycle, by scaffolding development of stronger foundational skills in their monolingual and bilingual English learners.

As noted, often L2 vocabulary words are taught first orally, and then in writing. Many basic English vocabulary words are orthographically complex, presenting a challenge for dyslexic EFL learners. For example, among common English color names in Alexander & Dray (2002), only "red" can be decoded without guessing by a beginning learner who knows only the sounds of individual letters. Other basic oral vocabulary categories present similar challenges.

MSL approaches to reading instruction compose connected texts from words that can be read and written using only the letters, combinations, and rules learned to that point (e.g. Combley, 2001). Words may be taught orally but are only incorporated in texts once they are within the learner's ZPD of decoding and encoding skills. Such scaffolded texts support successful reading outcomes, avoiding frustration and failure, and enable experience of pride, self-efficacy, self-esteem, and self-satisfaction (Trombly Latham, 2008).

2.4 Motivation

This section reviews literature on issues of motivation related to struggling learners and L2 learners. It then highlights issues in motivation specific to MALL use.

2.4.1 Affective issues of struggling readers: Motivation, avoidance mechanisms, and extrinsic and intrinsic rewards

Motivation is shaped jointly by environmental forces external to (extrinsic, EM) and internal psychological processes within the individual (intrinsic, IM), and can be fully understood only by considering the individual's profile and context (Hendijani et al., 2016). The relationship of extrinsic rewards and intrinsic motivation is controversial (Elliot & Covington, 2001), but evidence suggests that given "conditions that depend on the individual's motivational disposition … external reward and intrinsic motivation can become complementary and additive" (ibid. p. 2) and Hendijani et al. (2016) found that "Both performance-contingent rewards and intrinsic motivation improved motivation and performance" (ibid. p. 1).

These drivers of behavior in self-determination theory (Noels, 2000) shape the development of reading skills: pleasurable reading experiences promote reading practice that improves skills, while negative experiences lead to avoidance of practice, thus exacerbating the problem (Stanovich, 1986). An essential goal of the scaffolding approach is to promote learners' positive affective outcomes and avoid negative ones (Wood et al., 1976). In applying these affective considerations to teachers' roles in supporting reading, DeNaeghel et al. (2014) assert that

> According to the self-determination theory…teachers who support students' inherent psychological needs for autonomy, competence, and relatedness are more likely to create an optimally motivating classroom climate (p. 1549).

Wolters et al. (2014) surveyed adolescent readers and found that their reading comprehension was correlated with their motivation and perceived level of control over their learning. Engagement, the "behavioral displays of effort, time, and persistence in attaining desired outcomes" (Klauda & Guthrie, 2015:p. 240) represents the active role of language learners and is facilitated by the learner's feeling of self-efficacy, and this belief increases effort and persistence in task performance (ibid.).

Directly related to motivation in foreign language learning is the anxiety level experienced by learners. A correlation between anxiety and achievement has been extensively demonstrated among foreign language learners, one which increases among adolescent students grades 7 to 11 (MacIntyre, 1995). Though there is some disagreement about directions of causality and whether anxiety is merely a side effect of language-learning challenges, as in the Linguistic Coding Deficit Hypothesis (LCDH) posited by Ganschow and Sparks (2001) and Sparks et al (2011, 2016), anxiety is evidently a negative motivator in

foreign language learning. Melchor-Couto (2016) emphasizes the negative role of anxiety in learning a foreign language, especially in oral communication and in classes where it may be exacerbated by factors including competition with peers and the hesitation to speak for fear of exposure by making mistakes in public, and posits that this can be mitigated by using language in concert with multimodal environments where learners can practice language use in a more protected setting where they experience less feeling of risk of exposure and humiliation. Multimodal forms of language learning have been suggested as possible avenues to reduce the anxiety of foreign language learners, thus freeing them to engage more actively in learning and raising motivation levels (Calvo-Ferrer, Melchor-Couto & Jauregi, 2016) and language-learning achievement.

The anxiety/motivation/achievement continuum has a threshold level of negative experience, where learners reach a point of "amotivation," and relinquish responsibility for their own learning, as they cease to believe that effort will result in positive outcomes (Noels, 2000). This "learned helplessness" must be identified and addressed to re-motivate the learner.

Basic to the human psyche is approach/avoidance motivation, whereby people seek positive/desirable outcomes and avoid negative/undesirable ones. Educational interventions that do not consider their impact on motivation are destined to fail (Elliot & Covington, 2001). Learners prefer pleasurable experiences, including intrinsic rewards (feelings of self-efficacy, self-esteem, success, and pride), extrinsic rewards (praise, good grades, stickers or pizza) or both, to unpleasant, uncomfortable, discouraging learning experiences (Hendijani et al., 2016).

2.4.2 Motivation in L2 language learners

Relevance of materials to learner identity contributes to learners' pleasure and reading motivation. Providing texts of interest to older L2 learners with minimal L2 skills is challenging. Suggested solutions include simplified classics (Campell, 1987) and elaborative, pedagogically modified authentic texts (Heyer, 1998; Guariento & Morley, 2001; O'Donnell, 2009). The need for cultural appropriateness of EFL materials has been observed by EFL teachers (e.g. Hellerstein-Yehezkel, 2013; Al Riyami, 2016) and "reflects an increasing critical concern in applied linguistics with issues of identity in language learning and use" (Ushioda, 2011, p.202).

L2 learning is maximized through language-learning strategies involving cognitive and emotional aspects of learning (Oxford, 1990, Oxford & Shearin, 1994). Oxford recommends employing both direct learning strategies (memory, cognitive, and compensation) and indirect strategies that reflect affective, metacognitive, and social language-learning aspects. These strategies scaffold language learning by identifying tasks the learner is both cognitively and affectively equipped to attempt, and acknowledges the relationship between a learner's affective needs and successful outcomes. Noels (2000, p.58) notes that "affective variables…have been shown to be at least as important as language aptitude for predicting L2 achievement."

Some L2 motivation issues are unique. Ushioda (2011) notes that the L2 motivation field developed independently due to the special complexities of learning new codes of communication. Researchers of L2 motivation emphasize "individual differences within the context of self and identity" (Baker, 2011, p.201). Ushioda observes that some of the past motivations for EFL learning (e.g. identification with a specific language community) have changed, with English's status as a global lingua franca having changed learners' reasons for wanting to know it. Dornyei (2009) identifies types of language self-identity, both the "ideal L2 self" (what the learners envision for themselves as proficient L2 users) and the "ought-to L2 self" (the learners' understanding of what is needed in language learning to satisfy social expectations and avoid negative consequences).

Gardner & Masoret's (2003) meta-analysis determined the effects of various components of Gardner's socio-educational model on L2 learning. They concluded,

> The results clearly demonstrate that the **correlations between achievement and motivation are uniformly higher** than those between achievement and integrativeness, attitudes toward the learning situation, integrative orientation, or instrumental orientation (p. 123, emphasis in original).

No directional/causal connection between intrinsic reading motivation and reading competence is claimed, a point reiterated by Schiefele et al. (2012), though their survey highlights the stronger contribution of intrinsic reading motivation, over extrinsic rewards, on reading competence and behaviors.

2.4.3 Motivation issues of MALL use

Ushioda (2013) distinguishes between motivation to use technology for language learning due to inherent interest in technology versus strong language-learning motivation. Rogers's work (1962, updated 2003) on diffusion of innovation stressed that people vary in their

receptivity to new technologies. Advocating leaving the choice to use mobile technology to the learner, Ushioda (2013) notes that:

> mobile devices are primarily owned and used for personal and social purposes, which means that their potential as language learning tools may not be particularly valued or accepted by users… students may regard their mobile devices and smartphones as their personal territory or 'private space' to be kept clearly separate from their 'studying space (ibid. pp.2-3).

Teachers' choices regarding MALL must consider students' feelings about control over their personally-owned digital devices. Ushioda also suggests that MALL is more suited to "frequent (rather than deep) engagement in language learning" (ibid., p.3), observing:

> motivating the more demanding cognitive and metacognitive efforts needed for developing language skills and knowledge may be difficult to achieve using mobile technologies (ibid., p.4).

2.5 Mobile-Assisted Language Learning (MALL) and its Potential to support Literacy Skill Development

This section examines the newest area depicted in the conceptual framework in Figure 1, above: the use of individual digital devices (mobile technology) to support language learning.

2.5.1 Multimodality

Every new generation of technology partially displaces those that precede it (Kress, 2003). Kress's theories on multimodality emphasize the profound change in recent decades from communication predominantly stressing printed text to the increased use of images (still and moving) to communicate meaning, as they provide additional tools and layers of comprehension that text alone does not provide (Kress, 2000; 2003; 2005). He includes all the senses in his characterization of multimodality:

> There is a semantic trade among speech, image, and writing (and other modes, too, and via other senses – touch, feel taste) that is, simply, human (Kress, 2000, pp.338-339).

Kress (2003) notes that we are in a period of transition from dominance of the written word in the form of books to dominance of visual images, viewed on screens, and that educated cultural and political elites may well favor the print forms that provide them differential power advantages. Warschauer (2000a, 2000b, 2002, 2007) stresses that though new literacies include digital literacy, English literacy is needed to participate in the global digital conversation. Recent literature on educational technology (e-learning) has addressed MALL and the potential of this multimodal tool for language learning, particularly English

as a Foreign Language (EFL) and English as a Second Language (ESL) (e.g. Bahrani, 2011; Kukulska-Hulme, 2008 & 2012; Huang, 2014 & 2016; Alhinty, 2015; and surveys by Yengina et al., 2011; Felvegi & Matthew, 2012; Burston, 2013; and Chwo et al, 2016).

2.5.2 MALL as a Tool for Scaffolding Learning

Scaffolding theory has been applied in the design of computerized tutoring systems. Though such systems do not have the perceptive powers of human tutors (Wood & Wood, 1996), technology advances are mimicking these. Anderson (1993) created computerized Intelligent Tutoring Systems (ITS's) that incorporate principles of scaffolding, contingent instruction, and flexible response regarding learner actions, with the goal of facilitating at least some of the benefit of individual human tutoring.

Principles for successful ITS's include 1) learners should first attempt to solve the problem, with ITS providing relevant assistance in context 2) provide immediate feedback on learner errors 3) support successive approximations of learner behavior approaching competent performance, reducing instruction as independence increases, 4) provide reminders of the learning goal (ibid.). Yelland & Masters (2007) suggested that computer-tutor contexts should incorporate cognitive, affective, and technical scaffolding.

2.5.3 What differentiates MALL?

Mobile technology provides an accessible medium for delivering scaffolded learning materials and can bridge the skills gap of both learners and teachers by providing a guided, step-by-step learning experience (Godwin-Jones, 2011). Numerous studies of MALL use have been performed (see Burston, 2013) particularly in East Asian universities and among elementary ELL's in English-speaking countries. There exists a gap in the literature on use of MALL with beginning/struggling EFL learners which, as noted, this research hopes to address. Affordances of mobile technology contributing to language learning have been demonstrated in numerous studies e.g. Wakefield & Whitten (2006), Wong and Looi (2010), Wood et al. (2011), Lan et al. (2013), Levitt (2013b), Reid et al. (2013), and Wong (2016). These study MALL as a mediating tool to learn conveniently and continuously "anytime, anywhere" or "all the time, everywhere," in and out of classrooms, using multi-sensory channels to the brain: sound (audio and video), sight (text, pictures, video), touch (touch screens for navigation and content-related actions), and responsive interactivity (feedback and self-correction).

MALL's affordances are particularly suited to scaffolded learning (Chu, 2014). MALL has positive impacts on learning outcomes both in skill/content mastery and affective areas, e.g. Huang et al. (2016) compared learning motivation and performance of students completing the same vocabulary-learning exercise with and without MALL and found both superior among students using MALL. Jones and Issroff (2007) suggest that educational mobile devices possess key motivating features "control over learners' goals, ownership, fun, communication, learning-in-context and continuity between contexts" (p.247).

Aspects of mobile devices that may be disadvantageous include small screen size, poor resolution, lack of data input capability, little storage capacity, low bandwidth, slow processor, short battery life, software issues, and lack of standardization (Liu et al., 2010). Rapid technological development is reducing these disadvantages.

Concerns about MALL include Huang (2014)'s observation that learners with weak self-management skills benefit less from MALL use than those with stronger skills, corroborated by Levitt (2013a). Chu (2014) notes the importance of proper instructional design to avoid overloading working memory. Yi (2015) observes teacher concerns about using multimodal resources. MALL, though it has great potential, is not a panacea.

2.5.4 Use of MALL with dyslexic and low-achieving learners

Research on technologically-based interventions with dyslexic and low-achieving learners has explored how edtech interventions may benefit these learners (e.g. Lyytinen et al., 2007; Veater et al., 2011; Grimley et al., 2012; Zain et al., 2013). Amendum et al. (2011) found that struggling learners who participated in a structured computerized reading intervention outperformed the control group. A phonics-based, computer-based reading program was found to significantly improve LD first-graders' performance by Macaruso et al. (2006). Promising findings from this Computer-Assisted Language Learning (CALL) research, combined with the new affordances of MALL, suggest new avenues for research on how to best adapt earlier computerized learning systems to mobile platforms.

Cumming (2013) notes advantages of struggling readers' MALL use:

> (T)he popularity of mobile devices has given them the potential to become a powerful piece of assistive technology that is nonstigmatizing for students with EBD. Due to this popularity, most students also are proficient in using the devices, eliminating the need for intensive instruction in how to use the technology (ibid., p.23).

Reid et al. (2013) reiterate this benefit for dyslexic learners, and stress the potential they offer for individualizing instruction.

A major benefit of MALL is to provide appropriate instruction to learners when trained remedial reading teachers are not available. Lyytinen et al. (2007) propose that technological tools are a solution for students in remote locations:

> We consider that early identification of children at risk also entails an obligation to develop tools of prevention and intervention. Our preferred approach is to use computer-based training in the hope that it can more easily reach everyone in need, irrespective of whether trained remediation personnel are available (ibid., pp.109-110).

Mobile technology has the potential to reach these learners efficiently.

2.5.5 Use of MALL with ELL's

A growing body of research explores use of MALL for ELL's in English-speaking countries, e.g. Alhinty (2015a, 2015b) notes the affordances of touch-screen tablets, their motivation- and performance-enhancing effects. Wang & Vasquez (2012) and Ware & Hellmich (2014) discuss multimodal resources used in teaching ELL's. Yi & Choi's (2015) survey of literature on ELL's use of multimodal practices concluded that "the creation of multimodal texts helps ELLs acquire academic literacy and disciplinary knowledge…build their multilingual and multicultural repertoires…engage in collaborative learning…construct social identities…and increase critical awareness" (ibid., p.838).

Multimodal MALL tools support language-learning through multiple channels to the brain, providing information through audio, video, text, image, color display, touchscreen, and interactive features of mobile devices. Kotik-Friedgut, who researched language learning under Vygotsky's colleague Luria, asserts that, in language learning:

> It is worth our while to pay attention to the fact that people retain:
> *10% of what they read
> *20% of what they hear
> *30% of what they see
> *50% of what they simultaneously see and hear
> *70% of what they say
> *90% of what they simultaneously say and do
> (Kotik-Friedgut, 2010, p.4).

Language-learning activities provided by MALL involve multiple senses, an approach theorized to increase the learner's retention of the material. Learners can hear a voice recording of a passage while following the text on the screen, then record themselves reading it aloud, and play it back and compare their own performance to the model. They can hear a word, see a picture of its meaning, and write it with their fingertip on the screen, compare their answer to the correct spelling, and correct their answer. They can watch and listen to animated, illustrated explanations of language rules as many times as they need to

until they understand them. These combinations of actions, speech, listening, and viewing are theorized to improve language retention.

2.5.6 Central issues in the use of educational technology

Computer-assisted Language Learning (CALL) tools have existed for several decades, with Mobile-assisted Language Learning (MALL) their newest generation. Three major issues in MALL are summarized here: first, the need for teacher accompaniment for effective learning to occur; next, cost/benefit tradeoffs of investment in technology; and lastly, concerns of educators about potential loss of classroom control stemming from use of mobile devices in class.

2.5.6.1 Teachers' Role

The literature addresses the evolving role of teachers when technology is used by their students in and out of classrooms. While Mooney (2000) considers MALL a way to activate and empower learners, there is much research evidence that optimal learning with edtech occurs when human teachers accompany and scaffold learning, even if only to praise and encourage (e.g. Mitra & Dangwal, 2010; Mitra & Kulkarni, 2012; Dyson, 2013). "[G]ood mentoring is required in order to develop the ability to learn autonomously" (Warschauer, 2007, p.45). This need was demonstrated by Nielson (2011) who examined autonomous use of commercially-available CALL self-study language-learning programs by motivated adult learners under seemingly ideal circumstances but found a high attrition rate, attributed mostly to lack of human teacher support. Technology's affordances for language learning are not sufficient for completely autonomous learning, as teachers scaffold learning and provide direction in how to judge, evaluate, select, integrate and utilize available resources (Reinders & White, 2011).

Hutchison et al. (2011) noted that teachers' perceptions of technological tools, and their feelings about integrating technology into instruction, determined their willingness to use edtech. The potential gap between digital-migrant teachers' and digital-native students' facility with technology puts teachers at a disadvantage (Prensky, 2001a, 2001b). Corbeil and Valdes-Corbeil (2007) concur that "Today's instructors, if not already familiar with the digital language of their students, must learn it to maximize learning" (p.51). As teachers may not be digital natives, training is needed to support their ability to effectively integrate technological solutions into instruction (Harms, 2011). Teachers' familiarity and skill with educational technology, and their attitudes and feelings toward educational technology use, shape the extent and type of technology they use in their teaching.

2.5.6.2 Economic issues and cost/benefit tradeoffs

The literature presents debates on the wisdom and feasibility of investing scarce educational resources in rapidly-obsolesced mobile technology and discussions of the logistics of equitably providing and managing digital technology in developing nations (see Davis, 2010; Ogembo et al., 2012; Graham, 2013). Another key edtech concern is cost of acquiring and maintaining hardware and software and of the time, energy, and attention of educators and technical support personnel. Educators must anticipate implications and plan implementation carefully (Baroudi & Marksbury, 2013). Access to Internet resources is becoming more widespread and affordable due to mobile devices and the increase of mobile broadband subscriptions worldwide (Sanou, 2016). But even a "BYOT" (bring-your-own-technology) approach to reducing school investment in digital equipment (e.g. LaMaster & Ferries-Rowe, 2013) still requires the school to have an IT infrastructure capable of supporting and integrating mobile device use. Educators need to resist hype and to examine the real costs and benefits of individual edtech interventions to avoid wasting precious resources. Ongoing research in this field is helping to identify MALL interventions that provide real learning advantages.

2.5.6.3 Concerns about loss of classroom control

While the potential of MALL is great, it raises concerns about loss of teacher control in the classroom and has been the subject of extended lively debate, with many education systems globally have banned cellphones in class (Traylor, 2009). Even in institutions that have adopted mobile technology, some teachers refuse to let students use mobile devices in class (Baroudi & Marksbury, 2013). Teachers evidently recognize problematic aspects of device use, and are cautious about students abusing freedom to use the technology.

Advocates of classroom m-learning, e.g. Felvegi & Matthew (2012); Lan et al. (2013), Norris & Soloway (2013), and Rideout (2013) argue that personal devices are natural learning tools and that once a new code of trust is developed, students will use their personal devices responsibly. They recommend full integration of m-learning to implement a shift to learner-centric models of education following Dewey's principles. Mitra (2012) further questions whether access to online information via personal devices does not completely obsolesce current approaches to education and assessment.

MALL theoreticians differentiate between learners' personally-owned mobile devices and purpose-dedicated school-owned devices. Similarly, tradeoffs of MALL use differ between the use of learners' own devices in class, when they may distract from teacher-defined

learning goals, and out of class, when completion of learning tasks can be accomplished by learners on their own time and judged by outcomes, rather than by class time spent on task.

2.5.7 MALL summary

MALL has the demonstrated potential to scaffold, facilitate and integrate into language-learning curricula for students at all levels worldwide. Understanding that MALL is complex, far more research is needed to investigate the longer-term implications of MALL implementations and the way to achieve maximum benefit. As Gater & Wood (2014) suggest, research should identify specific aspects of resources, management and training that support success, so that effective MALL solutions may be developed for wide-ranging contexts.

2.6 The Hickey Method and its adaptation for challenged EFL learners

The Hickey Method (Combley, 2001) is an MSL approach that was initially developed for use with dyslexic native English speakers in one-on-one tutoring settings. Its primary goal is to help learners develop automaticity in decoding and encoding English in order to free the learner's attention for comprehension. It therefore respectively addresses the decoding and comprehension aspects of the Simple View of Reading (Gough & Tunmer, 1986). Scaffolding theory supports the Hickey approach of teaching foundational skills of decoding and comprehension gradually and respectively, so that learners become increasingly fluent in decoding and, once they can decode it, learning the meaning of the text. The approach supports learners' affective needs by staying within their zone of proximal development (ZPD), providing confidence-building experiences of success in reading to counter the Matthew Effect (Stanovich, 1986) and avoiding the frustration of reading material that is too difficult for them at the current stage in their reading and language-learning development.

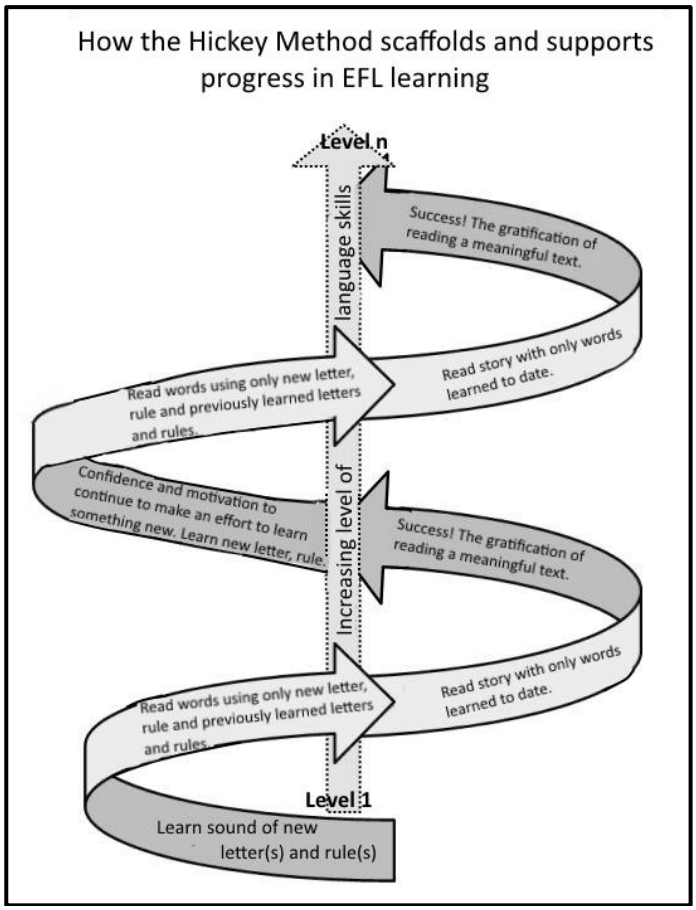


Figure 2: The Spiralling Cyle of EFL Literacy Learning via the Hickey Method

Figure 2 illustrates how, in learning EFL literacy skills via the Hickey Method, learners gradually increase in their level of language skills as they engage in cycles of learning new letters and rules of English, integrating these with what they learned previously into reading, writing, and comprehending words, and then integrating these new words with those learned before to read stories. Success reinforces motivation to continue learning.

2.7 Social Justice for Disadvantaged, LD learners

The Hickey Method was developed to increase literacy-learning outcomes, and thereby social justice for LD learners. The EFA recommendations for the post-2015 agenda propose to move beyond the Millennium Development Goal of universal primary school enrollment to ensure that learners achieve defined learning outcomes. Measurement of learning goals, including literacy, is recommended in this post on the World Education Blog of the team working on the Education for All Global Monitoring Report:

> By 2030, all girls and boys complete free and compulsory quality basic education of at least 9 years **and achieve relevant learning outcomes**…In the discussion of post-2015 global

> education goals, there appears to be general agreement that the assessment of learning outcomes must have a place alongside ensuring **equitable access to good quality education**. The EFA GMR has calculated that there are 250 million children not learning…We need be able to identify exactly how many **children around the world face compromised life opportunities because they do not possess foundational reading** and mathematics **skills** (Adams, 2014; emphasis added).

UN Sustainable Development Goal 4 notes the need for an "inclusive and equitable quality education for all, with 4.5 calling for "equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities" (UN, 2015, p. 21).

Concepts of social justice based on Sen's Capability Theory (see Saito, 2003) include making literacy accessible to all:

> Literacy in a national language, and arguably also in an international language … is a key learning outcome from a social justice perspective not only because it is valued in its own right but because it enables individuals to participate in procedures for making social claims of one another… literacy is a functioning which, as well as being valued across societies in itself, is essential for achieving other valued beings and doings and, as such, is central to human development (Smith & Barrett, 2011, p.23).

Tikly and Barrett (2011) define the quality of education based on social justice and human capabilities. Fraser (2008) defines social justice as parity of participation, permitting "all to participate as peers in social life…dismantling institutionalized obstacles that prevent some people from participating on a par with others as full partners in social interaction" (p. 16). This inclusion must extend to learning-disabled learners, despite their challenges in achieving literacy. Though there has been international attention to inclusion of disabled learners for at least five decades, according to Polat (2011), only 2% of disabled learners in low-income countries even attend school, and educational systems are often hard-pressed to provide for learners' differing needs. Recognition of the need for education that meets the individual needs of learners of all levels of ability and skills, congruent with Sen's Capability Theory, is summed up by Nussbaum (2006):

> [I]t would be a progress if we could acknowledge that there is no such thing as "the normal child"; instead, there are children with varying capabilities and varying impediments, all of whom need individualised attention as their capabilities developed (p. 210).

People have many kinds of abilities, and by focusing on disability and not ability, we miss out on developing full human potential.

2.8 Conclusion

This chapter has examined key concepts and theories guiding the research, brought together from a variety of disciplines to forge a new theoretical approach to the problem of

how to deliver effective, appropriately scaffolded literacy instruction to struggling language learners who need such an approach, particularly in EFL. I have emulated Vygotsky, who "drew on a range of disciplines …[and] embed[ded] much of his own reading…in his writing…[based on] creative fusion and development of many perspectives and persuasions" (Davids, 1996, p.2). Thus, by combining insights derived from research in several related literacy and language-learning fields, I have attempted to synthesize a new approach that recognizes both the potential power of scaffolded language learning for literacy learners (of EFL, but also for struggling learners of other languages) and the centrality of learner engagement in this effort. This approach can be used with books in traditional print format, but the multimodal, portable, personalized affordances of MALL tools enable MALL's use in providing and reinforcing scaffolded learning even when trained teachers are not available, positioning MALL uniquely as a potential tool in these literacy-development efforts.

This review has suggested that the theories of literacy acquisition in L1, and how this can be complicated by reading disorders and related behavioral issues, are consistent with scaffolded learning approaches that have proven effective in addressing the reading difficulties of learners. These interventions require a relationship with a supportive, knowledgeable guide, per Vygotsky's concept of the interpersonal, social interaction via which language is learned. Remedial interventions for assisting struggling learners, notably multi-sensory, structured language approaches, have been theorized to effectively help learners through appropriately scaffolded instruction that takes cognizance of learners' cognitive and affective needs. The similarities and differences between learning to read in L1 and L2, with a focus on EFL, suggest that these approaches can be effective in learning L2 and EFL and that, with sufficient and sensitive attention to motivational aspects of language learning, MSL approaches delivered through teachers, books, and MALL have the potential to play a key role in literacy acquisition in EFL.

MALL technology is a form of tool, serving as a mediator to the acquisition of new language skills, with potential to provide powerful advantages for language learning. MALL is the youngest field among the topics discussed in this chapter, and it is in the integration of this new technology to effectively address long-standing literacy education challenges and thereby promote social justice that this research hopes to make a unique contribution to knowledge. Finally, The Hickey Method and The English Club provided the intervention studied in this research.

Chapter 3: Methodology

Overview

This chapter reviews the epistemological-ontological philosophy of critical realism that, together with conceptual and theoretical frameworks from the literature, guided research design and analysis of findings. The methodological approach, primarily qualitative action research, is then discussed. Research stages are summarized, as is participant selection, followed by a discussion data generation and analysis methods. My researcher positionality and identity are examined, and validity issues discussed. The ethical considerations of the research follow, and the chapter concludes with the limitations of the study.

I employ the term 'data generation' in acknowledgement that data is not gathered by the researcher from passive participants, rather is created during the process of qualitative research in cooperation among the researcher and the other participants (Whatmore, 2003).

3.1 Critical Realism and its Methodological Implications

Critical realism is a combination of "ontological realism plus epistemological constructivism" (Maxwell, 2012, p. 11). As conceived by Bhaskar (1978, 1979), the world consists of perfectly real structures and mechanisms, comprised of complex, emergent levels of underlying structures and mechanisms that can never be perfectly known, suggesting that there is such a thing as reality, but it has deeper dimensions than we cannot directly observe (ibid.). These structures and mechanisms may involve e.g. cultural, psychological, or historical influences, discourses, texts, processes in power politics, or properties of physics. What they have in common is that they are not all obvious or visible to empirical observation, that our knowledge of them is imperfect, limited and fallible, so all our theorizing must of necessity be constructed with the understanding that our knowledge is incomplete, yet this need not stop us from trying to understand what our senses observe. Critical realism asserts that it is possible "to combine and reconcile ontological realism, epistemological relativism and judgmental rationality"(Archer, Bhaskar, Collier, Lawson & Norrie, 1998, p. xi) and that though:

> actors' accounts are both corrigible and limited by the existence of unacknowledged conditions, unintended consequences, tacit skills and unconscious motivations… actors' accounts form the indispensable starting point of social inquiry (ibid., p. xvi).

Hence this research is a departure point for further exploration, and, as acknowledged by Pawson (2006), my interpretation of the reality of what occurred, assembled from a range

of data generated from varying perspectives, is subjective and partial but nonetheless a starting point. As action researchers, when we create an intervention to systematically manipulate events, reality reacts and supplies us with results, from which we build up theories:

> To acquire usable knowledge it is essential that we know the mechanisms, processes and structures that produce the empirical events, and these are seldom directly visible. The knowledge we do attain is, however, always fallible, and its usefulness varies under different conditions (Danermark et al., 2002, pp 20-22).

The critical realist philosophy implies a methodology employing multiple methods to generate multi-dimensional, in-depth data about the *hows* – the mechanisms – behind the phenomena observed. This philosophy likewise coheres in the current research with the conflation of numerous intersecting conceptual frameworks and theoretical approaches discussed in Chapter 2:

> Scientific work must go beyond statements of regularity to the analysis of the mechanisms, processes and structures that account for the patterns that are observed…. methodological pluralism is advocated. This is a mixed-method approach that blends intensive qualitative inquiry with extensive quantitative data collection…Critical realists can be relevant for social practitioners, not by making predictions, but by producing knowledge about the structures and mechanisms that operate in a particular context (Denzin, 2004, pp. 249-250).

The conceptual framework and theoretical underpinnings of the intersection of the fields discussed in Chapter 2 were the first step in designing the research questions of the current study, based on my critical realist philosophy, and hence a first step in interpreting the data, even before it had been generated. Findings, while based on very real data, are constructed through the researcher's interpretation. Critical realism claims that theories can be legitimately constructed from these findings, which then need to be explored in further research.

3.2 Methodological approach

In keeping with the methodological pluralism advocated by Denzin (ibid.) the research was a mixed-methods study with the emphasis on qualitative research. It involved:

- Action Research, given that I am studying teaching approaches in my field of practice, and exploring new practices with the aim of improving and refining them (Kemmis, 1993). The new practices involved an intervention that changed how the subject matter was taught.

- Case study, with multiple individual learners as cases, a tradition in studying m-learning (Yin, 1993, 1994; Li et al., 2010; Wong & Looi, 2010). In-depth examination of cases of individual learners provided, even among this small sample, widely varying learning outcomes (see Chapter 4) and correlation of learning outcomes to factors that shaped them, e.g. engagement in learning, teacher support, learning profiles and the extent to which individual learners' needs were compatible with the intervention, family background, social, cultural and symbolic capital (Albright and Luke, 2012), expressed opinions and attitudes, and observed social roles in class.

I planned to implement a full school year of intervention to obtain an in-depth picture of the effects of the Mobile-Assisted Language Learning intervention over time. A limitation of many MALL studies is the intervention's brevity, sometimes limited to one class session.

3.3 Action Research utilizing The Hickey Method and The English Club via MALL

I chose the underlying methodology of action research given my interest in "change for improvement, rather than simply understanding" (Dunne, Pryor, & Yates, 2005, p. 25). Action research in educational settings often involves the setting of the educator's own practice, and examination of the practice in an attempt to improve it via a "self-reflective spiral of cycles of planning, acting, observing, and reflecting" (Kemmis, 1993, p. 178). This action research approach coheres with the evidence-based approach to policy development advocated by critical realist systematic review (Pawson et al. 2005; Pawson, 2006). Thus, action research involves the ongoing educational activity, in an attempt to improve policy and practice, in parallel or simultaneous with the practitioner performing the research, collecting and analyzing data, and attempting to make a contribution to knowledge about the field of practice.

The current study comprised action research in my professional field in order to contribute to new practices, knowledge and theory (McNiff & Whitehead, 2011) in the field of beginning literacy acquisition for challenged learners.

This research occurred in a school setting where I was a guest. My intention was to play primarily a research role but I was soon pressed into service as an additional teaching resource, rather than only observing. As it was to the learners' benefit to have additional teaching help and more individual attention, I cooperated with this change in my

anticipated role, increasing the teacher-student ratio, a factor in the intervention, a finding discussed in Chapter 4.

My own use of information technology as I performed and analyzed this action research mirrors and coheres with the new MALL technology studied. Just as the students used multimodal mobile devices to support and facilitate their language learning, I used my multimodal smartphone to support and facilitate my own research data capture, to record and play back interviews and real-time classroom interactions, and to dictate journal entries even as I drove home from the research site. I used IT further to download, transcribe, analyze, and write about the data, using specialized software developed specifically for each purpose. My researcher identity and methodology employed are thus inextricably bound up with the very subject of this action research. Just as I found purpose-specific software (e.g. Express Scribe, NVivo, EndNote, Word, and email) to be invaluable in facilitating my focus on the content of the research rather than on data- management mechanics, my motivation is that learners using multi-modal MALL technology can enjoy the affordances and facilitation of IT in support of their language learning. MALL provides a Vygotskian tool to make possible such multimodal, interactive learning support as hearing language spoken aloud while viewing its textual expression, and participants interactively checking their own answers rather than needing to wait for a teacher to correct their spelling. These IT affordances were not available (to learners nor to researchers) until recently.

3.4 Research stages (see Appendix 1)

I met and interviewed the headmaster during the summer holiday, when he agreed to the intervention and to my research. As I was invited to meet the teachers only after the fall holiday season, I was unable to study a full year of intervention as planned, but the eight-month intervention addressed the common limitation of MALL studies' brevity of intervention. The English coordinator and teachers decided that the weakest 9th and 10th grade EFL students would participate. They felt that the intervention would better suit the younger grades than the weak 11th and 12th graders.

I planned to commence the intervention with a 2-hour training session for the English teachers. In actuality, the two participant teachers were never available for a formal training session, and my interaction with them outside of class was of necessity opportunistic, informal and individual in the faculty lounge between classes. I answered questions as they arose. One goal of the research was to explore use of a Multi-sensory Structured Language

(MSL) approach to reduce need for teacher training, so the lack of even a brief training session actually supported this goal.

Before the intervention baseline data was generated (see 3.6 Data Generation Methods). I then began the intervention by providing the learners with individual iPod Touch 4 devices with the MALL app, The English Club™ installed (see Appendices 11-18). The learners used the devices mostly in class, at the teacher's discretion. I had anticipated that they would also use them at home, which they sometimes did, but only after the intervention commenced did I learn that the students at this school are not expected to do homework and their use of the MALL tool at home was not required by their teachers.

During the intervention period, which continued through the end of the school year (my weekly visits to the school took place from October 2014 through June 2015), I spent every Sunday, which is a regular weekday in Israel, at the school as a participant observer (see Appendix 1, Table 6), actively involved in working with learners. My role as a participant-teacher both enhanced and constrained my opportunity to observe the use of the MALL devices and books, and to generate data on the activities of the other participants. At the end of the intervention period, I conducted semi-structured exit interviews with the learners, teachers, and headmaster and repeated the English skills and attitudes assessment of the learners in a post-test.

I took notes and made audio recordings during interactions at the school, to the extent possible given that I was often performing an active teaching role. I dictated and wrote a research journal, recording what had happened at school that day and my reflections, immediately upon leaving the school during my 2-hour drive home. I used Express Scribe to transcribe all audio recordings, then imported all data sets (pre- and post-intervention interview transcripts and assessments, fieldnotes, research journal, and artifacts from the field) into NVivo, where I coded and grouped the data. The Findings chapters summarize my close analysis of the coded data and the themes that emerged. These focus on key points with illustrative data quotes, a crystallization process that has maintained some of the richness of hearing from research participants in their own voices and words.

3.5 Participants

Eleven students and two teachers participated in the research intervention, with additional participants who were formally interviewed being the school's headmaster, two guidance counselors, and the Ministry of Education English Inspector for the chain of schools. Informal conversations with a third English teacher at the school, with the English coordinator, and with other teachers provided further insight and information.

3.5.1 Participant selection

I was first exposed to the English teachers of this TECH school network when I led a workshop at an in-service training session organized by the MoE English inspector responsible for English learning in these schools. The website of the TECH network states:

> TECH provides an educational-academic framework with an emphasis on technology, the sciences and the arts for all strata of the population from high-achieving young people of Israel's elite to young people who are at risk (ibid., p. 1).

The population at the particular school of this chain where I conducted the research falls into the latter "at risk" category. After obtaining ethical approval of my research proposal, in late August 2014, I met the headmaster of the school where I carried out this study. We discussed and negotiated the intervention and my research needs, and he provided the following background about the school, its population and its teaching approach.

The school's emphasis is on preparing its students to be mechanics and technicians who will then serve in a branch of the Israeli Armed Forces, and later use these vocational skills in their careers. This regional school has 250 students, many from problematic homes. Some of them are bussed from their homes as far as two hours away. When the students first come to the school, most have little interest in the army or in school studies. Many of the students evidence serious behavioral issues and are defiant or angry. They come from difficult academic backgrounds, and as has been noted, to qualify for admission, students must have failed at least seven subjects in their previous schools. This, therefore, is a second-chance educational institution.

The headmaster reported a very high occurrence among the learners of ADD and ADHD, and widespread dysgraphia, dyscalculia, and dyslexia. Many of the students come from homes where their parents have not known how to get help, diagnoses of learning disabilities or special educational services. The headmaster mentioned that of the 250 students in his school, only 38 were girls, with a high rate of sexual abuse in many of their family backgrounds. The school employs two full-time counselors, and in addition a

psychologist spends one day weekly at the school. The teachers spend many of their teaching hours in one-on-one work with students.

The English classes are divided by skill level. We discussed the suitability of the planned intervention for students of various ages and levels, and concluded that I would leave the choice of participants to the English teachers. We discussed how I anticipated carrying out the intervention and research at the school, and agreed that I would interview students and teachers and measure the English attainments of the students at the beginning and end of the intervention and observe their English classes during the intervention, and that I would lend the students iPod Touch devices for the duration of the intervention. The headmaster, with some concern about potential costs and disruptive effects of mobile devices in class, committed the school to reimburse the repair or replacement expense of any device that would be lost or damaged. We discussed in depth issues of mobile device use in school, which will be examined further in Chapter 5.

The school was selected as the research context through follow-up to an in-service training session I taught to a group of English teachers. A teacher who attended, the English coordinator, and headmaster of the school expressed a desire to teach using the materials I demonstrated. I agreed to provide the intervention, devices and my professional guidance in return for the school's participation in my research. The number of participants in the study was limited to the number of identical iPod Touch devices that I had to lend to the school.

In my first meeting with the English-teaching staff of four teachers, I asked them to select participants based on the criteria that the students needed the intervention scholastically and would have the potential to cooperate and benefit. Ability or learning disability level was not a criterion. The sample was not random. The EFL teachers decided to involve their weakest ninth and tenth-grade learners.

3.5.2 Research Participants' Profiles

The following table summarizes the profiles of the research participants:

Table 2: Research Participants

Role in research	Alias	Gender	Age at intake interview	Languages
Teachers (2)	Sarah (10th grade)	F	19	Hebrew, basic English
	Orna (9th grade)	F	40's	Hebrew, fluent English
Ninth-grade Students (5)	Shalom	M	14	Russian/Hebrew
	Vladi	M	15	Russian/Hebrew
	Sami	M	13.5	Hebrew
	Ovadia	M	15	Hebrew
	Pansy	F	15	Hebrew
Tenth-grade students (6)	Ruth	F	16	Hebrew/Russian
	Andrei	M	17	Russian/basic Hebrew
	Yoav	M	16	Hebrew
	David	M	15	Hebrew
	Zach	M	15	Hebrew
	Omri	M	17	Hebrew
Counselors (2)	9th Grade counselor	F	N/A	Hebrew/English
	10th grade counselor	F	N/A	Hebrew/English
Headmaster	Headmaster	M	N/A	Hebrew/English
Ministry of Education English Inspector	Rebecca Dewey	F	N/A	Hebrew/fluent English
School English Coordinator	Rena	F	40's	Hebrew, fluent English
Third English teacher at school	Bogdan	M	50's	Fluent Hebrew, L1 Russian, fluent English

3.6 Data generation methods

"The essential purpose of the researcher's experience of the setting is to transform into text the experiences they have there" (Dunne, Pryor & Yates, 2005, p. 55). Toward this end, I generated multiple data sets while performing this research, as "the participant observer who is an agent in the events under study and who transforms them into data through the medium of fieldnotes or a reflective journal" (ibid., p. 59). These data sets include pre- and post-intervention assessments of English skills and attitudes (see Appendix 8), transcripts of semi-structured pre- and post-intervention interviews with teachers and learners on their attitudes and opinions (see Appendices 6, 7, and 19), transcribed and typed research journal

entries, transcribed recordings of interactions with students, participant observation fieldnotes, artifact documents reflecting the students' English classwork, test scores, and attendance records, and usage data captured by the mobile devices themselves. As I was often working with students and not free to take fieldnotes during class, I compensated by taking notes immediately after each class, in the faculty lounge during breaks, and by dictating a research journal on my way home from each visit to the school (see Appendix 20). Atkinson & Coffey (2001) propose that qualitative researchers can triangulate using data generated by mixed methods, with the spoken and observed bearing equal weight:

> Participant observation and interviewing are in themselves distinctive forms of social actions, generating distinctive kinds of accounts and giving rise to particular kinds of social analysis. Each yields particular sorts of textual representation (ibid., p. 808).

An overview of the data-generation methods in this study, and the research questions they addressed, is shown in Table 3, below:

Table 3: Data Generation Methods and RQ's

Method	Research Question	Number of instances (see dates in Appendix 1)
Semi-structured interviews with students, teachers, headmaster, guidance counselors, and MoE English inspector. (29 total)	**RQ 1-4**	MoE English Inspector – 1: during her annual visit to the school Headmaster – 2: pre- and post-intervention Teachers – 4: The ninth- and tenth-grade teachers were interviewed both pre- and post-intervention Students – 11 pre-intervention interviews (6 tenth-grade and 5 ninth-grade students); 8 post-intervention interviews (4 tenth-grade and 4 ninth-grade students, those who were at school during my visits of the final several weeks of the school year) Guidance counselors – 2 : 9th and 10th grade counselors, toward the end of the intervention
English Skills Assessments (19 total) Pre- and post- intervention	**RQ1**	Pre-intervention: 11 Post-intervention: 8 (those who were in school the final several weeks of the school year)
Participant Observation fieldnotes (on 27 visits)	**RQ 1-4**	Fieldnotes from the 27 days I participated in classes (List of visit dates in Appendix 1.)
Research Journal, dictated and transcribed and written directly **(32 entries)**	**RQ 1-4**	32 research journal entries, including the 27 school visits involving classes, the initial interview and meeting with the headmaster, and entries between visits and post-intervention (including after phone or email contacts with teachers).
Artifact Documents	**RQ 1-3**	Tenth-grade teacher's grade record, samples of quizzes and tests. Ninth-grade learners' writing samples. Lists of food orders for milestone celebrations.
Usage data captured automatically by devices	**RQ1**	Planned, but not fully implemented, as a) the headmaster requested that I block access to wi-fi and b) I did not receive all the devices back. The data was collected, alternatively but less precisely, through observation, interview, and artifact documents. This should be attempted again in future research.

The multiple methods of data generation provided a rich, multi-dimensional view of the issues of interest and were chosen for their appropriateness to the research context. As discussed in the next section, this data was imported into NVivo and coded to identify

themes and triangulate to create cases of individual learners. Pre-and-post-intervention skills assessments were compared for each learner.

Semi-structured interviews with students, teachers, and other school staff

Data on the students and school were generated through interviews with the headmaster, guidance counselors, and teachers, in addition to my observation of and interactions with the students, as some aspects important to the study (e.g. feelings, emotions, opinions, thoughts, background, history such as participants' accounts of their previous English-learning experiences) could not be observed directly, and I hoped, through interviewing participants, to "enter into the other person's perspective…To find out what is in and on someone else's mind" (Patton, 2002, p. 341). Cohen et al. (2011, p. 409) concur that "interviews enable participants – be they interviewers or interviewees – to discuss their interpretations of the world…and to express how they regard situations from their own point of view." The semi-structured interview format, with guiding questions toward answering the research questions, was chosen to provide sufficient flexibility for participants to raise issues and for me to probe points raised by participants, thereby achieving a balance among the strengths and weaknesses of approaches on the continuum between structured, standardized and informal, natural interview approaches as conceptualized by Patton (1980, p. 206). I interviewed research participants (teachers, students and headmaster) before and after the intervention, and compared responses (see Appendices 6 & 7). Data on individual learners' personal backgrounds was generated from the more structured questions about their families, previous education, and experiences with English. Likewise, I included questions for the teachers on their previous English-teaching experience, how they came to this school, and beliefs about their learners.

The interviews were recorded (in Hebrew) in audio files and I transcribed them, translating them into English and noting salient features of speaker, date, tone, pacing, and setting in order to retain valuable information and dimensionality, an issue noted by Dunne, Pryor, & Yates (2005). See Appendix 19 for a sample interview transcript.

English skills assessment

Pre- and post-intervention English skill assessments were administered and evaluated with attention to the delta on individual questions. I employed a standard assessment I devised for use by teachers/tutors, based on methods advocated by Hickey (Combley, 2001) to evaluate beginning English learners' ability in the four language skills, emphasizing basic literacy (see Appendices 8-9). The assessment checked learners' knowledge of letter-sound

correspondence and of rules determining letter sounds. The assessment has been evaluated by colleagues in my field, provides a well-rounded picture of learners' areas of ability and challenge, and has been refined based on feedback over ten years of use. It identifies both English knowledge of emergent readers and learning differences, e.g. directional and phonological processing issues. To adapt it for secondary school research participants and to measure their ability to read an English text outside the context of the intervention materials, I wrote a new miscue text to approximate some in the 3-unit English Bagrut (EFL Matriculation Exam), i.e. classified ads for employment and services.

In addition to the assessment described above, as I personally am oriented to multimodal forms of learning and data, and in creating the app had attempted to harness the power of multimodality toward language learning, I built into the app the facility to record and play back the user's own voice reading aloud. Given this non-intrusive method of potentially creating precise records of the student's progress in developing their reading skills, I had planned to evaluate these recorded readings using the Miscue Analysis technique. However, since I have still not received most of the devices, my field recordings and notes compensated with partial data of this type.

Participant Observation

Understanding that the God trick of standing outside the research situation and observing objectively as a fly on the wall is not an available option in observation, I obtained permission to be present in the participants' English classrooms. When present as a participant observer, I attempted to be a non-threatening, non-distracting presence, but my researcher identity as an American-born, Israeli-by-choice, middle-aged, upper-middle-class, college-educated English-speaking woman who speaks American-accented Hebrew, the creator of the app and an English teacher, was of great interest to both students and teachers, and had a direct effect on the relationships I formed with them. Issues of concern raised by positivist concepts of research such as contaminating data through participation, modifying the observed behaviors by my very presence, and deceiving the other participants by hiding my purpose in being at the school (Borg & Gall, 1979, p. 345) have been addressed by full acknowledgement of my researcher positionality and subjectivity.

I visited the school one day weekly (excepting holidays) over eight months, for a total of 29 visits to the school, performing pre-intervention and post-intervention interviews and assessments and, most of the time, participating in classes and working with individual or pairs of students. Cognizant of Dunne, Pryor & Yates's (2005) point that "what is

noteworthy inevitably depends on the observer" (p. 66) and that "capturing observations as neutral, objective data becomes an unattainable goal" (p. 67) I evaluated the tradeoffs of more and less structured observation (Cohen et al., 2011). I concluded that a structured observation schedule was neither desirable nor feasible in this classroom research setting, and determined to take field notes containing thick descriptions to capture information answering questions posed by LeCompte and Preissle (1993) as cited by Cohen et al. (2011, pp. 466-467), including e.g. who participants are and how they interact, what events are occurring and why, what resources are used, and what is said. I realized it was ambitious to capture so many simultaneous situational facets, and, from the first day of observation, I became cognizant that:

> *There are so many aspects to notice in observation! What the teacher is doing, the curriculum content, students' ability to participate, what else they are doing* (fieldnotes, October 14).

I considered how to capture in note form a thick record of what was going on in the classroom:

> *Even with only 4 learners and the teacher, it's hard to observe what's going on, in detail, simultaneously with all of them. Maybe observe them by turns? Sample their activity?* (fieldnotes, December 7).

My notes were partial, as notetaking was often disruptive to my interactions with participants. (For this reason, when interviewing, I recorded the conversation for later transcription.) When possible, or when I thought it would not make participants self-conscious, I made fieldnotes during and between classes and supplemented these real-time notes of field observation by recording interactions and dictating research journal entries immediately following or preceding visits (Appendix 20).

Research Journal

At the end of each visit to the school, immediately upon commencing the drive home, I dictated and recorded my impressions, recollections, thoughts and observations about what had happened in school that day, problems encountered, possible solutions, and reflected on what had occurred and how it compared to my pre-visit expectations. I also dictated my thoughts on the drive up to the school regarding my retrospective reflections on the previous week's visit, my anticipation of what would happen that day at school, and my plans for the visit. This research journal provided the means of capturing ongoing, overlapping, and progressive stages in the action research spiral of observe, reflect, act, evaluate, and modify described by McNiff & Whitehead (2011, p. 9) and to capture

accounts of "personal action, reflection on the action, and the learning arising from it" (ibid., p. 144). As noted by Dunne, Pryor & Yates (2005, p. 24), the keeping of a research journal removes rigidity among these sequential stages, as all, including analysis, may be captured in entries as the research progresses. My journal allowed me to document "the development of perceptions and insights across various stages of the research" (Altrichter & Holly, 2005, p. 25):

> If, as Foucault (1972) observed, everything is already interpretation, the research diary can make more interpretation visible, enabling the researcher to be a spectator of the 'facts' and of the reconstructive process which brings them into being, and, from, that, to generate new understandings (ibid., p. 27).

I transcribed the recordings of my dictated accounts and reflections, and sometimes typed entries directly. This journal contains my increasingly-focused understanding of what factors were shaping participants' English-learning experience while using the intervention, and the repeated themes that arose as the weeks unfolded. In keeping with the action research cycle that involves reflection and adaptation of the intervention, the intervention evolved to address problems experienced. I recorded my attempted solutions to the challenges we faced, and my evolving awareness of the complexity of reaching learning goals.

Artifact Documents containing samples of student work, quizzes, teachers' records

I gathered relevant artifact documents about the English learning of the research participants (see Appendix 21). Sarah, the tenth-grade class's teacher-soldier whose class participated more actively in the intervention, provided me copies of her class grade and attendance book and samples of tests and quizzes. I also collected samples of the writing of the two ninth-grade students whom I tutored. These documents are representative of the type of data that normally track students' English attainments.

Usage data captured automatically by the mobile devices

One of the affordances of digital technology is its ability to capture and transmit usage data non-intrusively. I had user consent to capture such data and transmit them to an analytics service. I intended to use this data to measure patterns in behaviors that enhance learning, such as frequency and length of review. However, due to the school's requirement that the devices not connect to the Internet to avoid distracting the students, this data was not captured and transmitted.

3.7 Methods of Data Analysis: Distilling data into findings

Data were analyzed for both their nomothetic and idiographic properties, i.e. patterns, emergent and pre-identified themes, trends, and individual/unique events, people and behaviors (Cohen et al., 2011, p. 542). Maxwell (2012) describes two basic approaches to qualitative data analysis, categorization and connecting strategies, and describes how these may complement one another. The use of a case study approach, looking at the full set of data for an individual learner, was a connecting strategy for a comprehensive view of individual research participants. The connections among the data for a given learner helped me understand and explain factors affecting variations in learning outcomes.

I started to informally analyze data and develop theories while the intervention was in process, in keeping with the action research approach of short cycles whereby the intervention is continually adjusted to accommodate received feedback, thereby improving outcomes to the extent possible. The formal process of data analysis followed the intervention, when I translated and transcribed voice recordings into text and imported all data into NVivo: transcripts of recordings, fieldnotes, research journal, assessments, and artifacts. I then coded the data, using the same set of codes for all data sets (see Appendix 22), thereby triangulating using data generated by multiple, parallel and overlapping means, e.g. the data sets might include several records of the same event, including a transcript of a recording of a session of a student reading aloud to me, my field notes taken during the reading session, and my research journal account of the session dictated immediately afterward. The data on English skills attainments of each learner during the year were organized by codes for learners to derive a cogent picture of each learner's profile, process and outcomes. Notations by me and the teacher about learners' progress were compiled into an Excel spreadsheet (see Appendix 9, Table 8-Table 9.)

The question "what is this data about?" can be answered from many perspectives and on many levels. I coded the data in NVivo with an eye toward identifying themes that addressed the research questions. As I planned to present some individual student cases, I also coded the data by the participant to whom it pertained. I chose to look at individual cases because "How we learn from the singular case is related to how the case is like and unlike other cases we do know…what is known about one case may very well be true about a similar case" (Stake, 2005, p. 454). I later selected the three student case studies in Chapter 4 based on their having the most complete, multi-dimensional data about the participant's EFL achievements, learning and personal profiles, given more frequent school

attendance. I observed that my viewpoint played a significant role in how I interpreted and coded the themes of the data, as Bhaskar (1978b) observes,

> The reality of the posited explanation must then, of course, be subjected to empirical scrutiny (for in general more than one explanation will be consistent with the phenomenon concerned) (pp. 3-4).

I derived the initial codes from my research questions, conceptual and theoretical frameworks, and added emergent codes as I progressed to identify those elements that had coalesced as influential factors, with my interpretation of the data generated guided by the conceptual and theoretical frameworks discussed in Chapter 2. Data was viewed through the lens of Vygotskian social constructivism and language development, and the overlapping concepts on learning to read, learning to read in L2, struggling literacy learners, motivation, and use of MALL in language learning shaped my emerging understanding. Factors in the students' personal profiles were coded so that I could connect the outcomes for a given student to aspects of their profile that might shape them. I coded to support both individual case studies and themes so that the data would be grouped by both dimensions when I wrote up my findings.

After coding all data, I grouped and consolidated codes by theme or subject into 'nodes' and found that 'stories' gradually emerged that I then used as an outline for my findings. This was an iterative process, as related themes were consolidated and grouped themselves into two chapters on findings, divided into those that mostly reflected human and environmental factors and those primarily related to technology factors. These follow this chapter.

As I analyzed the data and wrote up the findings, greater theories, implications, and directions for future research emerged. Throughout the research and writing process I reflected at increasing levels of theorization about the meaning and implications of the findings and their relevance to other learners and contexts. This both required and empowered me to stretch my ambition and think about how these findings could contribute, and what else should be investigated, to promote educational literacy goals.

3.8 Researcher positionality and identity

My field of practice is in training teachers in the Hickey Method and in creating learning materials to extend the reach of this approach. In studying subjects so closely bound up

with my own identity, I have brought my viewpoint to the research, as observed by Clark (2003):

> One thing we cannot do, one trick we cannot perform, is to extract ourselves entirely from the mesh of worldly goings-on – and view them from a distance …Having nowhere to stand outside the fray also means that there is no ground from which to couch laws or principles of judgement that are beyond circumstances, or applicable to every eventuality…we have ourselves been forged, shaped and reshaped out of a lifetime of encounters and engagements (ibid., p.42).

As action research in my field of professional practice, the study was inextricably interwoven with my professional identity. I am an advocate of this method, wrote the intervention materials, and built this MALL app to address problems I see in my professional practice. Rather than negating my reliability as a researcher, and though my understanding and interpretations are both corrigible and limited (Archer et al., 1998), my involvement in this research was the "indispensable starting point" (ibid., p. xvi) of understanding how these Vygotskian language-learning tools may potentially benefit literacy learners. I acknowledge that my commitment to these materials means that I am not 'objective.' Other researchers who investigate further will not be as closely identified with them as I.

Education action researchers are characteristically committed to exploring solutions to problems in their teaching practice. I am deeply committed to exploring new ways to address literacy-acquisition problems using tools that I am in the position, due to my particular professional identity and experience, to develop. The current study might be viewed as one in an ongoing series of investigations, following the action research cycle of observation, reflection, action, evaluation, and modification (McNiff & Whitehead, 2011) that I have executed since 2003, when I first became a Hickey tutor, and started to craft tools to make this method available to more learners. The previous formal research I carried out on this subject was with a mixed-ability group of beginning EFL third grade students (Levitt, 2013a). I am familiar with other methods of EFL teaching, and the Hickey Method approach is not needed by all learners. But for those who need it, it is a powerful tool.

When I met the research participants, their perceptions of me, which affected the relationship I developed with them during the research, included my age, gender, identity as an American immigrant to Israel, educational level, socio-economic class, parental and marital status. My values, inter-personal style, personality and assumptions about my role shaped how I interacted with them. These nuanced, complex personal relationships

between me and the participants shaped how I enacted my several roles of participant-teacher-researcher, the intervention materials' entrepreneur-developer-owner, and expert outsider to the English Inspectorate of the MoE. This is one of the ways that research is subjective.

As mentioned, my role at the school during my weekly visits rapidly evolved toward active work with the students in order to provide more individual attention. I was the intervention's champion, and pushed to maintain student and teacher momentum and energy. Had I not been present, it would have been easier for all concerned to simply relax expectations of the students' English progress:

> *So we all want this to succeed and my role as an action researcher is also to push, to make sure enough learning time is devoted to the project. So I'm putting pressure, not just giving it to them and seeing how they activate it – I'm pushing* (fieldnotes, November 23, 2014).

This is another way that my researcher positionality affected the research outcomes, and raises some questions that will be discussed in Chapter 6, particularly, who are the stakeholders who really care that struggling EFL learners learn English, when they are not expected to take standardized exams and therefore will not be included in the statistics that bring funding and recognition to the school? Though their teachers make reasonable efforts to teach them English, hoping that greater English skill would contribute to their well-being and success in life, no one else had the ambitious expectation I did that if students would engage seriously with the intervention, continuing into the following year, they could pass the 3-unit English Bagrut in 12th grade. I believe this based on my past experience with non-reader learning-disabled (LD) high school EFL learners.

The research findings grew out of data that accurately reflects my perception of what occurred, reliably and honestly reported. My strong motivation not to give in to the obstacles in implementing the intervention kept participants focused on progressing and contributed to positive outcomes. My researcher positionality shaped my adjustments to the intervention during the action research cycle, e.g. investigating 'solutions' to address student avoidance mechanisms. I believe all motivated teachers should likewise pursue creative means to engage their students, but not every teacher is as motivated as I was, and as found in the study, teacher motivation is a crucial factor in an intervention's success. Being the creator of the materials was significant, even in sparking participants' interest in the intervention. Teachers in other schools, committed to the progress of their LD high school students, have observed similar results working with the intervention materials, so I

remain confident that the findings presented here are not solely due to my having been a participant-researcher-teacher in this study.

3.9 Descriptive, Interpretive, Theoretical and Evaluative Validity

I sought through my research design to construct a coherent approach to generating and analyzing data, and drew findings grounded in the data to provide insights that I hope will be useful in improving English-teaching or other literacy-teaching both in similar and different contexts. Though these provided insights from a learner population of a specific profile and context, and the sample size was small (11 learners and two teachers), this research can be seen as:

> a single instance that offers a more generalizable insight…to form a mini-hypothesis that can go on to inform future observation and analysis (Dunne, Pryor & Yates, 2005, p. 23).

The legitimacy of drawing broader insights from a single instance underpins the case study approach, and is why I employed it. The findings represent my understanding of what occurred, and I hope provide directions for further inquiry in other contexts. Implicit in this study, as in other educational research, is the desire for the findings to be transformative and, in some way, increase social justice, equity, and fairness.

Research can add to our perception of reality, with loaded concepts of validity, understanding, and evidence characterizing the conclusions that can be drawn. Many different terms are used for the soundness of findings, reflecting researchers' understanding of their aims. My ontological-epistemological stance that there is a reality, and we construct our understanding of it, leads me to believe that:

> …the nature of this reality is critical for assessing the sorts of understandings we can attain, the conclusions that embody these understandings, and the evidence we use to reach these (Maxwell, 2012, p. 127).

Several necessary steps in the chain of reaching sound findings, in order to accurately reflect the reality that the findings purport to represent, include:

1) descriptive; i.e., does the researcher's account really represent what happened?

2) interpretive, i.e., do the connections made by the researcher reflect the real meaning of the data? and

3) theoretical, i.e., can the researcher connect aspects studied in order to create a theory of what has gone on, possibly with relevance to other contexts? (ibid.).

My attempt at every stage, from design, through data generation, analysis, and theorization, has been to use my best judgment and employ the theoretical frameworks discussed in the previous chapter for an in-depth understanding of issues raised by the research questions. I have attempted to remain aware of alternate interpretations of the data, though reflexivity on my researcher positionality and identity acknowledges my subjective position in relation to the research.

3.10 Ethical Frameworks and Approval

The ethical goals for this research included:

- Protecting and respecting participants' confidentiality, anonymity, dignity and privacy,
- Providing an intervention that I expected to benefit the participants,
- Ensuring that learners participated voluntarily in addition to parents' consent,
- Reflecting responsibly and honestly on my own researcher positionality,
- Consideration of the various types of validity of the findings,
- Acknowledging the limitations on the generalizability of findings.

Confidentiality and anonymity have been ensured by employing aliases and by keeping data in a secure, locked location in the researcher's home. The research involved 11 teenagers (ages 13-17) in ninth and tenth grades who, due to their age, were classed as vulnerable subjects. The work was conducted in the context of their regular English classes, involving data collection during normal teaching interaction with students and did not introduce risks outside of normal school routine. The intervention was agreed to by the English teachers for enrichment purposes to the learners, and differed from normal school practice only in the type of learning approach employed and in data collection for research purposes.

I received permission to provide the intervention and study its effects on the learners (see Appendix 2). Consent letters for signature by parents, learners, and school personnel were approved by the university's Ethical Approval committee (see Appendices 3-5), then translated into Hebrew and provided to the English coordinator.

3.11 Limitations

Every aspect of this study provided insight into the research questions, but also delimited generalizability of findings. My researcher positionality uniquely positioned me to perform

this study, but my personal commitment to this approach and stake in exploring the intervention's effectiveness is not replicable by others. Competing priorities in the school setting meant that the school was often stretched to capacity in functioning as usual, without making major adjustments to my research needs. The small sample size provided in-depth understanding of each participant's case, but there are infinitely more profiles to be studied. The eight-month intervention duration provided better insight on its impact over time than shorter-intervention MALL studies, but more longitudinal study would be beneficial. These findings are based on a particular context and population, and will undoubtedly vary for others. Because the students at this school were not expected to do homework, this study could not investigate the effects of requiring independent MALL use between classes. Data generation was constrained due to the circumstances of the school, the limited time in which I had access to learners and teachers, and my participant-teacher role. I was not given formal access to personal information about the students and had to glean information from observation and interviews. Even so, I believe that the study developed significant insights into what transpired and supports a new theorization of how MALL can be used to bolster literacy acquisition among challenged learner populations in many contexts and settings.

Software limitations

Software development is a costly undertaking, and The English Club software used in this intervention was created with the resource constraints of my limited personal funding. Funding constraints mean that the software is modest in how it implements the scaffolded MSL approach.

Chapter 4: Findings - Human and environmental factors

Overview

This chapter discusses findings on human and environmental factors found to shape the intervention's English-learning outcomes, while the next chapter discusses factors specifically related to MALL technology. All findings in these chapters were derived via coding and analysis of the data sets (observation fieldnotes and transcripts of recordings of interactions with students and teachers, interview transcripts, research journal, pre-and-post intervention English skill assessments, and more) as described in the previous chapter.

This chapter first presents findings on students' and teachers' attitudes to English learning and previous English learning experiences. Learning behaviors that were found to shape learning, both negatively and positively, are then examined, with discussion of avoidance mechanisms and the intervention's attempts to foster motivation, followed by findings on behaviors that contributed to learning. Following are case studies of three students linking their individual learner profiles and intervention use to their English learning outcomes. Findings on the role of the teacher are then discussed, as are school characteristics that were found to positively and negatively impact learning. The chapter concludes with a summary of EFL learning outcomes.

4.1 Students' English-learning backgrounds

The participants, the weakest EFL learners in their grades, recognized the importance of English as a life skill and unanimously agreed that English was important for general purposes (travel and communication) and specific ones (jobs, using technology interfaces, social media, games). They opined that English is a global language needed for travel abroad that would help them in life. One mentioned English as a career requirement. The students' unanimous belief in English as an important life skill was a positive basis from which to embark on the intervention (Ushioda, 2011).

Participants' previous English-learning was sparse and ineffective. They had failed to master reading skills with resultant learned helplessness, amotivation and negative self-image (Noels, 2000). Though they may have formally studied English from third grade (age 8), they had not developed grade-level skills, and their inability to participate often resulted in disruptive behavior and exclusion from class. Frustration with having been taught outside her zone of proximal development (ZPD) was expressed by Pansy:

> *[I learned English] since … third grade?... I don't know anything at all…I wasn't in class…I would go out. [I would describe my level in English,] from one to ten? Minus zero. Like, minus one. …they didn't teach me! They taught me from up above, from high, despite the fact that I was in the lowest group. …like, everyone made progress and I got stuck behind, I didn't understand, they would talk to each other and I didn't understand* (baseline interview with Pansy, Nov. 16, 2014).

Participant learners' current skill levels and accounts of previous learning suggested that they had been taught by methods or in settings inappropriate to their learning needs (Morris et al., 2000; Amendum et al., 2011). Nevertheless, most participants expressed confidence that they would eventually know English. A minority acknowledged this depended on their own efforts.

The participant teachers sympathetically acknowledged students' language learning difficulties, in both Hebrew and English (corroborating Snowling and Hulme, 2012a). Orna, experienced with weak English learners, asserted that inconsistent school attendance, learning issues, home environments unsupportive of schoolwork, and family backgrounds had impeded her students' English learning. She was reluctant to judge previous schools, accepting full responsibility for addressing lacunae in knowledge. Sarah attributed learners' lack of progress to their own lack of effort. Neither blamed a mismatch between teaching approaches and students' needs for learners' weak English skills. Both resisted the suggestion that methods more suitable to students' learning profiles would have been more efficacious (see Shaywitz, 2003; Kuhn et al., 2010; Snowling & Hulme, 2012a).

The teachers endorsed basic English as a life skill and expressed commitment to the students' English learning, even if studies would not culminate in the Bagrut matriculation exam, but believed that the students themselves lacked motivation due to not being on a Bagrut track. Both observed that this school is exceptional in supporting English studies for non-Bagrut students.

To summarize, the students thought learning English was important and that they would succeed. They demonstrated little awareness of what would increase likelihood of success. Their interest and confidence was a positive basis on which to begin the intervention, and met Peer and Reid's (2001) criteria for successful work with challenged secondary-school learners. The intervention was designed to teach skills that they ostensibly believed they could master. The teachers were committed to students learning English. Participants were theoretically receptive to an intervention using innovative methods.

4.2 Student learning behaviors

Avoidance Mechanisms and Motivation

Although Hebrew and Arabic are the primary languages needed for everyday life in Israel, the larger sociolinguistic and sociocultural picture in Israel positions English as a global language of central importance to the lives of all Israelis. EFL is a required subject in all schools, and demonstrated skill in English is needed to achieve the prized status of high-school matriculation, acceptance to tertiary education, and remunerative employment (see Appendix 24 for a fuller discussion of the role of English as a global language in Israel). As mentioned in the previous section, the participant students ostensibly recognized the importance of knowing English as a global language (though it was posited by a teacher that students might only be repeating the 'party line' they had heard from adults, and had not truly internalized this goal), and expressed confidence that they would, one day, know English. The issue with motivation of these students, therefore, appeared to be a disconnect between their theoretical desire to learn English and the very real effort required to achieve this success, with frequent lack of readiness to invest the engagement needed to support their own language learning.

During the intervention, the students exhibited avoidance mechanisms diminishing time and energy devoted to learning. Prevalent was their claim that they lacked strength or energy. Absence from school, attempts to 'cut' class, and distracted behavior were common, and disruptive student behaviors were observed in every class. Though the school officially required that cellphones be put away, students often interacted with cellphones during class. Many of the students had attention deficits and hyperactivity issues (ADD/ADHD), with limit-checking and sometimes violent behavior. Constant effort was required to keep learners focused on learning tasks and goals.

Success in language-learning depends on students taking responsibility for their own learning (Oxford, 1990). Participants avoided this, frequently deflecting learning tasks with the common Israeli one-shoulder shrug of passive resistance, saying "I don't have the strength." Sulimani (2002) and Secemski (2002) agree that this phrase reflects learned helplessness. Teacher persistence was required to overcome this resistance. When a teacher whom they liked and trusted firmly insisted, the student sometimes cooperated. At all times, teachers' coaxing, redirection, firm negotiation and limit-setting were required to persuade students to attempt tasks.

Participant students did not consistently exhibit intrinsic motivation to perform the repeated activities, review, and practice needed (Oxford, 1994) to support effective EFL language learning. Avoidance mechanisms presented a significant challenge to linking effort to successful outcomes. The quest to motivate learners to engage was a major theme. Valued incentives initially included the positive personal relationship with the teacher (Frymier, 2000), grades, praise, pride, competition among students, class identity and team spirit that developed over time. Sarah added English Club material to graded tests and quizzes, composed straightforward tests, and graded generously to bolster learners' self-efficacy (see Appendix 9). These conventional teacher immediacy rewards helped persuade students to devote time to their English learning.

An initial reaction to the first level of the MALL app was that it was "childish" (fieldnotes, Nov. 16, 2014). This concern about the childishness of beginning language learning materials is also a well-known issue. Non-reader second-chance learners' skill in the target language is minimal, and thus it is difficult to provide age-appropriate content (see Campell, 1987; Heyer, 1998; Guariento & Morley, 2001; O'Donnell, 2009).

In my role as participant-observer-teacher, I was unwilling to compromise for the minimal effort and slow progress that typified these students. The most significant obstacle to learners' progress was their lack of motivation to make an effort. Based on the literature (e.g. Leafstedt et al., 2004; MacDonald & Figuerado, 2010; Snowling & Hulme, 2012) and on my professional experience, I firmly expected that the intervention approach would support these learners' needs, and that they could make solid progress if they would engage. Once they saw their efforts bear fruit, they would enjoy intrinsic rewards and would develop momentum, pride, strengthened self-efficacy and motivation (Trombly Latham, 2008). Guided by motivation theory that posits the synergy of extrinsic and intrinsic rewards (Elliot & Covington, 2001; Hendijani et al., 2016) I offered unconventional extrinsic rewards to celebrate learning milestones.

Even teachers often lack motivation to explore ways to increase student learning outcomes (Pritchett, 2013). At this school, teachers placed a high priority on students' well-being but had low expectations for the English achievement of these weak English learners. I, however, had seen this scaffolded MSL approach succeed with profoundly learning-disabled (LD) students, and was not fatalistic. I resisted capitulating to avoidance mechanisms and disruptions, and to marking time without learning progress. My goals for the students were ambitious, and it was of personal interest to me to push the learners to

use the intervention to improve their English skills. My researcher positionality thus motivated me to identify unconventional incentives that would raise the level of student effort. I considered incentives valued by the learners, concurring with Covington (2001) that "the true enemy of intrinsic engagement is the pursuit of avoidance goals driven by fear of failure" (p. 87).

After the initial novelty effect of the iPods wore off, the students realized that even with innovative game-like technology, language learning requires effort. They evidenced little readiness to make that effort, and given their previous experience of failure, there was little reason to expect this to change. My November 30 fieldnotes describe Omri's flagging energy. Remembering my Hickey mentor's suggestion (Secemski, 2002) to offer a pizza party at the completion of Level 10, I offered pizza for the class's reaching this milestone.

This occasioned excitement and interest, and became a group and individual goal, enhancing team spirit among these socially-oriented adolescent learners. The tenth-grade class had a pizza party on January 25 for reaching Level 10, over two months after receiving their iPods on November 16 (see Table 5). They were excited and enthusiastic and proposed the ambitious aim of achieving the next milestone (Level 20) within two weeks. They shared their 'spoils' with friends from other classes, who were mildly envious and impressed that the participants were using 'cool' technology (see Reid et al., 2013) and had earned this special reward, thereby neutralizing some of the stigma of being in the weakest English classes, and increasing participants' social capital. The food itself was symbolic. Though it was appreciated for itself, as evidenced by the participants' evident pleasure in ordering and devouring it, their excitement, discussion of, and interest in the group celebration suggested that acknowledgement of their human needs, public recognition, and novelty of this recognition in a school setting spurred motivation (fieldnotes, January 25, 2015).

The event served its purpose, and the menu for the next milestone party inspired animated debate, with extensive speculation regarding when they would reach the Level 20 goal. The tenth-grade class reached this milestone on February 22, less than one month later – a significant improvement in pace. The students' chose schwarma (Mid-Eastern meat sandwiches) for their second celebration, with detailed individualized orders. I honored these to demonstrate my respect for their individuality and reward their efforts, as they were anxious for me to respect their individual preferences (fieldnotes, February 22, 2015). That I was willing to invest the effort, time and money to provide individualized

recognition made a deep impression on the students, evidenced by their animated discussion, and addressed their affective needs. Learners' negotiation for these rewards, and the efforts they invested to attain them, attested that they valued this recognition, which contributed to overcoming avoidance behaviors. Subsequently, when motivation flagged, I occasionally offered a chocolate for every story read aloud to me, a more immediate gratification. This was also extremely effective in fostering engagement.

When offering extrinsic rewards, Sarah and I had to carefully define the learning goal required to earn them, as learners invested minimum necessary effort, e.g. they negotiated the definition of "reaching Level 10," with Omri insisting he only had to unlock the app to Level 10, and Sarah requiring that he read all the stories aloud including Level 10. All target behaviors had to be clearly specified, as students avoided activities they considered extraneous.

This was a controversial way to foster student engagement, causing Orna to cynically refer to the intervention as "the schwarma method," to object that she could not afford to provide such rewards, that the school's budget would not cover them. Although she showed me an article from an EFL textbook (Carmel, 1995, p. 135) describing a U.S. inner-city school project with disadvantaged youth (Herbert, 1993; Hahn et al., 2010) that paid at-risk students to stay in school, her feeling that such rewards were dubious contributed to her skepticism about the intervention. I was aware that introducing such atypical food rewards was an additional variable, in addition to others of the intervention, that needed to be openly discussed in my findings, and I believe that I have clearly indicated the important role I found celebratory food rewards to play in motivating the students to engage in language learning, and the importance of motivation to language learning in general. Knowing that learning milestones are often rewarded in multitudinous other ways gave me confidence that, as long as I was open in describing their role, celebrations of learning milestones involving food were not an ethical infraction. My recommendations for policy and practice include a suggestion to educational authorities to consider providing meaningful rewards (whatever these might be in a given context) to learners in recognition of their learning efforts and to incentivize them to make those efforts.

The extrinsic rewards proved effective in engaging the students. At the point when students themselves started seeing genuine progress in their English skills, intrinsic pride surfaced, as my February 8 fieldnotes observe, *"David read through L19 story (in book)…He's very proud! He can read now!*" Their dawning understanding of effort's link with achievement

increased momentum mid-year, corroborating Hendijani et al. (2016) that "Both performance-contingent rewards and intrinsic motivation improved motivation and performance" (p. 1) and Elliot & Covington's (2001) observation that "extrinsic reward and intrinsic motivation can become complementary and additive" (ibid., p. 2).

The learners who had started as the weakest in their classes demonstrated the most dramatic gains in momentum once they developed confidence in their own ability to learn via this scaffolded method within their ZPD (Vygotsky, 1978). The intervention demonstrated to them that investing effort led to successful learning outcomes. Their growing confidence empowered them to compete intellectually where they had previously failed:

> *[W]ith Yoav, I think it was … the competition…. more with himself, he wanted to be like the rest of the group. The rest read, he was the exception. That was what motivated him* (Sarah exit interview, June 7, 2015).

David made particularly good progress, once he gained confidence in his ability to succeed:

> *For David … it was very hard for him to read, but what motivated him was to surpass everyone, or to get the prize –that really, really motivated him...He was ready to invest effort, yes, when he saw the reward, he saw it is a goal* (Sarah exit interview, June 7, 2015).

As the school year progressed, the sense developed of the class having a unifying team goal. The extrinsic rewards created energy and momentum, fueling attainments which gradually shifted learners' motivation from extrinsic to intrinsic rewards as the students realized that their investment of effort was paying off in increased English literacy, the ability to read texts aloud and understand them, and resultant feeling of pride and achievement. This provided unfamiliar gratification, which in turn motivated them to continue to invest effort.

To summarize, given the limited time available for improving English skills, various rewards proved to be effective incentives to increase time on task. Experiencing achievement and success created further motivation to invest effort and energy, as the students realized this would lead to positive intrinsic, as well as extrinsic, rewards.

Effective Learning Behaviors

When students engaged in learning, it was found that the program scaffolded by the English Club app and books and accompanied by teachers supported their literacy acquisition. In taking an active role, learners activated language-learning strategies that

addressed cognitive, metacognitive, affective, memory, and other learning dimensions (Oxford, 1990). Sarah and I supported the scaffolded Multi-sensory Structured Language (MSL) instructional approach and encouraged engagement. Learners' individual profiles determined how they interacted with the app, books, and teachers.

Sarah integrated the intervention as a central element in the weaker tenth-grade class and the MALL app as a tool for independent learning by Yoav, the single non-reader in her stronger class. The six tenth-grade research participants used the app and books to varying degrees during English class hours, and the following examples come from my observations of them. The two ninth-grade participants whom I tutored individually and together, while their teacher Orna taught the rest of the ninth-grade class, worked less consistently in school with the app (Shalom's device had been confiscated, and Vladi did not often bring his device to school, though he reported that he worked with it at home). Rather, I worked with them by the more traditional tutoring method using the books. When they applied themselves, they too made good progress by this scaffolded approach.

Learners' individual attention spans and learner profiles determined how they interacted with the app. My most frequent opportunity to closely observe and record a student's interaction with the MALL app was with Yoav, the sole participant from his class. He preferred the app to the books, and despite starting behind all other participants in English skills, worked independently through all 50 levels. By the end of the school year, he had learned to read and write English and understood the stories. He accomplished this almost exclusively through independent use of the MALL device due to the good fit between the MALL intervention and his learning profile (see case study in next section), with facilitating intervention by teachers limited to requiring him to work with the MALL device, providing encouragement and hearing him read stories aloud. Due to Yoav's dogged motivation and concentration ability, he made excellent progress and was the only research participant who completed all 50 levels. An early example of Yoav's effective learning interaction with the app follows:

> *I came to Yoav's class – he is working intently with earphones…Noticed his ability to concentrate. At 11:00 he asked for help – was stuck. Said "I have no strength"…I showed him how to do the white card for the letter "I"; he did it. Said "snake" aloud (repeating from the sound he heard on the s white card). … Yoav is working independently.*
> *11:08 Yoav is up to yellow word cards – repeating the words aloud. Got to the story – reading it aloud! I showed him how to record himself. Tapped twice – he heard himself. Green cards – (word writing) I showed him how to operate. He wrote a word, left out a vowel – I showed him how to return to the white cards to see how to write the sound…*

> *He figured out that he can look back at yellow card to see the word spelling. Fine! He can "copy" – he has to take a visual snapshot, remember, and reproduce – it's a good aid…*
> *11:20 Yoav still engrossed. The others are doing a test/worksheet…Yoav is up to the game. He chose most of the words correctly the first time! When he didn't know he just guessed randomly all four.*
> *11:23 Yoav: "Enough! I can't do any more. This is retarded" (the game repeats for a long time)…I told him – "great, you did almost a whole level in half an hour!" Half an hour of solid concentration – great!* (Fieldnotes, Nov. 16, 2014).

Some of the typical scaffolded MSL MALL activities in which this learner actively engaged were: choosing clue words to help remember a letter's sound(s), practicing writing lower-case and capital letters, reading and repeating words aloud, reading story text aloud with recording and playback, writing words from their sounds or by copying them, and correctly identifying words from their sounds and pictures. Though the pictures provided a visual clue to meaning, in addition to the translation into Hebrew that the learner could display, all activities required learners to decode and encode the word in its text form. As he actively engaged in these learning activities in the app, Yoav internalized the skills and knowledge they scaffolded. Two weeks later, he was able to read a story aloud to me and displayed increased speed in word recognition, practice having improved fluency (Kuhn et al., 2010). Neither Yoav nor the other research participants knew enough English to mimic reading aloud by memorizing sentences describing story illustrations. Participants' methodical decoding indicated that they were reading the printed text.

Ruth quickly and independently worked her way through the app to L27, at home, but remained reticent to read aloud. Once she was persuaded by Sarah to do so and succeeded, she gained confidence and read numerous stories aloud in succession.

Use of earphones helped learners to concentrate and work individually without disturbing others, and reduced learners' self-consciousness about replaying words or making mistakes. Hearing the sounds of words and stories said aloud while learners read the text provides exposure to spoken language that is typically, for beginning EFL learners, otherwise limited to hearing their teacher in class. Use of the app expanded exposure to spoken English beyond the English classroom, empowering learners to hear target material outside of interaction with the teacher (which a book does not provide). Playing words aloud is an app affordance that also provides a model of the correct pronunciation of words, in the accent of a native English speaker (a supplement to the accent they hear from their native Israeli teachers). Replaying a word's sound also provides an emergent reader a more solid basis on which to choose the correct answer when identifying a word:

> *David: doing game, replays words several times (about 4 times) when he doesn't know the answer… he replays the sound of the words in the game 3-8 times before choosing the (almost always) correct spelling* (fieldnotes, Dec. 7).

Working independently with the app allowed learners to progress at their own paces and repeat activities without embarrassment. When they engaged in these effective learning behaviors, they succeeded in internalizing the material, evidenced by their subsequent ability to read story texts aloud and explain their meanings.

A combination of using the app to introduce and integrate new material, followed by reading the story aloud from the book to a teacher, proved a practical and effective way for the students to advance in their reading skills. In reading aloud, students made reading errors which they sometimes self-corrected, or Sarah or I repeated the line of text correctly. The following typical transcript of a student re-reading a text to me after working independently with the app shows his reading miscues and my prompts and scaffolding of his decoding and comprehension. This session reflects the precisely targeted, individualized, scaffolded approach to Vygotskian language tutoring in the ZPD, providing the feedback and encouragement needed at that moment to help the learner advance from assisted to independent performance (see Wood, Bruner, & Ross, 1976):

> *Timed second attempt from 3:41 minute mark: O: Ned naps in tis F: his O: his tint, in his cap. Nes pet tin sitis F: Wait, let's go over this word – "hen," this isn't "t"*
> *O: Hen. This is Can-can, the cat. Can-can spins. F: that's (t). O: spits at the hen. Ned can't m…nap. Ned stinds. F: (ă). O: stands. He spins. Scat Can-Can, Ned spins. F: what's that word? O: said.*
> *Sarah: Did you see how he reads, you saw? F: he's reading!*
> *O: Hen isn't in the nest. Hen, hen, said Ned. Ned is sad. The hin isn't in the nest. The hen is in Ned's cap, Ned can nap.*
> *Done at 6:33 (2 minutes and 50 seconds [this second time is almost one minute, or 25% shorter, to read the story]). Yay!* (transcript of recording from Dec. 7, 2014, comments added during transcription).

These laborious attempts to read aloud, supported by the teacher, were typical effective learning behaviors, necessary for emergent readers (Hempenstall, 2005); Rosenthal & Ehri, 2011). With sufficient repetition, reading practice supported the development of accuracy, fluency, automaticity, prosody, and comprehension in reading (Kuhn et al., 2010). As decoding became automatized, attention was freed for comprehension.

Ruth was stronger in English, but lacked confidence, while David had profound problems in phonemic awareness, and could not read at all at the beginning of the year. Teaming these two complementary and compatible students proved an effective strategy to keep

them engaged. It was Sarah's inspiration that they would be a good team because they got along well and David was highly motivated to prove to Ruth that he could make progress, while Ruth used her stronger knowledge to play the role of 'teacher.' Their social gratification provided an additional reward.

Between us, Sarah and I often had the tenth-grade class covered for individual/pair work. The students took turns reading aloud, while any student not reading with a teacher worked with a device.

In summary, the tenth-grade learners, encouraged by their teacher to actively engage in the intervention, all succeeded in acquiring new English skills through effective learning behaviors. These included independently using the MALL app on mobile devices. These activities were followed by individual or pair work with teachers, with students reading aloud and discussing the meanings of word lists and story texts from the books and integrating all they had learned toward decoding and comprehension. Teachers provided reading feedback through modeling correct pronunciation and asked "wh" questions about the story text to scaffold comprehension by encouraging students to turn their attention to the meaning of the text and to make inferences. When students actively engaged in these effective learning behaviors, they made significant progress in acquiring new English skills.

4.3 Cases of Individual Learners

How much English each student learned, the pace of progress, their strengths and challenges, and how they reacted to the intervention differed among students depending on their learning and personal profiles. Learners demonstrated widely varying abilities to interact independently with the materials. The balance among use of the app, books, and teacher time was adjusted to each user:

> *…it's individual to each one – to some it came easily to work with the iPod, and there are some for whom it came more easily to sit and read [from the books], to practice reading. Zach didn't manage…he just didn't get through the levels on the iPod, he got up to level 5 or 6, and he didn't have much energy for it and he left it with me and didn't want to take it home with him…. But from the point of view of reading [from the books] he did improve* (Sarah exit interview, June 7, 2015).

The ability to concentrate and stay on task was observed to be critical to systematic, independent interaction with the MALL app, confirming earlier findings (Levitt, 2013a) that learners with language learning disabilities were able to work independently with the app, excepting those with pronounced ADD/ADHD. In the current study, a higher

percentage of the students had attention disorders and found it difficult to focus and work steadily with the app.

The learners related to the app differently depending on their personalities and learning needs. The scaffolded approach succeeded when they engaged in practice even for learners with profound dyslexia or phonemic awareness issues. Thus, each learner's emotional availability and motivation, together with their organic learning issues and other aspects of their profiles, shaped the extent of their language-learning progress, as measured by the level number they reached.

The following three exploratory learner cases (Streb, 2012) were chosen to illustrate the English skills development of learners with differing combinations of organic and environmental challenges and because the data was most complete for these students, who attended school regularly and whose teacher actively supported the intervention. The data was analyzed for a holistic picture of the student's learning profile, interaction with the intervention, and learning outcomes (Yin, 1993).

4.3.1. Yoav

Yoav, the only tenth-grade student with virtually no knowledge of English before the intervention, was a dramatic example of a successful match between a learner's needs and abilities and the MALL intervention, as his natural preference was to interact with a mobile device and he had a long attention span when doing so. It was my impression that Yoav evidenced symptoms of Asperger's syndrome, rarely smiling nor making eye contact, though I received no official confirmation from the school of this (I was told informally by a teacher that he had a chromosomal abnormality) and when I asked the grade counselor about it, she abruptly ended the interview and said she had to ask the headmaster about sharing personal information about the students with me (which she did not do). Yoav was highly motivated, knowing that his English level was the lowest in his class and grade. This combination of learner traits with the scaffolded app was therefore an ideal match. Sarah was firm in requiring him to work independently with the app during class time, while she taught the rest of his higher-level class. When required, he demonstrated his new ability to read the stories aloud from the book and to explain them.

On my school visits, I sat with Yoav for two hours while he worked but he preferred to interact with the app, saying "I can figure it out alone" (fieldnotes, Nov. 16, 2014). I thus had ample opportunity to observe and take notes on how he employed it. In Sarah's exit

interview, we discussed Yoav's phenomenal progress from being a complete non-reader to reading aloud and explaining all 50 of the stories in the intervention program, almost exclusively through use of the MALL intervention:

> *S: Yoav invested the effort … it was really important to him to know.*
>
> *F: He really did every single thing in the app – he wrote every word – he didn't write it on his own, he copied, but he heard the words, sometimes several times to make sure he really knew what they said, then he chose – with almost no mistakes when he identified words in the game – and this from really scratch, right?*
>
> *S: Really from absolute scratch. Yoav started with me – he has very low self-esteem, and he knows, it's not a secret, that he's the weakest one in the group. And he's in a group of kids who are, on the whole, on a pretty high level. And his level is at the extreme opposite end. And it [the app] really saved him, from the point of view of not feeling like a misfit, and I also told him, that if he gets up to level 50, it's about the level of the group from the point of reading and vocabulary. So that's what motivated him: he wanted to be like everyone in the group. So, regarding him, it was amazing and he did it as quickly as possible, just because he didn't want to feel the gap with the class. … so at the end of the day, it really helped him. And afterward, I made them a bingo game with all kinds of words that appeared in the app, he was able to answer lots of words that he really didn't know before.*
>
> *F: Not just to read them, but also their meaning?*
>
> *S: It was enough that I said the word, and he already knew how to look for and find it in English, and also the meaning. The fact that he knew how to identify a written word – he didn't know that before, not even the letters – not at all, not even a little bit! So really Yoav went through an amazing transformation* (Sarah exit interview, June 7, 2015*).*

Yoav benefited greatly from the app: his skills improved immensely (see Figures 3-5). The app enabled him to work independently of his class and provided the appropriately scaffolded instruction and practice that he needed, and which there was no trained remedial English teacher available to otherwise provide. Taught completely through the MALL app, he would carefully sound out and repeat words that he read aloud from both the app and the books. Conversely, he ignored any teacher feedback while he read aloud.

I had observed Yoav's starting point during my first class observation. Because he could not read, Yoav played on his iPhone the entire lesson, did not look at the board, and refused Sarah's efforts to engage him. He had no involvement in and derived no benefit from the class, reinforcing his outsider status (fieldnotes, October 14, 2014).

I noted Yoav's unusual relationship with technology during the pretest, when he methodically used his cellphone keyboard, a Vygotskian "mediator" (Bodrova & Leong,

2007), to recall the lower and upper-case letters. This strategy evidenced his resourceful technology use, motivation, and persistence. I allowed this, an instance of practical digital literacy (Warschauer, 2007; Mitra, 2012) (see Figure 3). The second column shows the same task on the post-test, which he completed without his cellphone. He had developed confidence to attempt this task without his keyboard, moving from Vygotskian 'assisted' to 'independent' performance.

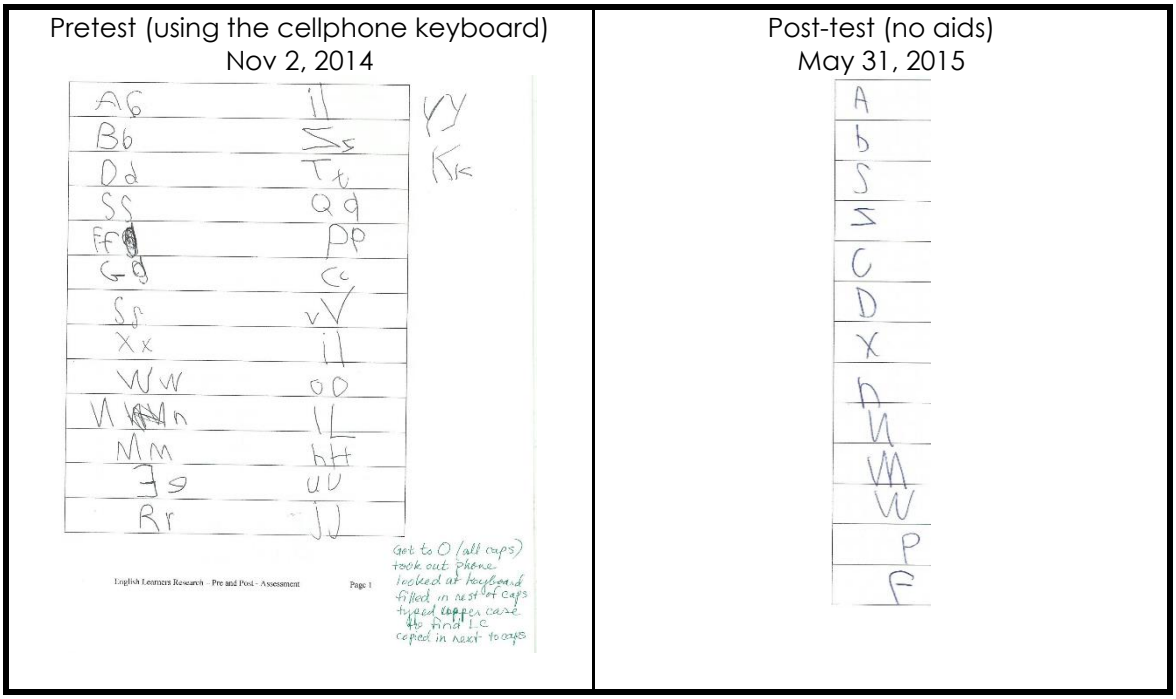


Figure 3: Yoav's letter-writing, pretest and post-test

Yoav's concentration ability was reflected in his attentive use of the app, as observed in a MALL session (fieldnotes, December 7, 2014). He skipped the review opening the level, but then systematically copied 12 individual words, repeating each aloud, once checked the sound of "e," and though he copied rather than attempting to write words from hearing alone, he scored an impressively high percentage of first-time correct answers in the word-identification game. Yoav displayed persistence in performing tasks he could have skipped, and progressed steadily:

> *Sarah came to report that Yoav read with earphones through L8, and said "it suits him…He's made so much progress. He couldn't read at all at the beginning of the year"* (fieldnotes, January 11, 2015).

Yoav read slowly and mouthed words when he read to himself in both English and Hebrew, as evidently he was also a challenged reader in his L1 (a common pattern; see Ganschow & Sparks, 2001). However, his speed in identifying words in the game increased

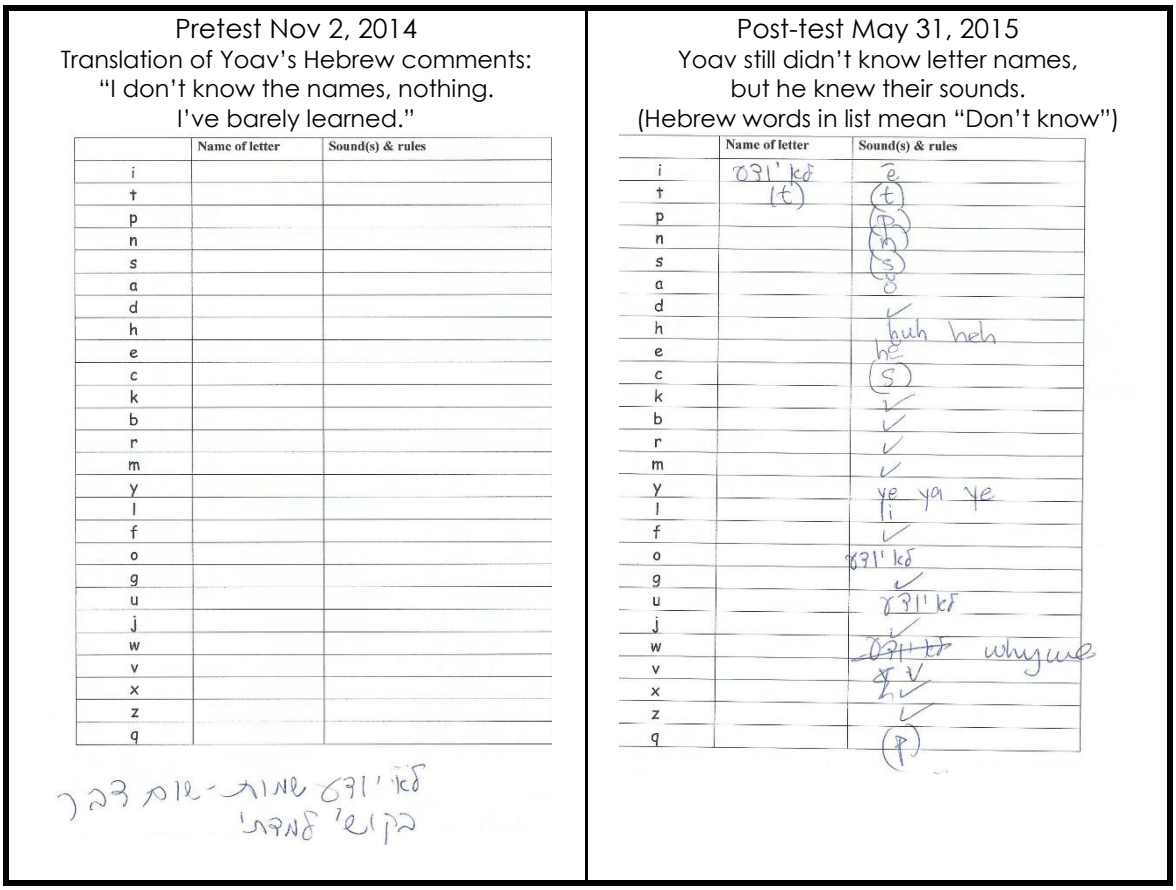
over time as he gained reading fluency and word identification skills. He sought out and attentively read the Hebrew translations of words and stories, building vocabulary and comprehension in L2 while engaging in mutually reinforcing reading practice in L1 together with phonological and reading practice in L2. He wrote words on the screen of the iPod with his thumb, his eyebrows following his movements, a multi-sensory, kinaesthetic aid to internalizing letter shapes (Snowling & Hulme, 2012a).

With his unflagging attention and ability to systematically perform repetitive tasks, Yoav worked through the app levels conscientiously and demonstrated what he learned, exclusively through the MALL app. Representative notes observe him play the game of Level 37:

> *Played the game as usual: repeats word in games, looks carefully, makes almost no mistakes in game. Is slow, replays words and repeats them aloud under his breath, attentive – chooses right the first time, usually.*
> *F: "How do you know which word to choose? The first letter?" Y: "I read the word". He can get to 2000 points without being kicked out of game at all! [i.e. not making 3 mistakes in choosing about 65 correct answers the first time]* (fieldnotes, May 3, 2015).

His preference persisted for working with the app over interacting with me, but he read aloud to me or to Sarah, as required, all 50 stories, sometimes several at a time, though he read so intently that he never acknowledged hearing feedback. As has been observed by Cook (2012), some forms of autism, such as Asperger Syndrome, actually may provide learners with outstanding abilities that particularly suit them to technology use, e.g. excellent concentration in repetitive tasks for longer than average and strong memory for details. Yoav's abilities worked in his favor in using MALL. Other factors supporting Yoav's learning were that most of his English classes transpired as scheduled and his attendance record was excellent, so he had approximately twice as many English class hours for the year as the students in the other tenth-grade class, who often had half their weekly class hours cancelled.

Yoav successfully completed all 50 levels of the app on the last day of school, and read aloud to me the last ten stories on that day (June 14, 2014), for which I delivered to his school bus en route home (the driver graciously idled at the turnoff as I raced back to meet them) Yoav's requested reward of two McDonald's Big Mac meals. Comparison of his post-test to pretest results demonstrate a dramatic change in Yoav's abilities to say the sounds of letters and to read a text, as shown in Figures 4-5:



Pretest Nov 2, 2014
Translation of Yoav's Hebrew comments:
"I don't know the names, nothing.
I've barely learned."

	Name of letter	Sound(s) & rules
i		
t		
p		
n		
s		
a		
d		
h		
e		
c		
k		
b		
r		
m		
y		
l		
f		
o		
g		
u		
j		
w		
v		
x		
z		
q		

Post-test May 31, 2015
Yoav still didn't know letter names,
but he knew their sounds.
(Hebrew words in list mean "Don't know")

	Name of letter	Sound(s) & rules
i	לא יודע	e
t	(t)	(t)
p		(p)
n		(n)
s		(s)
a		a
d		✓
h		huh heh
e		he
c		(s)
k		✓
b		✓
r		✓
m		✓
y		ye ya ye
l		li
f		✓
o		לא יודע
g		✓
u		לא יודע
j		✓
w		~~לא יודע~~ whyuwe
v		✓
x		✓
z		✓
q		(p)

Figure 4: Yoav, Stating letter names and sounds, pretest and post-test

Figure 4 is a strong indication that Yoav learned the letter sounds directly from The English Club app, which focuses on the sounds of the letters, as grapheme-phoneme correspondence is required for decoding (Gough & Tunmer, 1986; Tunmer & Hoover, 1993), and the letter name is heard only when the learner plays letter-writing videos.

The majority of sounds Yoav stated (19 of 26) are correct. Analysis of errors shows that they are typical of LD L1-Hebrew EFL learners. He still does not have a solid idea of the vowel sounds (some of which do not exist in Hebrew); has a directional issue with "q"; is aware that "y" has multiple sounds; gives the (s) sound for "c" rather than the (k) sound learned in the app; gives one of the two sounds for "s" learned in the app. To progress further, it would be helpful for a teacher to clarify these issues, but he learned a remarkable amount from his independent use of the MALL app.

Most dramatic was the change in Yoav's ability to read (see Figure 5). In the pretest, he did not even attempt to read. In the post-test, he read the entire text quite fluently and accurately. Following is our interchange about reading the miscue passage on the post-test. Though he attempted to avoid reading, sympathetic persuasion overcame his mild

resistance. Post-intervention, Yoav had both the knowledge and the confidence to attempt this task. An additional evident benefit of working with the app was that he had begun to imitate the accent of a native English speaker.

> *F: Okay. So now you will read to me – like the stories that we read, and I think you already learned all the letters…*
> *Y: No, no, I don't have the strength to read*
> *F: I know…it's not more than one story, and we read sometimes <u>ten</u> stories at a time, right?*
> *Y: Yes.*
> *F: Okay, so read to me.*
> *Y: ALL this?*
> *F: [lightly] Yes, all this.*
> *Y: I don't have the strength.*
> *F: Try. I know that it demands strength. Try.*
> *Y: What does this say?*
> *F: Look – what's this?*
> *Y: **"Jobs"***
> *[Reading aloud continues to timestamp, his reading is slow and halting, but he moves ahead pretty confidently and steadily and definitely recognizes the letters and often says the right sound; I notice a pretty good accent when he says things like numbers]* (May 31, 2015, transcript of post-test).

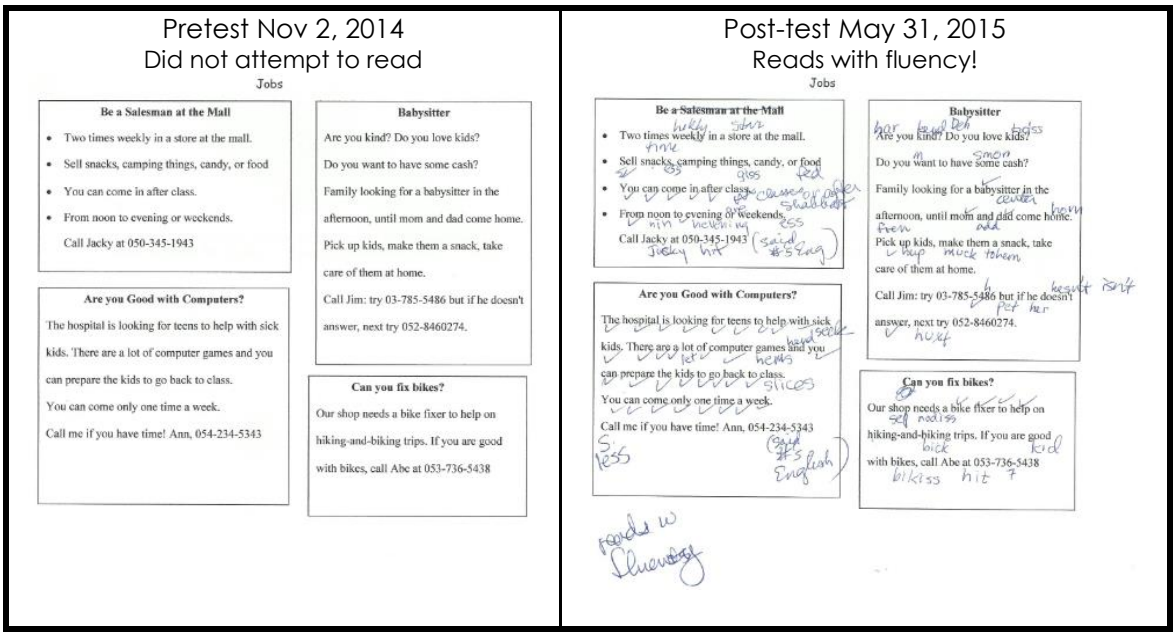


Figure 5: Yoav - Reading Aloud - Miscue analysis, pretest and post-test

Yoav has become an English reader who can read an unfamiliar text without pictures. This demonstrates that, outside of the context of the intervention materials, Yoav can decode

unfamiliar regular words containing the letters and letter combinations taught in the intervention. Further instruction should teach additional letter combinations to equip learners to decode any regular word and more irregular words, and oral use of the language to practice vocabulary that was learned and its incorporation in conversation. With more practice and clarification of the sounds of a few letters, Yoav has the foundation to become increasingly fluent and accurate in his reading and to devote attention to comprehension. He now has the skills to participate in his English class, which he could not do before.

4.3.2 David

David made significant progress in his English skills during the intervention, and after initial resistance, picked up momentum as he gained confidence. He initially displayed poor self-esteem, passivity, low energy, and lack of English skills. He lives at the type of boarding school chosen when family life is dysfunctional. The paucity of his language skills in L1 suggested a background with little language stimulation during his developmental years, possibly due to low SES and parental levels of education (see Hoff & Tian, 2005). He evidenced phonological processing weaknesses, possibly heritable, with his parents having similar challenges. From a Vygotskian view, his lack of language skills denied him tools for thinking and conceptualization. David did not appear to be a promising student at the intervention's outset, but as the year progressed, he made remarkable progress, despite his significant challenges:

> *I sat with David and heard him read several stories from the printed book (through 19) and he wanted to continue to read 20 aloud but the bell rang. I noticed a pronounced problem with phonemic awareness [when reading words with] –i_e – the long I sound – he can't remember, can't hold it in his memory and retrieve the sound again even until the very next word on the list.*
>
> *– we went over the three levels containing i-magic-e variations and even after he heard the long I words, and repeated them, he persistently returned to short i or other pronunciations when he was reading. He also asked competitively about what level another student got up to. He's starting to smile embarrassedly as he hears praise for having made such good progress* (Field notes, Feb 8 2015).

By mid-year, David displayed intrinsic satisfaction in his achievement, and his high earned medal count in the app attested to his frequent and voluntary use of the app:

> *David is proud as punch, glowing, to show that the app is open to L21! (3054 medals)…<u>Against all odds!</u> David's making progress, starting to apply himself, more cooperative. … It's hard work pushing but when they make the breakthrough, it gets easier* (fieldnotes, Feb 15, 2016).

The same day, he began to demonstrate more interest in story content, with attention freed for comprehension as his fluency increased (Kuhn et al., 2010):

> *David's smiling but not so self-consciously that it interferes with his reading aloud. David comments on the –ike story. "They're in the forest so how did the car get there? And how does he have a bike thing on his car?" So he's doing some evaluation on the content of the story. Reading -ire words from the next story, he comments on how dumb the characters are; the bike got a flat tire because the guy kicked it* (fieldnotes, Feb 15, 2015).

David developed momentum and demonstrated a fierce drive to forge ahead through the levels:

> March 1: *David is up to 25, said "I have 8 shelves left – not a lot."*
>
> March 8: *Sarah read with <u>David</u> who is open in the app to L29 and he read her L23 story aloud from the book- they started reading words from 24 –ss*
>
> March 22: *David – 27-29 (three stories) with Sarah (open in app)*
>
> May 5: *<u>David</u> keeps saying [in English, with great enthusiasm] "fuck you" – he read through L34.*
>
> May 17: *David with Sarah…Read 35, 36, finishing 37 with a lot of distractions. His friend came in early and listened, distracting him. Calls Ned "Nod." Decodes, adds syllable at end for –s – "runiss."*

Despite his serious language issues and lack of reading perfection he had made strong progress and evidenced determined motivation to acquire further English skills via the MALL app. His experience of success fueled his growing confidence that he would see positive outcomes for investing effort (Stanovich, 1986; Oakes et al., 2010). Sarah described his attainments:

> *Regarding David, it also very, very, very much helped him. …he got 100 on every test. He got a certificate of excellence this year in English… he doesn't do so well in his other subjects, so this really will give him a good feeling at the end of the year. And he <u>invests effort</u>, he got into this subject this year, and it's the most important thing to him, and he doesn't miss lessons – it's really, really important to him and he feels like he's the best one in the group, which is also really good* (Sarah exit interview, June 7, 2015).

Following is a sample of David's English skills before and after the intervention. David wrote the letters in Figure 6 from memory on the pretest and 21 additional letters (minus "x") on the post-test.

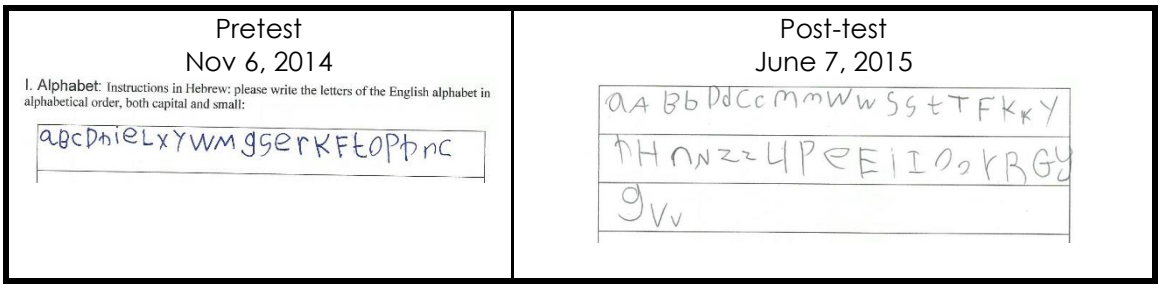


Figure 6: David's letter-writing, pretest and post-test

Most dramatic was the improvement in David's ability and willingness to read aloud (Figure 7). In the pretest, he read aloud one word -"two"- as "tum," said "I don't know" lay on the table and refused to read further. In the post-test, David read straight through the entire text, slowly but determinedly. The miscue notation below shows a check mark above words read accurately, and approximate phonetic representation of words read incorrectly. The majority of words were read correctly, and the errors reflected phonologically close approximation of correct word sounds. He commented on the meaning of some words (e.g. "babysitter"). Further decoding practice and automaticity will free more of his attention for comprehension.

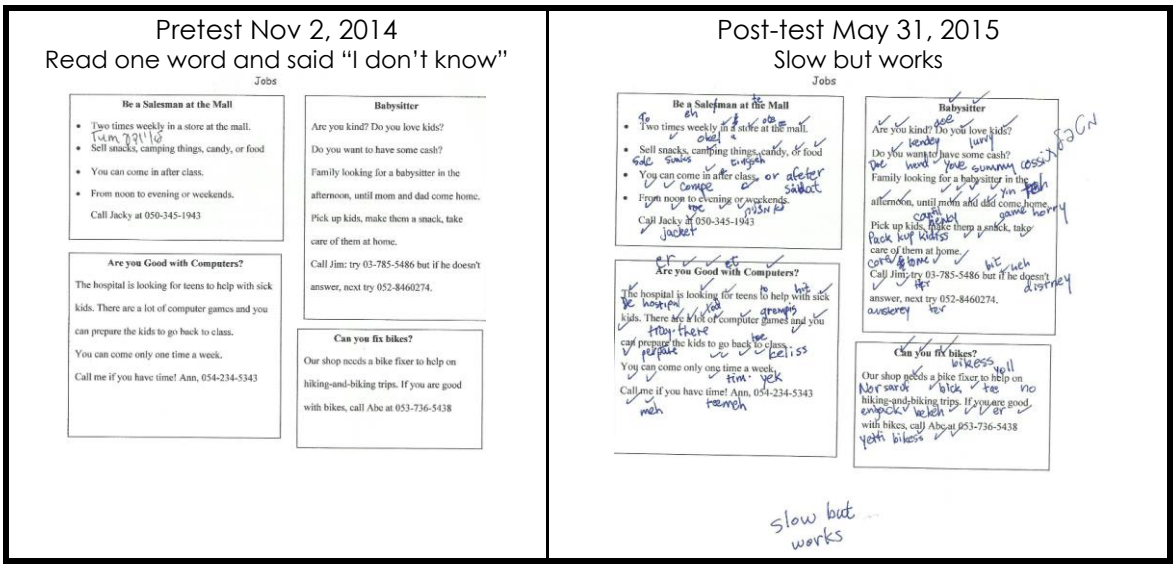


Figure 7: David - Reading Aloud - Miscue analysis, pretest and post-test

The improvement was significant. This student, who started tenth grade as a non-reader, had within seven months developed the skills and confidence of an English reader.

4.3.2 Ruth

Ruth had marked language ability and the strongest English knowledge in the weaker tenth-grade class. She was bilingual from home, speaking both Russian and Hebrew, and helped Sarah translate the Hebrew definitions of English words for Andrei, a Russian-speaking new immigrant. (In Ruth's case, we see some of the benefits of learning multiple languages at a young age on thinking and language skills, as theorized by Vygotsky, 1986.) Ruth's issues were emotional; her social preoccupations, intense need for attention and lack of ambition contributed to her lack of seriousness about studies, though she loved coming to school and rose at five each morning to do her hair, makeup and outfit. Her drive and ability to use the MALL app independently were unique: she reported after her first weekend with the iPod that she had sat in bed all day and unlocked the first 13 levels of the English Club app, and one week later, she had unlocked through Level 27. Her iPod evidenced this progress. She told me she worked with it when she was bored. She had completed all the activities and correctly identified about 65 English words per level. Thus, when not distracted by social pulls in school, she was able to focus on using the app.

Ruth's social preoccupations often absorbed her energies fully, and she skipped class, came late or drifted in and out, preferring to be with friends outside. This led to her suspension from school, when she missed more class time. Sarah perceived that providing Ruth with gratifying social interactions in class would engage her in English studies, and Ruth often worked with David, whom she liked and with whom she felt comfortable. She also enjoyed the flirtatious attention of another boy in the class, Omri, enough to cooperate on working toward the milestone celebrations.

With coaxing by Sarah, whom she trusted and respected and whom she admired as a barely-older role model, Ruth developed willingness to read aloud the simple intervention texts. Because they were well within her ZPD, and increased only gradually in complexity, she overcame her earlier refusal to read aloud. The simple activities of reading aloud and discussing the meaning of the texts increased her confidence in her English ability. As she had worked ahead independently in the app, she knew that there would be no unpleasantly surprising demands. A habitual under-achiever, she experienced success, demonstrating that learners' affective needs are important in scaffolding learning (Lyytinen et al., 2007; Allington, 2013). Sarah's opinion was:

> *Regarding Ruth, she had good previous knowledge, relative to the group I mean, because she knew how to read, she just is very lacking in confidence. So from the point of view of confidence it did give it to her, also the practice, and we really forced her…you remember she would say she didn't have*

> *the energy…we really kept at her until she was ready to read, and it worked, at the end of the day* (Sarah exit interview, June 7, 2015).

It was evident that the device with the MALL app was a medium that enabled this learner to work independently, away from the distractions of school and without fear of failure. The novelty effect was powerful at first, when she made rapid progress.

Ruth exemplified students who lack confidence and practice, rather than English knowledge or ability. The intervention provided her a safe environment in which to practice, and rewards for doing so. She progressed significantly in reading aloud increasingly difficult texts and benefited from preview, review, and reinforcement. She used the app privately, heard words and texts spoken aloud, and felt reassured that she would not embarrass herself when reading aloud in class. Her reading avoidance behavior was evidently based on anxiety about humiliation (Csizer et al., 2010; Connor et al., 2014). The intervention helped this student overcome her fears and read aloud all the stories in the intervention materials through Level 40 to Sarah, though she still refused to read the text in the post-test aloud to me. This was an additional instance of my lack of skill in convincing Ruth to read aloud, compared to Sarah, e.g here Ruth read five stories and word lists aloud to Sarah when she only agreed to read one to me:

> *Class hour 3 10th graders – Ruth said, "I haven't got strength to read."*
> *She's up to L27. Said she does it in bed when she's bored.*
> *We went to the car to get books.*
> *She read me L1; "I have no strength."*
> *then – went out to talk to friend*
> *I sat with Omri*
> *She came back and sat with Sarah and read the word lists and story up to L6! from the book*
> (Fieldnotes, November 30, 2014).

Ruth's pre- and post-test results are shown below. Figure 8 shows that in the post-test, she wrote all 26 English letters (capital and small) in the same clear, accurate print in which she had written 24 letters in the pretest, including in the post-test the two letters U and V that she had neglected previously:

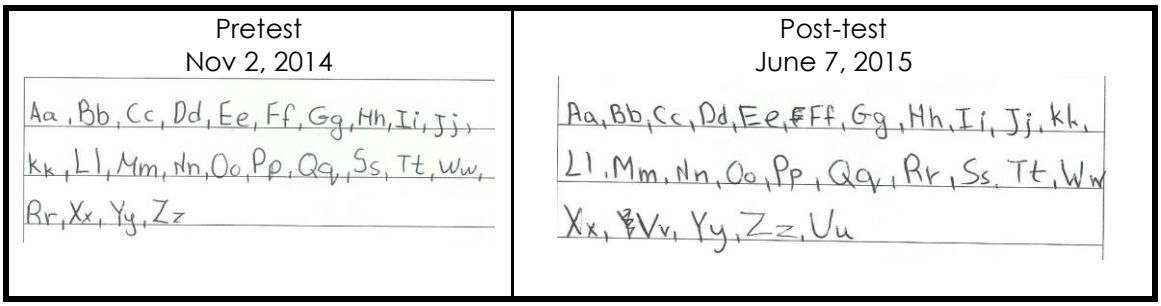


Figure 8: Ruth's letter-writing, pretest and post-test

Ruth's knowledge of letter names and sounds was quite strong before the intervention, and improved somewhat through the intervention (see below; remarkably consistent answers from pre- to post-test, with newly correct answers e.g. for the sounds of "p", "d", "m", and "z" and the name of "y").

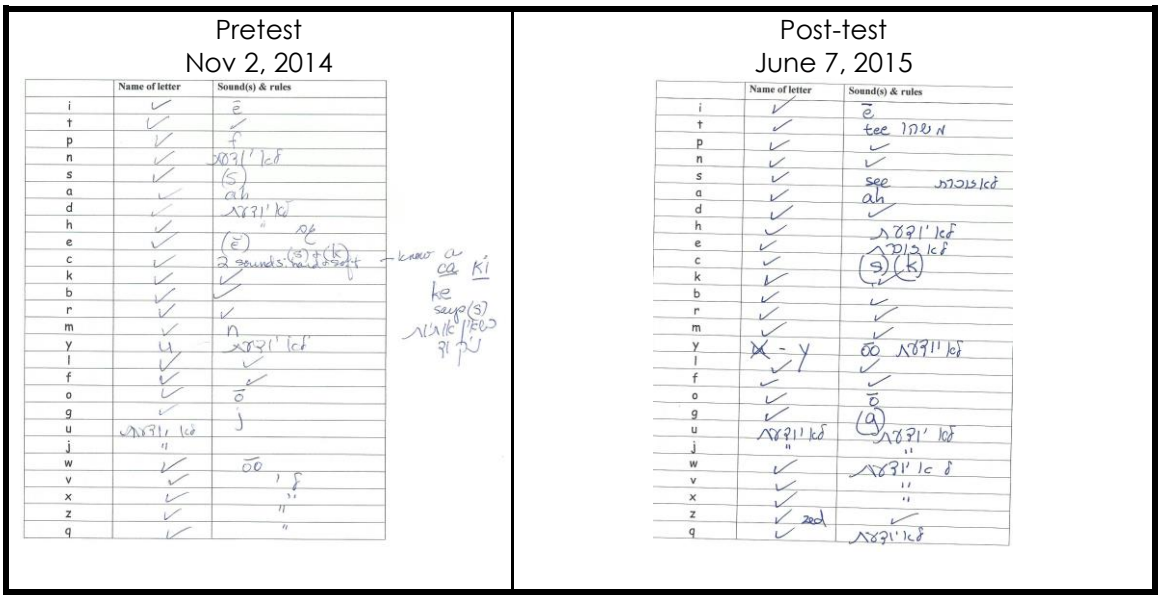


Figure 9: Ruth, Stating letter names and sounds, pretest and post-test

Ruth successfully resisted reading the miscue analysis text aloud to me in both the pretest and the post-test, resulting in both of those pages remaining blank, with the exception of the comment in the pretest, "*Are you crazy?"* (colloquial Hebrew, non-literal translation of "*mah pitom*") and in the post-test, "*I'm too tired, I didn't get to sleep until four in the morning.*" Even in this final activity, Ruth's social preoccupations interfered with her channeling her strong language knowledge and ability into engagement with schoolwork.

4.4 The Teacher's Role

Previous studies found that learners working with self-paced CALL or MALL tools benefit from the accompanying support of teachers, are more likely to persevere, and make better progress given this support (Mitra and Dangwal, 2010, Nielson, 2011). The findings of this study strongly support this position. Teachers were an essential component in the success of this intervention.

This section discusses two aspects of teachers' supportive role in the intervention. First, the teacher's accompaniment complemented and supplemented the affordances of MALL and printed materials as Sarah and I both engaged, motivated, praised, guided, and redirected learners. These findings corroborate the essential role of teachers in technology-based learning (see Warschauer, 2007). Second, it was found that teacher commitment was vital to the intervention. Without a motivated teacher taking an active role, inertia and entropy dissipated learning efforts.

The role of teachers was changed by the use of MALL from designing curriculum and direct instruction to providing encouragement and feedback. Teachers heard learners read aloud from books, and Sarah also incorporated the material in her frontal teaching and assessments. The balance among MALL app, books and teacher accompaniment to individuals or dyads was adjusted to suit each learner's needs and support work within their ZPD. All three elements supported the affordances of the other two. Teachers provided clarification and feedback on individual learners' reading issues as envisioned in the Vygotskian tutoring relationship. Some learners, who did not manage well with the MALL app, advanced almost exclusively through their work with teachers.

Sarah, the teacher of the two tenth-grade weak English classes, and Orna, the teacher of the weak ninth-grade English class, both maintained positive relationships with learners whereby teacher and learner were allies working for the student's success (Vygotsky, 1978). Sarah felt that her role as a teacher when the learners used devices included explaining meaning of texts, providing feedback to correct their reading, ensuring that they read the passages in the app, and motivating them to make an effort when they worked alone.

Teachers provided positive feedback and personally-suited scaffolding targeted precisely to the learner, as described by Wood et al. (1976). For example, students often left out vowels when encoding words they heard from the app, a common mistake for Hebrew-speaking EFL learners. A teacher repeated the word, enunciating each sound, drew the learner's

attention to the missing sound, and demonstrated in the app how to remind himself of the encoding of the vowel sound. The teachers thus adjusted MALL instruction to the learner.

Students who consistently used the app learned from it most of their new knowledge supporting English reading. Teachers accompanied, redirected, encouraged, verified and clarified students' understanding of rules of English:

> *He read me the story from L6 twice…He reads haltingly and needs reinforcement with blending, mixes up d & p (a classic dyslexia directional issue, we discussed it, I wrote both down to show him how similar they are and try to find a way to differentiate), I asked him if he remembers what n't means from the tip video (he did) also the 's rule from the tip video (he did)* (Field notes, Dec. 7).

Frequent teacher attention to individual learners was critical. The main activity performed with teachers was reading word lists and story texts aloud, mostly from the books. Some learners who were impatient with the app, who had a briefer attention span, or who did not find the app intuitive needed a higher proportion of teacher attention. These students needed the warmth, encouragement, reinforcement, feedback, caring, and limit-setting of a human teacher. Reading aloud from the books, with success reinforcing motivation, was the main tool used during the tenth-grade class time, supplemented by independent use of the app/devices.

Sarah expressed positive attitudes toward the pedagogical approach and the MALL technology. This chapter addresses the teachers' attitude to the pedagogical approach while the next chapter addresses teachers' attitudes to the technology component.

Sarah evinced a positive attitude toward the intervention and implemented it enthusiastically. Her students actively engaged with the MALL, and all made significant progress. The ninth-grade teacher, Orna, was an experienced and effective remedial English teacher who spoke English fluently. She did not feel a need for the intervention and had only reluctantly agreed for her students to participate. As she later released the participants she had selected from attending the planned "special assistance hour" (it conflicted with the students hands-on workshops which they greatly enjoyed), she relegated the intervention to use by her two complete non-readers, Shalom and Vladi, in weekly tutoring sessions, which I taught in the English Department office during class time, a different type of intervention than planned. They made good progress using the books, and used the MALL app to a more limited extent due to Shalom's iPod having been confiscated by a teacher-soldier who objected to his "playing catch" with it, and Vladi frequently

leaving his iPod home. Unlike the tenth-grade class, there were no available iPods to borrow during class. Orna assessed that my tutoring was responsible for the progress of Shalom, who had learning disabilities and BD. She maintained that Vladi, whose learning gaps she attributed to family neglect, would have progressed even if tutored by an untrained teacher-soldier with other materials, albeit less. The other three students whom Orna told vaguely to use the MALL intervention on their own time, attended their regular English classes and did not use the MALL app at all, correctly perceiving that Orna did not care whether they used it. Orna made no attempt to restore Shalom's iPod after its confiscation.

The two teachers' differing views of the intervention's potential effectiveness cohered with their previous experiences. Orna had extensive formal training and experience in remedial EFL teaching, was older, openly skeptical of the intervention, and had had negative experiences with educational technology. She had learned the Hickey Method and liked it, but had developed her own methods of teaching and did not feel the need for an alternative solution for any but her weakest students.

Sarah was a 19-year-old teacher-soldier with no formal training in teaching EFL, whose teaching experience comprised the previous year when she was "thrown into the water to swim" under the guidance of the school's English coordinator. Sarah had been selected by the army for this job based on her leadership qualities and English Bagrut score. Her English knowledge was just sufficient to teach her students. Her entire teacher training had been one month in the army on class management and lesson planning. She had no training in teaching EFL nor in teaching struggling readers, and had not succeeded during the previous school year in helping them systematically. She had been more successful with students possessing stronger EFL skills who were preparing for Bagrut exams.

Sarah adopted the intervention with enthusiasm, and utilized it actively in the weaker class where it was appropriate for all the learners:

> *I learned from [this method] a lot of techniques, … how to teach reading, generally; before what I did with them – I have no experience in it, it's not something I learned, so I just taught them A, B, C – just according to the order of the alphabet – and vowels, and… I didn't really have techniques, and ways to teach reading, and I think that it's a very, very good way to teach a small group of letters and straight away to read a story… when they've hardly learned any letters at all, it's <u>excellent</u>. That it progresses gradually is great* (Sarah exit interview, June 7, 2015).

Sarah accepted me as an older expert, and had no preferred alternative. She put her full authority behind the intervention. It was a central focus for her entire tenth-grade class of

weak readers, and for the lone non-reader in her stronger class. Including material from the intervention on her tests signaled to the students that she took it seriously. She also printed supplementary materials, e.g. games and activity sheets, from the Hickey website (Levitt, 2017b).

Sarah was barely older than her students. She performed her job with good will and affection, was a positive, energetic and vivacious presence in the school, was skilled at forming relationships with the learners, and applied herself to instructing them in English. She was, however, not a trained English teacher. Her willingness to use the scaffolded MSL method enabled the class to make good progress in their English reading, writing and vocabulary skills because she was fairly diligent in keeping them on task for the majority of their available learning time. It was evident that the teacher's firm commitment to keeping learners on task is essential to the success of the method.

Orna, who only nominally accepted the intervention, believed Hickey to be an excellent method but had reservations about using it with adolescents, as she thought they would find it childish, and believed it is better used one-on-one than in the classroom, common concerns about the Hickey Method. She thought "magic-e" should be introduced later and disagreed with teaching generalizable rules and patterns. Orna believed that the weak learners at this school, whom she differentiated from classically dyslexic students, would find rules that are broken by exceptions confusing and this would diminish their confidence (agreeing in this with Clymer, 1963/1996 and Johnston, 2001). These beliefs reduced Orna's support for the intervention.

As Orna was a strong, experienced teacher and English speaker she did not need the intervention for the majority of her learners. She felt that instruction by her own methods was working well. She did not want to experiment with a method that she feared might damage her learners' confidence and her control of the class. Given her profile, this was a well-founded decision. The initial plan to work with five of her weakest students during an extra 'assistance hour' soon was abandoned. Two boys, Ovadia and Sami, had basic reading skills, and sufficient motivation to participate in class to avoid attending the assistance hour that conflicted with their favorite school activity, hands-on workshops. The intervention was therefore unnecessary for them. She told them to use the app independently at home, but did not follow up, and they consequently ignored it. Her role in the intervention evolved to sending out to me two non-reader students, Vladi and Shalom, for individual and pair tutoring, so I changed the hours of my weekly visit to the school to tutor them.

Orna taught her own material in class, including to Vladi and Shalom, who were below class level, on the days I was not present. She judged their progress by whether they could read her material, and mentioned to me several times that they could not. I only expected them to read words containing letters we had covered – by my standards, they were progressing steadily in decoding and comprehension. Thus, Orna and I applied different standards of success, and she concluded that the intervention was not very effective. Shalom's comment "*What's the good of reading long words if I can only read the words in this book?*" (fieldnotes, May 10, 2015) reflected Orna's opinion, which did not prioritize teaching this student within his ZPD. She often reiterated that Vladi "actually is very bright and doesn't have real learning issues" and that Shalom was confused by the rules I had taught him.

Orna was conflicted about how to acknowledge Shalom's progress from the intervention, since he was uncooperative in class. She gave him an end-of-year grade that combined my assessment of his good progress with her own that he had not kept up with the class. It was evident to me that the class's work was outside Shalom's ZPD (Vygotsky, 1978). Unlike Yoav, Shalom did not have the self-management skills to work independently.

This discussion of the two teachers, with contrasting profiles and commitment to the intervention, demonstrates the finding that teachers must be committed to an intervention to ensure its implementation, corroborating findings by Westbrook et al (2013). Commitment to the scaffolded intervention equipped an untrained, inexperienced teacher to accompany struggling English learners in acquiring significant new literacy skills, despite having been unable to accomplish this previously. This section has shown that active teacher support is the key to students obtaining educational benefit from this intervention. Also demonstrated here is that MALL does not replace a caring, interested teacher's support.

4.5 Aspects of the School that Impacted Learning

Features of the school impacted, positively and negatively, the amount of English learning achieved during the intervention. The school provided a nurturing, caring environment sensitive to the students' personal and learning needs, with a teacher ratio and orientation that supported learning, following the New Educational Environment philosophy (Sulimani, 2002), by students who had failed in previous frameworks. Still, some factors in the environment detracted from learning. Disruptions, including the cancellation of many English class hours, students' use of their cellphones during and between classes, the no-

homework school policy, and teacher absences, diminished learning. Chaos sometimes reigned due to students' behavior. Focusing students' attention on learning was challenging.

The school provides tremendous support, including emotional, academic, transportation and nutrition, acknowledging that its learners come from complex backgrounds and home circumstances. Some students come from homes without financial or organizational resources, and are provided informally with tea and bread for their midmorning break. All receive a hot lunch. Their families may not function effectively in meeting basic and routine daily needs.

Teachers at this school collaborate to exchange information about their shared students and work as a team, as advocated by Sulimani (ibid.). Though they might have been expected to experience burn-out from working with this challenging population, they were at the school for the long term, out of choice, and displayed tremendous maturity and generosity in dealing with their students' multi-layered issues and challenging behaviors. They seemed to accept the complexities of their learners' needs and did their utmost to advance the students within the existing constraints.

Students sometimes arrive at the school with negative stereotypes of the school, and the issue of whether they will take the English matriculation exam affects their motivation:

> *They need this assurance [of taking the Bagrut exam], because when they come to this school, they feel already that this is a 'bad place.' … when they come here, they come here because …they were dropouts from other schools, or they weren't accepted; it's the second or the third choice. Many of them have extremely terrible homes, and they have homes that are very dysfunctional…So when they come here, if they don't get the matriculation exam, they say, "Oh, we are right, this is a school for dummies" and it's not!…it's a great place to learn if you have difficulties!* (Orna exit interview, May 31, 2015).

Among factors found to diminish learning was the reduced time for learning due to a long delay in beginning the intervention, frequent class cancellations and absences. It was my intention to maximize the intervention period for the 9.5 months of the school year (September 1-June 15.) Ultimately, I was able to involve the participants in learning for 6-7 months. We started late and, toward the end of the school year, the learners were already distracted by 'spring fever' and disruptions in the learning routine.

This is typical of the Israeli school system. Many hours theoretically dedicated to learning English are diverted for alternative purposes or cancelled. In practice, learning time is far less than the number of hours formally available, increasing the urgency of using them effectively. English classes were often cancelled due to Sarah's medical absences or

absences of teachers earlier in the day. Sarah confirmed that one class had had about half their English hours cancelled:

> *Every Thursday their lessons got cancelled – every Thursday! … I had two hours with them per week – one hour on Sunday with you, and one hour on Tuesday. But many times, the double lesson Thursday was cancelled, or if not cancelled, then just one or two students would come* (Sarah exit interview, June 7, 2015).

In contrast, due to his English class schedule, Yoav, who progressed the most amongst the participants, was the only tenth-grade participant who had few of his English lessons cancelled. He had a double class for independent work with the app on the day I was at the school.

> *Yoav…had only Sunday and Monday. Yoav didn't have a lot of classes cancelled, actually. He had a lot of classes. So, you really see the outcome* (Sarah exit interview, June 7, 2015).

This reduction in actual learning time was one factor shaping the intervention's outcomes. Another was that the students at this school are not expected to do homework.

> *I told Orna and Sarah to get them to review at home, and I gave a little speech about review and automaticization. Orna said: "They won't do anything at home at all – that's the situation of their families, there is no support at home for doing schoolwork"* (fieldnotes, Feb 1, 2015).

The fact that learners' voluntary use of the MALL app at home was minimal confirmed observations by Shabalina et al. (2010) and Kam (2013) that language education software, even if game-like, does not attract learners to use it voluntarily without the support and enforcement of adults. Thus, available learning time was largely limited to class. Class time, as noted, was frequently reduced. Some students were absent from school for extended periods or during inclement weather. In summary, it proved challenging to achieve adequate learning time.

4.6 English Learning Outcomes

The primary goal of this study was to investigate how this scaffolded MSL approach to teaching English, delivered through MALL, would affect the learners' English skills and confidence, and which factors influenced this process.

The English skills taught in the intervention developed through using materials outlined in Appendices 11-18. Their focus is primarily on teaching foundational literacy skills of reading, writing, comprehension and correct pronunciation. Learners' skills in these areas were measured before and after the intervention, including reading aloud an unfamiliar, unillustrated text containing the letters and letter combinations taught in the intervention.

Note that learners would need additional instruction to develop skills beyond the intervention's scope, such as decoding additional letter combinations and practicing conversational use of learned vocabulary. However, conditional on the level of target material reached, learners after the intervention can apply their new knowledge to reading words and texts in other contexts that contain letters and letter combinations they learned.

The English-learning results were largely shaped by the extent to which the learners engaged with the intervention. Students who were usually present in class and who were accompanied during the intervention by a teacher evidenced a significant improvement in their English skills and confidence. The four tenth-grade participants who attended school regularly learned actively, with a teacher's involvement, with the book and the app in varying proportions. These students all made significant progress in their English skills, as evaluated by their teacher:

> *Persistence, and whoever did what we asked them to do, achieved amazing outcomes* (Sarah exit interview, June 7, 2015).

Sarah's overall evaluation of the intervention and the learning outcomes among her students was highly positive:

> *It's a very, very thorough method, and from the point of view of how the material is divided up, the sounds, and the fact that no letters appear that they haven't yet learned, it was* <u>*excellent*</u>*. … there was nothing that they encountered that they suddenly didn't know how to read. … all of them read up to about 30, 40 stories, it was really, really good* (Sarah exit interview June 7, 2015).

Her evaluation of the learning outcome was likewise positive:

> *And the reading of all of them improved. There isn't one… that it didn't have an influence on, that it didn't cause him to improve. And I think that also the fact that we sat one-on-one…was really good, it enabled us to explain and to read with them* (Sarah exit interview, June 7, 2015).

The two ninth-grade students Shalom and Vladi, whom I tutored for 1-2 hours per week, also made good progress. There my identity as a trained remedial English teacher performing traditional tutoring was a significant factor.

Individual cases of learners were presented earlier. Table 4 below shows the highest level story each learner read aloud to a teacher, indicating the English knowledge of which they demonstrated mastery (see Appendix 9, Tables 7-8 for interim progress). The majority of learners demonstrated reading at a higher level from the book than from the app, for reasons discussed in the next chapter. Yoav persevered the longest and achieved the most.

All advanced well relative to their abilities and amount of engagement. Zach, who did not intuit app use and was frequently absent for shunt surgery, advanced the least.

Table 4: Final Level of The English Club reached by each student
(see Appendix 9, Table 8-Table 9, for details of interim progress)

Student	**Level to which read aloud (in book)**		**Level unlocked in MALL app (my record)**	
Tenth Grade:				
Omri	34	May 17	17	March 1
Zach	20	May 10	4 6	May 3 later
Andrei	19	April 19	did not bring to school	
David	37	May 17	29	May 17
Ruth	40	May 10	over 40	?
Yoav	50	June 14	50	June 14
Ninth Grade:				
Shalom	32	(May 17)	confiscated	
Vladi	30	(May 17)	16	March 22
Sami	teacher released him from intervention			
Ovadia	teacher released him from intervention			
Pansy	teacher released her from intervention			

Table 5: 10-level Milestone Celebrations

Date	Level	Menu of celebration
January 25	L10	Pizza for tenth-grade class, Yoav absent on field trip
February 1	L10	Pizza for Yoav
February 22	L20	Schwarma for 10th graders (all 6 including Yoav)
March 1	L10	Pizza for ninth-graders Shalom and Vladi
May 3	L30	Schwarma for tenth grade
May 17	L30 L40	Schwarma, falafel for Shalom, Vladi and David Hamburger & chips for Yoav
June 14	L50	Two hamburgers & chips for Yoav for finishing!

Table 5 shows the record of 10-level milestone celebrations. It took over two months for the tenth-grade class to reach L10 but less than a month to progress to L20, attributable to increased motivation. The next 10-level milestone was delayed by the long spring break and the learners lost momentum. After that, the learning routine was disrupted.

Appendix 9 contains additional tables showing changes in the learners' English skill levels. Sarah's record of quiz/test scores for her tenth-grade class (Table 7), indicates that she constructed assessments on which the students could succeed and obtain high grades of which they could be proud, and confirms that two students were frequently absent from school. These students made less progress in the intervention than those who were more often present and participating (Tables 8-9, Figure 12). Tables 10-12 summarize knowledge about English letters before and after the intervention. The tables show that learners who participated actively made good progress, while those who were absent made less. For example, Vladi, who had not studied English seriously before the intervention, showed a significant improvement in writing and reading letters, though his net score in naming letters was unchanged (with 5 errors in both the pretest and post-test, though the errors differed.) Because several students were absent from school on the days I performed post-tests, their data is incomplete. The extant data indicates the progress made by participants, but numeric scores that flatten understanding of the source of errors are not meaningful in this case. Analysis of errors provides rich information about the source of the learner's misunderstanding or confusion (Cardoso-Martins et al., 2011). Participants' errors stemmed from letter sound-name confusion, directional issues, and native language interference, typical errors of struggling beginning EFL learners in Israel. Rather than quantifying change in English skills, as there was some inconsistency, a pattern typical of LD students (Levine, 2003) and possibly also related to test anxiety, the ability of students to read texts aloud appeared to be the most useful indication of the progress learners had made (Tables 8-9).

Conclusion

This chapter has discussed findings related to the intervention's English learning outcomes and the human and environmental factors that shaped them. The research found that students who participated actively in the intervention made substantial progress in acquiring basic English literacy skills. The scaffolded MSL intervention comprised mutually reinforcing elements of teachers' support, printed books, and the MALL app on mobile devices. Scaffolding was found to address learners' cognitive and affective needs and

motivation. The degree to which MALL devices contributed to learning depended on each student's learning profile, with use of the devices critical for some and marginal for others. Progress was uneven and laborious, but advanced with teachers' support when the learner was sufficiently engaged. There was a tendency among students to resist engaging in learning, and disruptions reinforced this tendency, but with energy and determination, the teachers who supported the intervention motivated learners to engage in effective learning behaviors. When they engaged, participants made significant progress in their English skills.

Chapter 5: Findings: Technology factors

Overview

One goal of this research was to investigate technological issues surrounding MALL as a delivery vehicle for scaffolded Multi-sensory Structured Language literacy-learning. This chapter presents findings directly related to technology. The first section addresses attitudes to technology on the part of teachers and learners. The second explores the debate examining whether, on balance, mobile device use is an asset or distraction in educational settings (e.g. see Traylor, 2009; Baroudi & Marksbury, 2013; Norris & Soloway, 2013). The third section explores focusing learner attention on the affordances of the app, as the charm of mobile technology did not automatically extend to edtech. Next are the many logistical issues of using electronic/digital edtech, followed by a discussion of how decision-makers weigh the edtech adoption decision. The chapter concludes with a discussion of some of the tradeoffs involved in the design of educational software.

5.1 Attitudes to technology

The teachers and learners all had previous experiences with technology that shaped their perceptions. Teachers' expressed attitudes toward the potential of educational technology were directly correlated to their utilization of the intervention and their assessment of its success. Teacher commitment to the intervention was critical to learners' progress and correlated to successful outcomes, corroborating Harms (2011) and Baroudi & Marksbury (2013). Learner attitudes toward mobile technology were uniformly positive and enthusiastic. However, learner enthusiasm for personal mobile devices did not automatically extend to using MALL. Participants recognized that the app was 'good for them' and, once the novelty wore off and the material became more difficult, they resisted using the MALL devices as they might resist other forms of schoolwork.

Teachers' attitudes to educational technology

The two teachers provided contrasting examples of teacher attitudes toward use of this educational technology. Sarah was pleased to employ this intervention as a solution for teaching students. Orna expressed reservations about using this MALL technology with this

population, and her negative experiences with edtech fostered her caution and skepticism. The baseline interview revealed that Orna had, overall, clear negative attitudes toward the potential for benefit of the research intervention, and she evaluated in-class use of the iPod devices with skepticism. She cited instances of students using cellphones in class to cheat, and one when students hacked into the school computer. She expressed a common concern (e.g. Harms, 2011) that technology problems would derail lessons:

> *My biggest fear is that I'll be in the middle of teaching a lesson, get stuck [with the technology] and won't know how to fix it. I've taken lots of courses in using technology in teaching – I do great – but then in the middle of class there's a technical glitch and I don't know how to fix it* (Orna, fieldnotes, November 16, 2015).

Orna was concerned about students using technology while she was working with other students. She feared that students would be unable to operate the iPods independently, thus requiring constant teacher supervision. My reassurances were insufficient to overcome her concerns. Orna did not expect that the app would improve her teaching:

> *Somehow, this program didn't manage to make it accessible to them. We didn't … campaign it correctly. …maybe it's our fault…I didn't like it. I have to admit. I didn't like the program. I didn't see how it is going to make my life, as a teacher, how it's going to better my pedagogy, my work in class* (Orna exit interview, May 31, 2015).

Conversely, Sarah had the positive and comfortable attitude toward mobile devices of a digital native (Prensky, 2001a, 2001b). She had had no negative experiences with previous edtech use, though she acknowledged that personal cellphones distracted learners. She assumed that mobile devices might be a beneficial resource. The day her students received their iPods, Sarah positively evaluated their reaction, and the next week she was optimistic that the intervention would advance her students to a "really high level:"

> *I think it's very good because the students really take an interest in it. All the thing about the game, and moving up levels, and the competition with each other is really good. And it will help them learn because it will help them to read… really to understand how to read correctly – because it works well* (Sarah baseline interview, November 23, 2014).

Despite her optimism, Sarah recognized that many of the students lacked sufficient self-regulation skills to work independently with MALL and needed interaction with her to complement their device use. Within one week, she decided to have the tenth-grade class use the iPods for one of their four weekly class hours, on the day I raised the teacher-student ratio, and would incorporate the same material in her frontal teaching, quizzes, and written

assignments during the other lessons. Her positive but realistic assessment of the potential contribution of the devices evidenced no illusions that MALL alone would provide a panacea (see Traylor, 2009; Toh et al., 2013) to solve her students' EFL learning challenges. Sarah was thus an example of a teacher who was realistically disposed to using the technology, who was open to experimenting with edtech and immediately incorporated feedback to adjust how she employed the technology with her students.

Overall, Sarah's assessment of the use of MALL in the intervention was highly positive:

> *The app added …because they thought it was cool, first of all. It's innovative and they knew it was only for them, and they were the only kids in the school who got it, and that was fun for them. And also…it's a generation that's used to occupying itself with things like this, so instead of playing with their cellphones on me during the lesson, they would busy themselves with this. And if they didn't have the energy to read, they did the app, it's not that they didn't do anything… The app really helped… for each one it helped in something else* (Sarah exit interview, June 7, 2015).

It is difficult to separate the intervention's technological and content aspects, but teacher attitudes toward technology use appeared to be a self-fulfilling prophecy. Orna, who started with negative attitudes toward the devices, marginalized their use. Sarah incorporated app/device use actively into her lessons.

In summary, teacher willingness to use technology was needed to overcome the multitudinous obstacles to learning. In both cases the teacher's pre-existing attitude toward edtech was closely related to her commitment to, and to the success of, the intervention. This suggests that teachers should only be asked to use educational technology when they are positively disposed to do so.

Learner attitudes to technology

All the learners owned cellphones, mostly smartphones, which were their constant companions. However, as suggested by Ushioda (2013) learners' positive attitudes toward mobile technology did not automatically extend to using MALL. In their baseline interviews, the students all expressed positive attitudes toward their personal cellphones. These students are all Prensky's (2001a, 2001b) "digital natives," born into cellphone and Internet use. Their positive feelings about their cellphones corroborated Wehmeyer (2008) on device attachment and the 'deep relationships' between users and their mobile devices.

Students generally used cellphones for entertainment (games, music, movies, videos) and social media. This use of mobile technology is consistent with the profile of this student population (Toh et al., 2013). One student described deep attachment to her cellphone:

> *[My smartphone] is part of me. I don't leave the house without it, I don't go out without it, if I have to take out the garbage I take it… everything with it* (Pansy baseline interview, Nov 16).

The students also had positive associations with other mobile devices, and expected that using the app on the iPod would be "okay." Yoav, whom I had already observed retreating into interacting with his cellphone in class, asked whether he could download other applications onto the iPod, though they were on his iPhone. He evidently anticipated using the iPod in class to engage in his usual activities. Two students who were dysgraphic anticipated that using the iPod might make it easier to write (i.e. type). Ruth, who used her cellphone for Facebook and social media, had obtained an instant translation program for English text on Facebook. This was consistent with her having by far the strongest English skills among the student participants.

In summary, all the student participants had positive attitudes toward mobile technology and enjoyed using their own mobile phones for entertainment and communication purposes. This was a promising basis on which to embark on the intervention.

Observed use of the MALL app

Once the learners started using the iPods, it was evident that their positive attitudes toward their personal cellphones did not automatically extend to the use of mobile technology for learning. Prompting by the teacher was required to ensure that the learners devoted time and attention to using the app, consistent with Kam's (2013) observation that learning games are perceived by students as "work," and do not have the same appeal as games designed purely for entertainment. In fact, once participants started working with the iPods they related to use of the app as schoolwork.

It might be claimed that the reason this MALL app does not have the same appeal for students as other mobile games is that it is "behaviorist." My impression from observing the students was that, largely, they did not have significant motivation and extended attention span for learning in general, and that it was not the nature of the app that caused them to consider it "work" thus reducing its appeal, but the fact that engaging with the app required energy,

attention, self-regulation, and deferring more gratifying activities (such as socializing with classmates) (see Keller, 2008). When possible, we incorporated socializing into the English-learning efforts of the participants, but learning still required their engagement. The limited number and repetitive nature of the activities in the app (learning new material in every level, but using the same mechanisms for its learning and integration) might be an additional factor in eliciting this response. As mentioned later in the Findings section on Educational Software, a greater variety of activities and games, and more interactivity in teaching principles of language, might help to mitigate this reaction.

For reasons detailed in the literature review sections on how to best support literacy acquisition by struggling learners and on the combined challenges of learning an L2 by struggling learners, the approach of this MALL app is to teach explicitly in small digestible units of new material, review extensively to create new brain synapses that facilitate automaticity in reading, writing and comprehension, provide learners the ability to return to clarify previously-learned material, and provide multi-modal inputs to support independent learning. For beginning struggling learners returning (as second-chance learners) to the entry point to EFL literacy, these facilities provide basic building blocks and success where previously, by less systematic methods, the learners experienced failure. Once learners become competent readers and have developed their basic literacy skills, or in parallel with these efforts as constraints of time, teacher ability, and setting allow, they can engage in more "constructivist" activities that might be more intrinsically motivating, better suit their style of learning, and better contextualize language in ways that appeal to the learner's individual interests.

Yoav, who ultimately completed all 50 levels of the app, epitomized the dichotomy between the spontaneous appeal of mobile games of his own selection and the use of the MALL app. Although he constantly interacted with his iPhone, he often resisted work with the iPod, saying it was annoying, and initially he consented to using it in class only because Sarah said he must. During breaks he played games on his iPhone with total absorption. He confirmed that it was not the iPod that he found annoying, but the need to learn with the app. Thus, though the students agreed to use the MALL device for learning purposes, it did not hold the same spontaneous appeal as their personal cellphones.

Scaffolding theory might interpret this lack of positive feelings for MALL use as suggesting that the MALL app did not fully address the affective or cognitive needs of the learners, or both. In the ZPD, cognitive needs must be addressed at a level that is neither too high (frustrating) nor too low (boring) for the learner (Wood, Bruner, & Ross, 1976; Wood & Wood, 1996). The repetitive nature of the app, the material which was the same for all learners regardless of their individual interests, and the paradox between simple beginner material being seen as 'childish' yet challenging learners' ability, might all be salient factors. Conversely, learners control their choice of games and social media, and choose those that are reassuring, challenging, or relaxing, according to their affective needs.

M-learning theorists (Norris & Soloway, 2013) advocate students' utilization of their personal cellphones for learning. I attempted to facilitate home practice by installing the MALL app on the personal devices of several learners, but encountered lack of interest or resistance. After Shalom's iPod was confiscated, I suggested installing the app on his iPad, but nothing came of this. Even when I offered several learners to download the app on their phones at no cost to them there was no interest. It appeared that, contrary to the hopes of educators, the learner population preferred a clear separation between their personal devices, which were their personal territory, and devices dedicated to learning (as observed by Ushioda, 2013).

The students had little patience for watching the educational videos in the app. Even learners with good concentration and a relatively long attention span often ignored the animated videos on rules of English (most no longer than 60 seconds), a known trend: "The attention span of consumers today is, what, eight seconds? You get one shot" (Luchini, 2016, p.B5). Despite these limitations, the app and devices provided significant benefit to learners who used them. Digital native learners think of technology as 'cool,' and working with devices is natural and familiar to them.

In summary, although their universally positive attitudes and enthusiasm for their cellphones did not automatically extend to MALL iPods, their basic attitude to using mobile technology for learning purposes was positive. Their resistance was based on their not wanting to engage in learning activities, and not on the technology, though they preferred a clear delineation between private and learning devices.

Personal devices in school

This research found that the ideological position that a new pact of trust with learners will be sufficient to prevent the distracting use of their personal mobile devices in educational settings is naïve and ignores the instrumental role of learner maturity and self-discipline. The study findings question the practicality of integrating personal cellphones as a learning tool in schools where the students have low emotional availability for learning. In many schools, as in this one, there is a formal rule that if cellphones are visible in class, they are confiscated. This intervention differentiated between giving learners unrestricted access to their personal devices during class time and employing purpose-dedicated MALL devices, but the issues overlap.

This issue was raised by the headmaster in his initial interview. The use of mobile devices in school was his main concern in allowing me to perform the proposed research. The headmaster had battled for so long to enforce a ban on cellphones that he was cautious about allowing the use of iPods. I assured the headmaster that I would lock the devices so that they could be used only to run the MALL app, and I attempted to keep my promise by limiting device use by various means. In practice, as the year progressed, the students found ways to circumvent the device limitations.

Despite the school's formal no-cellphone policy, I observed students using their cellphones often during classes. Cellphone use evidently satisfies learners' human needs so powerfully that it is virtually impossible to convince them to desist from their use; teachers were also inconsistent in enforcing the ban. Having personal cellphones in school, even outside of class, proved a constant potential distractor for students – and teachers. It was an ongoing struggle with students to get them to focus on classwork and not on their phones. When necessary, the school policy was cited by the teacher, and the threat of confiscation had the authority of official school policy. Yoav's experience below illustrates enforcement of the no-phone policy and its effects on students:

> *I told him to put away his phone – [the headmaster] said they're not allowed. The special ed teacher took his cellphone and put it in the drawer of her desk. He visibly withdrew into himself – pulled his hood up over his head, put his head down on the desk* (fieldnotes, December 14, 2014).

Thus, the ban on cellphones was difficult to enforce without damaging relations with and affective needs of the students and intruding on their personal domains.

Despite my wish to believe in the potential for using personal devices for educational purposes, I could not envision that such a system would work in this school. Had they been allowed to use their phones or other mobile devices with Internet access for learning purposes, the students were far from having the self-discipline or motivation to focus on learning activities rather than using them for more compelling activities. Concerns about the distraction of personal mobile phones in the classroom were observed, here, to be justified. The students were very involved with their smartphones and charged them throughout the day. They did not have the same interest in the MALL iPods. If I could have installed the app on their smartphones they might have used it more, because they would have had it with them at home on a device that was charged and with them at all times. But, as mentioned, they wanted to keep a clear separation between their personal territory and 'school' use of technology.

To summarize, use of dedicated devices in this research was intended to avoid the loss of control when students use personally-owned devices. The intervention largely succeeded in this regard, though because the students did not find the devices as engaging as their personal cellphones, they did not keep the iPods charged and available. Students' preferred use of mobile equipment, left to their own devices (literally and figuratively) was for entertainment and social, rather than educational, purposes.

5.2 MALL's multimodal affordances compared to books

The app on the mobile devices provided a number of benefits unique to multimodal, interactive learning software on touch-screen mobile devices. These affordances of mobile technology offered benefits not available through use of the books alone, which were particularly useful in language learning. The app provided interactive stimuli that made this MALL a Vygotskian language learning tool (e.g. audio, video, animated video explanations of English principles, self-checking of answers, sounds of words and texts pronounced correctly, ability to write letters and words with the finger on the screen, immediate feedback) and enabled learners to work more independently. The app presented the material sequentially, and by requiring learners to satisfactorily complete steps and demonstrate mastery of material before moving on, it ensured that learners would not have gaps in their knowledge. Learners could hear, imitate, and pronounce the sound of a spoken word or line of text (something that

can only be guessed at when reading an unfamiliar word in a book), providing a meaningful learning activity for students when the teacher was occupied with others:

> *[The app] was much better than just a book. Let's say if we would have given them the books, for example, to take home – the wouldn't have done anything with them…it was very good, from my point of view, that I could sit with one kid to read, and the other…I knew that he was working, not just doing nothing. So that lent itself to learning* (Sarah exit interview, June 7, 2015).

Another advantage of using MALL is that students with learning challenges are often embarrassed to read in front of others because their reading is not fluent or accurate (Stanovich, 1986). Using an app that demonstrated reading for them to imitate provided practice for learners who otherwise avoid reading aloud in front of the class:

> *They also weren't ready…let's say I would try to read as a class, everyone read a section – they wouldn't cooperate because they didn't want to read when others could hear them* (Sarah exit interview, June 7).

The MALL app enabled use of the Hickey Method by challenged learners who are embarrassed to make mistakes in front of their peers. The multi-sensory affordances of the app enabled a degree of independent learning, though the extent varied by learner. The learning profile and habits of the learners at this school may evidence less independent study ability than the average learner, but as demonstrated by Nielson (2011), a human teacher is still needed to accompany learners in their use of language learning software.

Use of app/devices provided a tool for coping with the multi-level classroom

The research participant learners possessed varying levels of English skills, resulting in multiple skill levels in the same English classroom. Using the MALL app provided a tool for coping with this disparity, as a student at a different level from the group could use the MALL app while the rest of the class was otherwise engaged. A corollary was that learners returning from extended absences could make up missed material, closing gaps in their knowledge, without requiring the teachers' immediate attention. The app also provided the potential for working at home.

The tenth-grade class used the app in class when I was at the school, though Sarah observed that managing a multi-level classroom takes more energy from the teacher than teaching frontally, and confirmed that she preferred frontal teaching when on her own with the students. Managing a multi-level class with students working independently with MALL

devices or printed materials requires that the teacher move among and engage them individually. Frontal teaching has advantages, but lacks some of the benefits of having learners work at their own levels and paces in their own ZPD.

Preceding the intervention, Sarah had been teaching the classes frontally and at an average level. This had not provided effective learning support for the weaker class members, especially those who needed the most basic, fundamental skills. The app provided these tools:

> *With Yoav I felt it the most, because he was a kid with whom I didn't manage well at the beginning of the year, and …I tried to teach things to the whole group, and then I realized that he was in a completely different place …this thing [the iPod and the books] really helped me to approach him and succeed in teaching him. … He worked alone…[with the iPod] … every lesson – let's say he would start from level 35, by the end of the lesson he would show me that he was up to level 37 or 38, he really advanced, during the double lesson we had he could easily do three levels* (Sarah, exit interview, June 7, 2015).

I often accompanied Yoav to an empty classroom, where I observed him working on the MALL app with or without earphones, and Sarah told me that he also worked with it on the days I was not there.

Students were thus empowered to work independently with this Vygotskian tool which scaffolded learning, provided feedback and encouragement, and provided a framework for periodic interaction with the human teacher.

5.3 The challenge of attracting students to attend to the affordances of the app

Getting the students to pay attention to the affordances of the app was an ongoing challenge and process. Some had brief attention spans (due to attention deficits, social preoccupations, or emotional unavailability for learning) and raced through interaction with the app, investing the minimal effort required to unlock the next level. I attempted to point out some features that provide rewards and learning inputs – such as that the trophies filled with color as the learners completed lessons – but mostly I observed how the users naturally operated the devices. I am aware, as the app developer, that I will not usually be present when users employ the app; action research enabled me to see how these users would naturally interact with it. (I reflected on what I observed, and subsequently made and plan to make changes in the intervention materials, starting additional action research cycles.) Learner impatience often caused them to skip potentially beneficial activities. The 'coolness factor' of technology did not

overcome the boring, annoying aspects of repetition and practice, nor did it ensure learner patience for explanations. These digital natives were savvy about avoiding activities they found difficult or tiresome – and foreign language learning requires repetition and practice (Sparks et al., 2011). Once the novelty of the app wore off, it proved to be easier, with some, to coax learners to read aloud from a traditionally printed book.

I had expected to train the teachers for an hour or two in the content of The English Club and the 40 'tips to English' it contains (see Appendices 17-18). As the teachers were unavailable for this training, I observed what they too explored independently. Neither teachers nor learners exhibited much curiosity about learning the rules of English that the app contains. I had envisioned that we could connect a MALL device via cable to the overhead projector, and thus Sarah could present the 40 tips frontally and discuss them in class. I was surprised that even Sarah basically ignored the potentially powerful resource of the tips to English. As she herself had not paid much attention to this content, she could not review it during frontal lessons with all the learners. It seemed that neither the learners nor the teachers found the tip animations engaging. They require attention span of an average of one minute to view, and the learners' patience to watch non-state-of-the-art animations and listen to explanations, and run to completion while the learner is passive, not requiring the learner to interact with them in any way. This finding suggests that, for the tips to be better conveyed, more interactive methods should be developed that require active involvement on the part of the learners.

These learners lacked appreciation of the value of review. Consequently, they did not engage thoroughly in the review at the beginning of each lesson, an important contributor to fluency and automaticity (Kuhn et al., 2010). As the app depends on the users' engagement to provide benefit, if they simply go through the motions, they can complete many activities while successfully avoiding learning. In order to ensure that the learners have really mastered a level before moving up to the next, the app keeps levels locked until the learner has earned 2,000 points (by correctly reading about 65 words) in the game at the end of each level. Without this, learners whose only interest is competitively moving ahead, as I observed in my previous research with third-graders (Levitt 2013a), will derive less benefit from the app, and will simply mechanically progress through all the levels. However, I observed that learners who were motivated and had even a minimal attention span interacted with the app as it was meant to be used, with some finding the interface intuitive and others less so.

Another activity in the app is the green card word-writing exercise. The app shows a picture of the meaning of the word and plays its sound, and the learner is asked to first try to write the word (with a finger) on the screen, then to display the correct answer, compare it to their own, correct mistakes, and proceed to the next word. The effort of retrieving from memory the letter that corresponds to a given sound and writing it (encoding) is valuable in reinforcing the sound-letter correspondence. The MALL app does not force learners to make this effort independently, e.g. Yoav always looked at the answer first and simply copied the word. His dislike of making mistakes was reflected in his preference for copying the answer. This was a middle ground in terms of using the affordances of the app.

Learners' interaction with the application differed depending on their ability to concentrate, their confidence in their English knowledge, their learning styles and their motivation, but all who actually used it succeeded in making progress in their reading, though they often ignored some of its features and affordances. While the research participants did not take full advantage of its learning opportunities, each gave it as much attention as their personal profile allowed, and their English learning outcomes benefited accordingly.

5.3.1 Coolness factor and the Novelty Effect

From the literature review, the suggestion is that the medium of mobile technology is so attractive to students that they willingly employ it for language learning. The current study attempted to use MALL for a program that was more comprehensive in two ways: to teach non-reader EFL learners to read and write English, and to study MALL use for an entire school year. The novelty effect at the beginning soon wore off when they realized that the learning program was serious. They retained positive feelings toward the iPods, but the majority of the students might easily have ignored the app had they not been required to use it. Sarah expressed her surprise:

> *I was sure, in advance, that they would really be enthusiastic about it and would work at home. That didn't happen. But they worked in class….The fact that they didn't want to take it home … I felt like it was a wasted opportunity, but they just didn't do it. At the beginning, there was a lot of excitement around the iPods… And then they quickly lost it* (Sarah exit interview, June 7, 2015).

Educators must be realistic that learners may initially be enthusiastic about MALL, but that this may fade as the reality of language learning sets in.

5.4 Non-trivial logistics management

Managing the logistics of device use was non-trivial to the success of the learning outcomes. Ensuring that the devices were physically present from the beginning of each class, charged and operative, required substantial attention and effort, and a procedure for ensuring this was not part of the research design. When devices were not charged, the necessity for in-class connection to electricity was a major logistical obstacle in an older building where classroom electric outlets were scarce.

The cost of the mobile devices used in the research, and the question of who bore financial responsibility for returning them intact, was an issue of concern to all parties. The cost of equipment must be considered in adopting MALL as must the extent to which schools can hold students financially responsible for it. Though one solution would be for learners to use personally-owned devices for learning, this would create other challenges for keeping learners on task. The relatively high (but ever-shrinking) cost of digital technology makes school device use a sensitive issue.

When a device was not charged, was left home, or was inoperative, books could be relied on, needing only to be opened and read from. Books do not have to be charged, nor sequentially unlocked. The devices were not entirely interchangeable as they were open to learners' current levels; in contrast, books could be passed around and shared. Books were found in this research to provide convenient access to the subset of material they contained partly because they do not require the logistics management of technology.

Although the site of my research was a school in a developed country, logistical issues arose reminiscent of those in developing countries. These included concerns about entrusting relatively costly and breakable equipment to learners and the ongoing need for a source of electrical power to keep devices charged and functional.

Charging devices

A seemingly trivial requirement for using digital technology, that had unexpectedly profound effects on learning, is the need to ensure access to electricity. The usefulness of the devices (at two years old, already "obsolete" by manufacturers' standards) was limited due to short battery life. Waiting for devices to charge, and keeping them plugged into electricity throughout the

lesson, contradicted the motto of m-learning enthusiasts, "anytime, anywhere learning" and its yet more optimistic version, "all the time, everywhere, learning."

Physical connection to electricity was an ongoing logistical problem in an older building, where many classrooms had only one electric outlet. Charging the MALL iPods competed for scarce outlets with personal cellphones, and learners sometimes used the MALL chargers to charge their phones instead. When we used a power strip on an extension cord, we had to sit uncomfortably close together. On one occasion, I took an unresponsive iPod home, and, fully charged, the device revived. When I returned it, I observed that the unusual experience of having a charged device facilitated learning:

> *Since I brought the iPod fully charged, he could get right to work, and he used the charger to charge his iPhone, without needing to manage which device to plug in and distract him from the work.* (Field notes, May 3, 2015).

This demonstrates the importance to learning of conscientious attention to device charging and maintenance.

Restricting access to non-MALL features of the devices

Another logistical challenge was the difficulty of 'locking' the devices to limit them to the use of the app. My original plan was to simply activate 'restrictions,' e.g. disabling wi-fi and Internet access, as I had done in my previous research with third graders (Levitt, 2013a). Just before distributing the iPods, I accepted the suggestion of a teacher-soldier to put them into "guided" mode, the setting by which tablets are used as menus in restaurants, an unintended consequence of which was that participants couldn't close the app nor shut down the device, draining the battery of its charge. I consequently tried to return the devices to 'restricted' settings, so the devices could be turned off. However, a student observed the password I had entered and discreetly shared it with the other students, who rapidly unlocked the devices so they could be used for other purposes. Thus, limiting access to other uses must be managed carefully when using MALL apps.

Physical availability of the devices in class

The research participants often neglected to bring their iPods to school, and the teacher often forgot to bring them from her locker. When she was absent or left her key at home, the devices she stored were unavailable. The loan of an unlocked device (not restricted to the app)

such as my personal cellphone provided an irresistible level of distraction to learners. Often learners didn't bring their devices to school, and the teachers did little to enforce the requirement that the learners do this. Even if a spare device was available to lend to the learner, the devices were personalized to the level of each learner, so the devices were not completely interchangeable, further limiting effective learning time.

Books are not obsolete!

The previous chapter noted the use of books, in addition to devices, in the intervention. This section revisits the subject of books to emphasize their availability as a Vygotskian tool in relation to mobile devices. Given all the above issues with using MALL devices, it was evident that traditional print-format books were essential as backup learning materials. This observation typifies the need:

> *Omri didn't bring his iPod. The extension cord is broken so it's not possible to plug in and charge multiple iPods. The projector in the Learning Center is not connected. I work with Omri: He reads from a book L14, 15, 16 stories. Ruth and David with Sarah, reading L13 & 14 stories* (fieldnotes, Feb 1, 2015).

Books also were noted by some learners to be their preferred medium of study:

> *Several of them today (Vladi, Omri) said they prefer just the book. It could work if we had more individual time with them, and cards to practice, but without that only books is not sufficient* (fieldnotes, March 1, 2015).

As we did not have enough teaching hours, and Sarah did not have enough training, to forgo use of the app and to individually tutor the learners, forgoing use of the MALL app would have provided insufficient scaffolding. Subsequently, letter cards and tips to English have been incorporated in a new version of the books, so that they will better serve this function. A teacher with several hours of training would thus be able to teach the material frontally, using books alone.

5.5 The synergy of working with both printed and digital media

Both media, the MALL app and the book, had advantages and disadvantages with unique affordances, creating a synergy between them. For optimal learning support, learners used them in concert. Printed books played a more significant role than anticipated. Learners often read to the teachers from The English Club books, and supplemented this by use of the

app/devices. The books soon emerged as an indispensable complement to and backup for missing or inoperative devices.

Books provided a larger page size so that information could be viewed in context (such as viewing all the frames of a comics-format story on one page, rather than one frame per small iPod screen, or displaying a full list of 12 words to be written, rather than displaying one word at a time). The books were less expensive than the devices, so more copies could be available, and were more robust so the fear of damage did not detract from using them freely. Each medium had its relative advantages, and learning the same material through both printed and digital media provided synergies between them. The multimodal affordances of the app provided interactivity, some measure of flexibility allowing the learner to switch among activities, immediate private and unembarrassing feedback, correct pronunciation of words, fluent reading of texts, spoken explanations, and touch, all with the ability to repeat and learn independently at learners' own paces. These prepared the learners well so that when they subsequently read aloud to the teacher from the medium more convenient for this purpose, and more closely identified with "reading," i.e. printed books, they had a higher degree of confidence than they otherwise would have that they would not embarrass themselves and were therefore willing to risk the attempt.

Some of the affordances of books are the diametric opposite of the affordances of the app, and it was these that proved to be their greatest advantage. Using the interactive, step-by-step app required the students to complete each activity and level sequentially, enforcing completion of all learning activities. In a book, learners could do only some of the activities (e.g. reading a story aloud) without completing all the accompanying activities in the app and still move on to the next level in the book – just by turning a page.

The challenges in technology use described previously and the preferences of the learners demonstrated that the stable, reliable, shareable printed book format had many advantages over digital technology. The book had many affordances that made it more convenient and easy to use than the app for in-class reading and learning by students with the teacher. While the app and devices had affordances that supported independent work, the books were the default resource when Sarah and I went over word lists with learners and heard them read story text aloud.

McLuhan & McLuhan (1992) observed that rather than each new generation of media replacing its predecessor, the new medium frees the preceding one to do what it does best. This study's findings support that view, in that the MALL app provided new affordances that the books did not, enabling learners to learn independently while being provided with multimodal sensory input. But unlike the MALL devices, printed books did not need to be charged to be useful and they did not need to be sequentially unlocked. Books proved far more shareable among students than devices. Nevertheless, every new generation of technology partially displaces those that precede it. The research participants might have been expected to prefer the MALL app, but they often demonstrated preference for books.

In summary, to paraphrase Mark Twain, the reports of the death of books have been greatly exaggerated.

5.6 Equipment cost and the sensitivity of obligating students to return it intact

Mobile devices are expensive, relative to textbooks. The small size, high price and portability of these devices makes them particularly difficult to manage and track. The headmaster expressed concern about the cost of the devices used in this research. I brought twelve of my own mobile devices to lend to the research participants (11 to students, one to Sarah), but as financial responsibility for their return remained with the school, estimating replacement cost arose immediately.

The responsibility for returning the devices intact was assigned to the research participants and their parents, who were required by the school to sign an agreement to return the devices and accessories in working order or to pay replacement cost. This was a prudent precaution, as even knowing they would have to repay me for lost devices, several learners neglected to return their devices. It has been difficult to retrieve most of these, and I have not requested payment, as teachers promised to retrieve and send them to me. I was not comfortable asking these learners, nor their teachers nor the school, to repay me for unreturned equipment.

It was found that guidelines are needed for whom is held responsible when one student borrows another's equipment and does not return it, or when a device accidentally breaks. This occurred with chargers and earphones, as well as with the iPods themselves. It was difficult to hold responsible either the student to whom the equipment was assigned or the one who

borrowed it and claimed he had returned it. Constant and tiresome negotiation with learners occurred about the value of the equipment.

In summary, the cost of mobile devices and their accompanying accessories and maintenance is a significant consideration when weighing the costs and benefits of mobile-supported educational projects. These are sensitive issues in any educational system with limited resources. The benefit of using mobile devices for educational ends is great, but it does not come without costs.

5.7 Edtech adoption decision by school decision-makers

The fourth research question, regarding factors affecting the technology adoption decision by educational decision makers, was addressed in the exit interview with the headmaster, when I asked him directly whether, having seen the participants' improvement in EFL skills, he would devote the resources the following year necessary to continue the intervention and further strengthen the students' English skills. These resources might have included both the MALL technology and increased teacher-student ratio. His answer was definite that his resources are limited, and that he chooses to devote them to subjects required for completion of the 12-year certificate of schooling (which does not include English) that is the minimum level needed for all public service jobs in Israel:

> *It's clear that it's a "**must**" for all of us, but for the students themselves, it's not a must… I put the resources into the subjects that the students must have to complete 12 years of school…I would like everyone to get everything all the time. But now we see that it isn't possible, the priority is for completion, of 12 years of study… and if say there's a kid, let's say, Yoav – if he is weak in math and literature, and citizenship, and in English then my last priority is that we focus on English, because – you understand? – because that is what he needs to get a high school completion. Because today someone who doesn't have the completion credential, 12 years of studies, can't do anything in the public sector* (exit interview with headmaster, June 14, 2015).

Therefore, no matter how effective any intervention of any kind might be in improving learning outcomes on any non-required subject, if it is a choice between devoting flexible resources to that subject or to required subjects, the headmaster's rational decision would be to devote resources first to required subjects.

This decision is evidently based on the expectation that there is an extremely low likelihood that students who begin at this high-school as non-readers will be able to take the EFL Bagrut

exam at any level, which would change the school's high-stakes testing statistics and make it worthwhile to the school to invest more resources in English learning. The logic of this assumption was explained to me on several occasions by the third English teacher at the school, (male, middle-aged with years of English-teaching experience at the school, an immigrant from the Former Soviet Union) who was not formally a research participant, but had participated in the initial in-service training for the school network that led to the contact with the school as a research location:

> *"They've missed already 8 years of English" (I said "but they really only start in third or fourth grade"), he said, "okay, five years. Six years. There are occasional students who care enough and are willing to work, to put in the extra hours outside of school so that they can close the gap." But he also pointed out that the students themselves know the difference, that they feel it - that they're not motivated if they realize that they're not going to be able to do Bagrut…and they also don't think very highly of their own achievements and they don't feel very proud of themselves.... So I asked if the solution is to try to concentrate on remedial work at a younger age. He said, "Yes, because then if they don't fall so far behind, they'll have a better chance of being at grade level when they get here. But who's been asleep on the job, that they get to junior high and high school without…?" he said "if they come in ninth grade and start to work, then there's a chance that by twelfth grade, they can catch up." … The students who are too weak to do bagrut, he feels that they don't really have much incentive to learn because they, themselves, don't feel that they're going to do the bagrut. So that's it" (Research journal, May 31, 2015)*

This conversation, and similar ones throughout the year with the same teacher, made me aware that my optimistic expectation that, with appropriate instruction and adoption of the intervention approach, many students who started high school as non-readers could reach basic Bagrut level by the end of high school, was not shared by the English-teaching faculty nor by the administration. Their low expectation of student motivation, based on previous experience, was a determining factor in the non-adoption decision.

Rebecca Dewey, the MoE Inspector of English for the technological-vocational network, stated in my interview with her (interview, November 16, 2014) that, for students who arrive at the school with a higher level of English skills than those of the research participants, completing the three-unit English Bagrut is very important, as it enables the student to complete high school with a full matriculation diploma, a better credential than the 12-year diploma. However, referring to the more challenged learners (the officially diagnosed "special education" students referred to the school by the Placement Committee of the MoE) though *"They excel– once they have gotten help they blossom. The special ed kids with help succeed very well"* (ibid.) this is evidently not reason enough to expect that the learners in this study would be able to

sufficiently quickly close the gap in both English and other subjects to pass Bagrut, the criterion for making it worthwhile to invest flexible resources in their English studies posited by the headmaster.

Rebecca Dewey stated, regarding the adoption decision:

> *We've never had a good solution for weak learners and most schools just give up on them. This school is the most serious about English and sends the most students to the English Bagrut, but still hasn't had a way to help the weakest learners. If your trial works, we'll use it in the other schools too* (interview with Rebecca Dewey, Nov 16, 2014).

Post-intervention, I sent Dr. Dewey a report of the initial findings of the research. I was disappointed that, though she thanked me for them, she did not suggest that we now extend the program to other schools. Once the findings of this research have been finalized, I intend to follow up with Dr. Dewey and to understand better her thinking about the adoption process in this particular school network, which is funded by the Ministry of Welfare and Employment, and not he Ministry of Education. It may be that decisions regarding adoption by this network, of an intervention that requires additional English-learning resources, differ from the decision-making process on adoption in schools under the jurisdiction of the Ministry of Education. Further study is therefore required of the adoption decision process, as the findings of this research regarding Bagrut may not be representative of other schools in the Israeli school system. This school weighs investment or edtech adoption decisions against its clearly defined goals, including the tempered expectation of the accomplishment required of its students to achieve target certification (i.e. high school diploma with or without matriculation exam).

5.8 Educational software

Apps are a product of design decisions, balancing constraints with maximizing benefit to learners. App developers evaluate tradeoffs to make their educational software as effective and engaging as possible. The findings of this research support the trend of using short-term cycles of planning, implementation, evaluation, and incorporating feedback for the next cycle, resembling that advocated for action research (Kemmis, 1993; McNiff & Whitehead, 2011).

Design of educational software involves tradeoffs between its pedagogy and attractiveness to learners. Successful educational software must strike a balance between fun/freedom and sound pedagogical principles. Software designers face dilemmas that surfaced in this research, e.g. does requiring learners to unlock the next level of an app only after completing all learning

activities and demonstrating mastery of the current level support their learning, or frustrate them unnecessarily? Does allowing users to skip review of previously learned material, because they find it tiresome, ultimately ensure that they will be more likely use the app for learning, or does it deprive them of valuable review? Successful educational software must strike a balance among tradeoffs, and accommodate widely varying learner needs.

The current research supports the finding of Kam (2013) that learners demonstrate a marked preference for games designed purely for entertainment (both interactive digital games and traditional physical games), over educational language-learning games. Without adult supervision, the learners in this study, as in Kam's, did not often voluntarily engage in MALL use. Still, the learners in the current study liked the word game and accruing points for correct answers, and would have liked to have more game formats. The need for the widest possible variety of MALL games to reinforce learned material is thus one finding of this research. This is purely a development cost issue, as an extensive selection of pedagogical games is available in paper format to reinforce learning by this method (see Levitt, 2017b). Two new game formats have already been added to the Android app in response to this finding, beginning another action research cycle.

The MALL app included animated videos to explain principles of English (see Appendix 17). I observed participants becoming aggravated or bored with being required to watch an animated rule video in the review so, as the app designer, I have subsequently enabled learners to skip tips videos during review.

Having observed the learners in my previous research (Levitt, 2013a) attempt to accrue the 2,000 game points required to move to the next level by drumming their fingers simultaneously on all four possible answers in the game, I had asked the app developer to build in detection of a suspiciously high rate and pace of wrong answers. The app first advises the learner to choose answers more carefully. If the learner persists, the app exits the game and recommends to the learner to review and try again. I observed learners in this research attempt the random answer strategy, then revert to choosing individual answers when they realized they could not circumvent this effort. This indicates that the reward structure in MALL apps must closely adhere to attaining the learning targets.

When I saw in my previous research (Levitt, 2013a) that learners lost patience with lengthy reviews, as the amount of material they learn increases, we created an app setting to enable users to determine the amount of review that will take place at the beginning of each lesson. The concept of the ZPD acknowledges that under-challenging a learner results in boredom, while over-challenging them results in frustration. But in keeping with the Matthew Effect, the very learners who most needed review were those who had the least patience for it. MALL app design must engage learners by acknowledging the variety in their needs.

The scaffolded approach requiring sequential completion of all activities and demonstration of mastery ensured that when students learned independently with the device, they would not skip necessary material. When a human teacher was available to perform this role, the restrictions of the app were less essential. The app, however, was able to perform this role for students who worked independently with the devices.

In summary, educational software designers need to strike the balance between making the software attractive and engaging, with rewards to the user for investing their effort in learning – but not sacrifice educational value by making software so flexible that it neglects pedagogically sound principles. Educational software needs to both engage learner interest and to provide solid educational benefits.

Conclusion

This chapter presented findings related directly to the technological aspects of the MALL intervention. Teachers attitudes toward edtech were highly predictive of their support for the intervention. The extremely positive attitudes of the learner participants towards their personal mobile devices did not extend to language-learning devices, though the learners had moderate enthusiasm for the MALL app for limited stretches of learning time. The novelty effect of the mobile devices and MALL intervention wore off once the learners realized that they still had to invest effort in language learning, but having experienced success, their willingness increased to engage with the MALL app.

Tradeoffs among installing MALL software on dedicated, school-owned devices versus on learners' personal devices represent a complex and sensitive issue for administrators, pedagogical staff and learners. The desire on the part of the school to keep the MALL app on

dedicated devices for use in class was observed to be justified. The cost and logistical issues of using digital devices in a school setting are non-trivial and require the school to devote resources for a support and maintenance system. Keeping school devices in school would maximize availability.

The MALL used in the intervention empowered an untrained teacher to effectively accompany her students in acquiring literacy skills and to manage the needs of students in a multi-level classroom where student absences, learner histories and differential abilities required students to learn at widely varying levels.

Given the above findings, the synergy between the interactive MALL app and printed books supports their use in concert. Each provides unique advantages, and their combination maximally supports learning.

Chapter 6: Conclusions

Overview

This chapter begins by answering the research questions, and extending the findings to propose a new theory of Literacy Acquisition via Multi-sensory Structured Language (MSL)-scaffolded MALL. Reflections on my development as a researcher follow. Recommendations for practice and directions for future research conclude this study.

My study addressed a gap in the literature by researching use of a new MALL tool (a Vygotskian 'mediator') to teach beginning literacy to learners who learned to read, write and comprehend beginning English through the tool's scaffolded multi-sensory, structured language (MSL) approach. The learners' personal challenges were complex, and they had reached high school without mastering this life skill. The unique contribution of this research was to explore how this MALL tool could employ Vygotsky's (1978) concept of effective learning occurring in the Zone of Proximal Development to scaffold the process of learners' literacy acquisition appropriately (Wood & Wood, 1996). The MSL approach normally requires significant teacher training; this research demonstrated that a completely untrained teacher could successfully accompany her students through literacy acquisition using this tool. This study explored the use of this new tool with a particularly challenged and disadvantaged adolescent learner population, and found that this tool, accompanied by motivated teachers and printed books containing the same material, significantly promoted learners' language skills and cultivated their confidence, and identified additional factors essential to their learning.

Investigation showed that this new Vygotskian tool was extremely effective in addressing the learning needs of students with a history of failure. It did this using multi-sensory structured language methods matched to the learners' needs and with sufficient individual accompaniment by a supportive teacher. Target learning material was introduced gradually, with explicit, direct instruction assuming no former knowledge, thus minimizing learner frustration, modeling useful strategies in integrating and utilizing new material, and gradually guiding the learner to attempt increasingly challenging tasks (Wood et. al, 1976), and deliberately integrated with all that had been learned before to enable first assisted, then independent performance (Vygotsky, 1978). This tool was particularly effective for learners whose literacy skills were far behind their classes' but, by using the MALL tool, were able to

learn and practice these skills independently both in and out of class, when a trained teacher was unavailable to tutor them. Notably, not all learners found the app interface equally intuitive, and these students made progress through greater reliance on the books and teacher involvement that also accompanied MALL use.

6.1 Research Questions

The first research question asked: How does the use of this MSL-scaffolded MALL app and content affect the skills, motivation, confidence, and attitudes toward EFL learning of non-reader or weak reader adolescent EFL learners with a history of failure?

This scaffolded multi-sensory approach teaches, integrates and practices orthographic, phonetic, syntactical, and morphological aspects of English and linguistically-informed rules and patterns of the language to create learning sequences developing decoding, encoding and comprehension skills. It introduces English from its simplest elements and builds systematically to ever more advanced levels of text. These build from letter sounds into words containing those letters, then contextualize the words in connected illustrated meaningful text to equip learners to read at increasing levels of complexity. Multimodal MALL accelerates learning by providing contextualized reading and writing, hearing spoken English and explanations in L1, and images and L1 definitions supporting comprehension. MALL rapidly draws learners into reading and understanding words, sentences and stories early in the L2 learning sequence. Frequent practice and review reinforce and consolidate learning, and comprehension in L2 follows but keeps pace with growing decoding skills with ongoing practice resulting in transfer of letter-sound correspondence from short-term to long-term memory, followed by understanding of the correspondence between the words in L1 and L2. (Learners who are illiterate in their L1 would need oral explanation of word and story meanings in L1 to provide this information.) This is in keeping with the Simple View of Reading that students need to first attend to decoding the word, producing its sound from its written symbolic representation, and only after this process becomes more automatic, they are able to give their attention to the meaning of what they have read. Because of the multimodal, interactive affordances of the MALL technology and its flexibility in allowing learners to repeat activities as needed, and the sequential design of the content that builds gradually and integrates previous material before moving on, this approach delivered via MALL works

within each learner's ZPD and successfully reorients learners to overcome previously learned helplessness. Learners make substantial progress in their literacy skills when they engage regularly in learning via this approach, at the pace and level enabled by their learning profile. Their progress creates a positive cycle in the Matthew Effect, with pleasant experiences increasing confidence and motivation to engage in learning.

The second research question asked: How does use of the MSL-scaffolded MALL intervention affect the EFL teacher in terms of their role, their practice and their classroom management in the context of a multi-level class of struggling adolescent non-readers or weak readers with a history of failure?

Accompanying teachers, having requisite commitment to MALL's pedagogical content and technology, are essential to success in MALL intervention. The MALL-embedded pedagogical approach, content and knowledge reduce the need for teachers to be knowledgeable in the pedagogical content and to plan how to convey it to students, thus enabling less trained, inexperienced teachers to effectively accompany learners within their Zones of Proximal Development. Teachers' roles shift toward ensuring sufficient engagement, support, facilitation, clarification, motivation, review using other techniques, providing encouragement and feedback. The teacher hears learners read aloud, asks questions to foster comprehension, praises effort, models correct pronunciation, provides supplementary learning materials, and tests and grades students based on the content of the MSL materials and MALL. The teacher may review the content of the MALL app, frontally or by other means, to reinforce its pedagogy and content knowledge.

The third research question asked: What are teachers' views on using a pre-determined and self-contained EFL curriculum delivered via MSL-scaffolded MALL in classes of non-readers or weak readers with a history of failure??

Teachers' feelings toward MALL depend on their attitudes toward its pedagogical approach and educational technology. Trained, experienced teachers who feel that they have a better approach and are confident they can enact it do not need and may not choose to employ MALL, as they believe they have a better way to meet their learners' needs and may well prefer to construct the curriculum themselves, even for multi-level classes. Such an approach may indeed be unnecessary for trained teachers who have sufficient individual interaction with

learners to scaffold their learning within their ZPD's. A teacher who does not prefer an alternate method and who has a positive attitude to technology use is more likely to positively respond to using MALL, will adapt its use to learner needs, will foster student engagement, may supplement it with available materials, and will employ it to differentiate instruction to suit learners at different levels and having different learning profiles.

The final research question asked:

How do school decision-makers weigh the costs and benefits of alternative solutions that might improve English learning outcomes, including resource allocation for investment in digital technology, and evaluate the cost-benefit tradeoffs of edtech solutions?

The cost of digital technology and of increasing the teacher-student ratio is a major obstacle to adoption unless schools are assessed, recognized and rewarded for the successful learning outcomes these resources could provide. The likelihood that these investments would improve English-learning outcomes is immaterial to the adoption decision unless their benefits determine how students' are formally recognized for their attainments (i.e. which diplomas or credentials they are granted) and funding depends on these attainments. EFL learning for extremely challenged learners who are not expected to succeed is relegated to a low priority, as it is often believed not only costly but futile to invest heavily in their learning.

The overarching question asked: What are the factors shaping the effectiveness of 'The English Club' approach, curriculum, and MALL EFL app in the context of classes of non-readers or weak readers in a high school for second-chance adolescent learners in a peripheral part of Israel?

Numerous factors shape the extent of students' progress using an MSL-scaffolded MALL tool, supplemented by books and supported by teachers. Learners' differing learning profiles, emotional and physical availability for learning, the extent of their active engagement with the intervention and their intrinsic and extrinsic motivation, shape the extent of benefit derived. Teachers' support encourages students to engage actively in learning, with effectiveness correlated to amount of engaged use. The affordances of multimodal MALL technology support students' learning when the devices are consistently operative and available for

learning. A school environment sensitive to learners' affective and cognitive needs, where teaching is targeted to the learners' ZPD, is vital to promote effective learning, as is ensuring that the weekly class hours slated for language learning occur with minimal disruption.

6.2 Contribution to knowledge

This study demonstrated that second-chance learners who need extra support for language and literacy learning were able, in a supportive learning environment, to learn effectively using this MALL approach, supported by committed teachers and books with the same material, when they had previously not developed English skills. As I was embedded in the school for an extended period and generated detailed, multi-layered data about the intervention, I was able to observe the learners' progress and obstacles to their learning in an almost ethnographic manner. The extended period and my ongoing reflection facilitated my engagement in several cycles of action research, adjusting elements of the intervention when it encountered obstacles (e.g. incorporating extrinsic rewards to help overcome learned helplessness and amotivation; adjusting the original plan for how the ninth-graders received instruction). This research has demonstrated that, when factors in the learning environment align, a scaffolded MSL approach can be effectively provided through MALL. This approach embeds systematic, synthetic phonics and linguistically-informed rules and patterns into learning sequences of letter sounds, words containing those letters, and reading contextualized words in connected meaningful text, with multimodal support from images, explanations and definitions in L1, hearing spoken L2, touchscreen interactivity and frequent practice and review consolidating learning through all channels to the brain. This MALL approach overcomes common problems in L2 learning by rapidly equipping students to decode, and immediately activating their new knowledge. Using MALL technology to contextualize learning via this scaffolded MSL approach affords simultaneous, parallel and alternative multimodal sensory inputs of viewing text, hearing it spoken aloud, seeing images and definitions in L1, and writing letters and words in the context of their meanings. The approach reinforces and accelerates learning through scaffolding, multi-sensory language inputs and outputs and frequent review and practice, thereby strengthening the transfer of new language knowledge from short-term to long-term memory. The approach effectively and rapidly filled gaps in the knowledge of disadvantaged, learning-disabled adolescents with a history of reading failure and created a positive Matthew Effect cycle that overcame previous negative literacy-learning experiences.

The research indicated that this MALL app did not hold the same intrinsic attraction for learners as that possessed by use of their mobile devices for purposes of entertainment or social networking, but achieved learning outcomes that had not been previously achieved by any of the approaches that had been attempted in teaching these learners English. The "behaviorist" nature of the app, employing repetitive review, minimal variety in types of activities, and explicit teaching of word and text meanings via translation, served its purpose of supporting the learning of these struggling second-chance learners, but if the resources to develop them are available, future versions of MALL apps for teaching beginning literacy skills should incorporate more variety and interactivity to increase the attractiveness of the apps.

Consistent with the ZPD and Scaffolding theories, each learner starts from their own point and, with sufficient individual attention and the scaffolded MSL MALL and book intervention, progresses at their own pace, differentiated by their challenges and strengths. Instruction addresses learners' affective and cognitive needs in the Zone of Proximal Development, providing support to achieve unassisted performance of increasingly challenging tasks, avoid frustration, and allay anxiety. Learners receive support targeted to their learning needs and can review and practice as needed, with learner needs and ability to concentrate varying greatly, and MALL affording learning at an accelerated pace. However, MALL alone is insufficient to satisfy all the affective and cognitive needs of learners, and complementary crucial environmental and personal factors include a supportive learning environment with minimal disruption, sufficient teacher attention, learner desire to learn the language and emotional/physical availability to engage in learning, and extrinsic/intrinsic motivation to overcome learning difficulties.

The scaffolded MSL cycle of learning in the ZPD, with success reinforcing motivation, motivation catalyzing engaged learning, and learning engendering success, is illustrated in Figure 9 below:

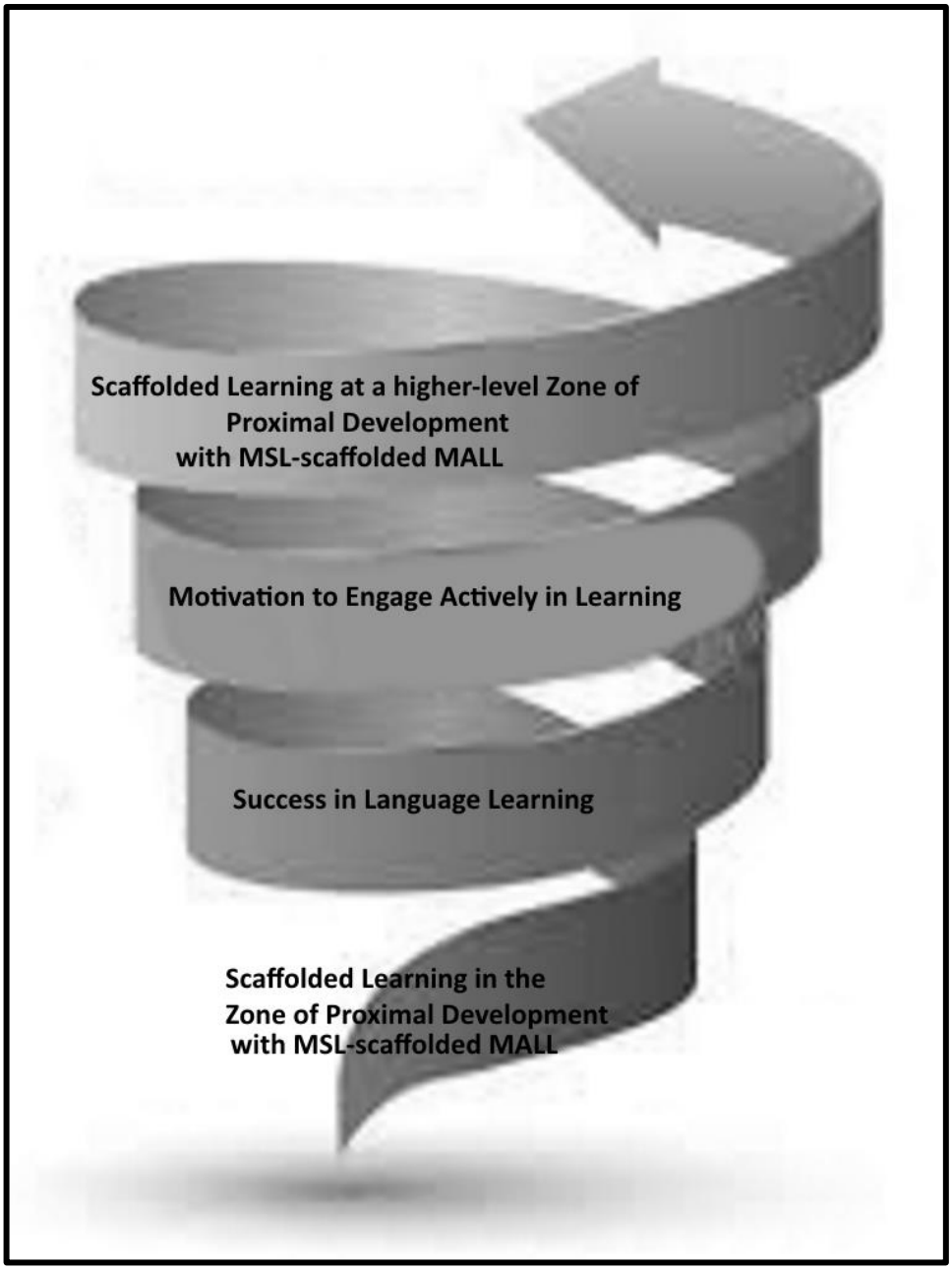


Figure 9: The Spiral of Learning in MSL-Scaffolded MALL

Based on my study, I have crafted a new theory of Literacy Acquisition via MSL-scaffolded MALL proposing that beginning or second-chance learners of a phonetic language can learn to read, write, comprehend and pronounce the target language (those elements of it they have learned), even if they have no or weak previous knowledge of the language, via a MALL application that speaks a language they understand and incorporates principles of a scaffolded,

multi-sensory structured language approach. The learners require close accompaniment by a committed teacher or other adult, who could be a family member, whom they trust, but the teacher need not be highly trained or experienced, as all the necessary language knowledge is embedded in the multi-modal MALL. Multiple additional factors promote this learning. Figure 10 illustrates the relationship among elements in the learning process:

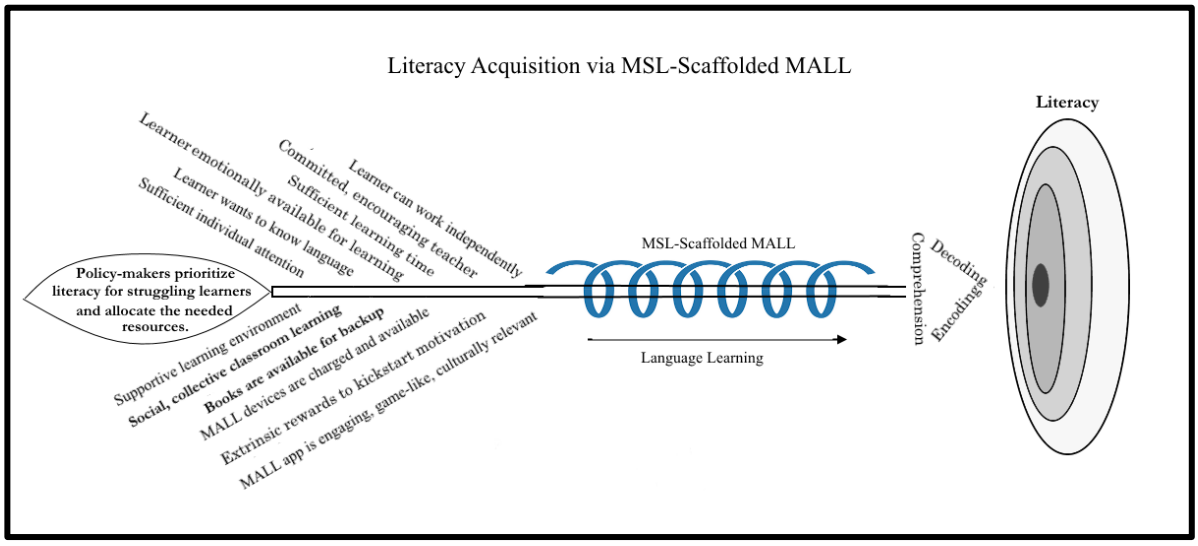


Figure 10: Literacy Acquisition via MSL-Scaffolded MALL

This figure illustrates how the elements discussed in this study combine in a theory of Literacy Acquisition via MSL-Scaffolded MALL. The arrow is another in the quiver of Vygotsky's 'mediators' or tools that can support and promote higher mental functions and thereby literacy learning (Ratner, 1991). The arrowhead of reading, writing, and comprehension skills defines the arrow's purpose. The MSL-scaffolded MALL learning intervention is the primary shaft of forward progress through the spiral of learning toward the target of literacy. Factors that enable learning to occur are the fletchings that stabilize the arrow's flight, keeping it aloft and moving unerringly toward its target. If the fletchings are missing or unbalanced, the arrow will not accurately reach the literacy target. The target itself comprises a spectrum of literacy skill levels, whereby an arrow with balanced fletchings and strong momentum can reliably hit the bullseye.

The MSL-scaffolded system cultivates development of literacy skills in each learner's Zone of Proximal Development via explicit instruction, introducing and integrating material, enabling

assisted performance through scaffolding, requiring demonstration of mastery before the next material is introduced, and guiding learners through meaningful illustrated connected texts that they have been equipped to read and comprehend, enabling experience of success. The multi-sensory aspects of MSL-scaffolded MALL provide parallel, simultaneous, or alternative channels communicating learned language information to the brain – how the words and connected texts look and sound, what they mean in L1 and in pictures. Also in L1 are spoken, animated explanations of rules of language. Each learner experiences and absorbs those language inputs, and produces language outputs contingent on their learning profile. Learners with low patience or concentration may need a teacher to review explanations through alternate means. Learners compensate for weaknesses via their strengths, employing the combination of MALL, books, and teacher that best supports their needs and abilities.

This study has also demonstrated the power of social, collective learning in the classroom, and how formal educational institutions can empower such students. Though individual students had little confidence in their language-learning ability, belonging to a team, learning with a partner or the class, and being challenged as a group to meet learning goals motivated and supported them in their learning. In a group, they were affirmed and released from paralyzing self-consciousness, secure that their classmates were interested in their success, even as they competed. When they worked together, they used their individual strengths to support each other's learning. Much of what I have written about their need for motivation, attention, and scaffolded, recursive learning could be applied to their learning of other subjects.

In support of the use of such an MSL-scaffolded MALL tool, the factors enumerated below are the 'fletchings' that must be aligned to create an environment conducive to language learning, one that comprises the interactive, supportive elements of both Vygotsky's social constructivist learning (see Bodrova & Leong, 2007) and those of the New Educational Environment (Sulimani, 2002):

- A sufficiently high teacher-student ratio provides necessary individual attention to scaffold individual tutoring in the learner's zone of proximal development (ZPD). Use of MALL widens the pool of teachers who can provide support by reducing requirements for specialized, lengthy teacher training and experience.

- Learners receive frequent individual attention, even briefly, sufficient for the accompanying teacher to hear them read text aloud at the level they have reached in the MALL app, to

discuss meaning of text, and to provide encouragement and feedback.

- The MSL-scaffolded MALL app is engaging, game-like, and culturally-relevant. MALL use provides students autonomy and power through a Vygotskian mediator that they control.
- MALL devices are operative and fully available during scheduled learning time.
- Books containing the same material provide a backup and alternate source of the MSL materials.
- The learner desires to know the target language, and is emotionally and physically available to engage in learning.
- Learners with attention deficits receive sufficient teacher attention.
- Extrinsic rewards, e.g. celebrating milestones, persuade learners to engage in learning.
- The learning environment is sympathetic to learners' affective and human needs, in addition to cognitive needs.
- Sufficient time is devoted to regular language-learning with minimized disruption to scheduled study routines.

My theory acknowledges that each learner has a unique learning profile of language-learning abilities (and other abilities as well). Even in a class where *all* the language learners are weak, each learner is unique in their particular combination of language-learning characteristics and requires individually-targeted teaching in their ZPD to maximize learning.

MALL is not a panacea but can deliver an effective scaffolded multi-sensory learning approach when the above supporting factors are aligned, without requiring a trained teacher to provide it. Language and literacy acquisition require concerted, consistent effort by learners and teachers and the support of the learning environment, necessitating engaged practice, repetition, review and use of the language to store, retain and retrieve knowledge in long-term memory. This study has asserted that learners with specific language-learning disabilities need appropriate methods of instruction and sufficient individual attention by teachers to successfully scaffold their learning, including literacy learning in their ZPD. Learners doubly disadvantaged by organic learning difficulties and social/familial deficits depend entirely on the educational system to address their learning needs. This study proposes a blended MALL approach that feasibly supports literacy development of struggling learners using new Vygotskian language-learning tools within learners' Zone of Proximal Development, that can

be used wherever learners need it, even when trained remedial teachers are unavailable. It has demonstrated that even without MALL, teachers with minimal training can use printed materials following an appropriately scaffolded Multi-Sensory Structured Language approach to support the learning of disadvantaged learners.

6.3 Reflections on my development as a researcher

My experience in the International Ed.D program has both equipped me with Vygotskian tools to perform research and reinforced for me the value of scaffolding. The program introduced me to the realms of ontology and epistemology, to the world of educational and research theory, and to mediator tools to understand and perform research, and has guided me steadily through the process of learning to use them all. Assignments were achievable tasks within my ZPD that raised my level of independent performance. The daunting task of performing and reporting on a significant piece of research was scaffolded step by step. Having wrestled with my own fears and performance anxiety, I understand why the learners in this study were often paralyzed by their fear of failure and unwilling to engage in learning, and how scaffolding helped them to overcome these obstacles. I identify with my research participants' joy in discovering new competencies, as well as with their anxiety at being asked to attempt tasks when sabotaged by self-doubt.

Becoming a researcher has given me tools to investigate what works well in my professional practice of teaching literacy to disadvantaged learners and why, and to explore how to improve outcomes in ongoing cycles of action research. I have learned not to make assumptions nor to view learning problems with blinders that focus exclusively on one aspect and neglect other myriad factors that play a role.

Researcher identity

I embarked upon this study expecting to be primarily a researcher, albeit a participant observer, not anticipating the extent to which I would actively accompany the learners. Action researchers typically investigate their own classrooms. Though they did not start out that way, these rapidly became my classrooms. The participant teachers' assumption that I provided an additional 'assistant teacher' seemed natural to all of us.

I had multiple roles in the intervention as a teacher, the developer of the intervention materials and a researcher. I worked directly with learners and promoted learning in other ways. As I myself was a student, I was learning about performing research as I proceeded. My many identities have contributed to the unique claims to knowledge arrived at via this research. I recognize elements of my researcher identity – particularly my aspirations to employ scholarly, reflective research methods and to see the recommendations of the research applied, in Hull's (2010, p. xi) observation of:

> [T]he need for a turn to policy as well as a continued focus on the practice of social justice approaches to education...an emphasis on reflective research methods that join serious approaches to scholarship with a focus on the ends of the research rather than merely its means.

and see a striking parallel between diverse student and researcher identities:

> [M]ultiple differences frame our students' identities, and these should be afforded respect; the same can be said for researchers' identities and their approaches to conducting their work" (ibid. p. xi).

6.4 Recommendations

This section discusses my study's implications for policy and practice.

Create MALL apps based on effective literacy instruction approaches

MALL apps relevant to cultural contexts should be created for use among literacy learners of any phonetic (non-logographic) language worldwide. Educational bodies should fund their creation and make them available free to all learners. MALL could then deliver a self-contained multimodal learning system to a mobile device, anywhere in the world where a user has a stable Internet connection for long enough to download it once. MSL-scaffolded apps to teach literacy skills require creation of content (text and images) for each context, and should speak to learners in their own languages (the target language, or others spoken by its learners). Educational bodies should compose teams of local educators to create culturally-relevant content meaningful given learners' ages, life experiences, interests, values, and concerns. These teams require skilled linguists, educators, writers, illustrators, translators, narrators, and technical coordinators. Each team would develop an order of introduction of letters, words, and principles of its language and write connected story texts with illustrations drawn by an artist familiar with the learner context, and voice recordings of speakers of the target language

for emulation. Principles of the target language would be explained and recorded in all learners' languages. The existing software platform or a new one could be used as a framework to deliver entirely new culturally and linguistically appropriate language-learning materials.

Teacher training and the MALL alternative

More teachers should be trained in linguistically-informed, multi-sensory structured language-teaching methods that research has demonstrated are effective with struggling language learners. In addition, an wide range of people should be equipped to teach with MSL-scaffolded MALL tools. This should include language teachers, EFL teachers, special education teachers, assistant teachers, volunteers, young adults doing community or national service, and family members. All can undergo brief training to better support and accompany learners.

Early identification and intervention for at-risk learners

Learners at risk of reading/literacy failure should be identified early via universal screening procedures, and immediate intervention should employ an appropriate method of MSL-scaffolded literacy instruction. Educational systems should prioritize funding to provide sufficient tutoring to scaffold learning for at-risk readers, respecting the precious and limited time during primary school years when their brains are most receptive to language learning and preventing the waste of these years through ineffective teaching approaches (see e.g. Snowling et al., 2000; Muter, 2008; Kuhn et al., 2010; Snowling et al., 2012b; Abadzi, 2014). MALL MSL-scaffolded approaches can be used. Early intervention will prevent the widening of literacy gaps between the learners' performance and grade-level expectations, and consequently forestall the development of learned helplessness.

Learners of any age who need foundational reading and writing skills can use MSL-scaffolded MALL to learn more independently, in and out of class, with the accompaniment of teachers, family members, and appropriate books. These tools can be used in mixed-ability and mixed-skill-level classes to facilitate differentiated instruction. Older learners, who did not enjoy the benefit of early intervention, should be provided appropriate instruction at the soonest point possible. Indeed, family members who accompany learners in their use of an MSL-scaffolded MALL app may themselves benefit from increased literacy skills.

Additional factors

Beginning language textbooks for literacy instruction should be guided by research on effective literacy instruction, and should scaffold explicit multi-sensory instruction. Educational bodies should demand of manufacturers that they create longer-lasting, less expensive mobile devices for educational use. Development of sustainable power sources should be explored to reduce dependence on electricity. The MALL app should be made available on purpose-dedicated school-owned devices that stay in school, are shared by multiple learners, and kept charged and available for in-class use. In parallel, the MALL app can be installed on learners' personal devices, if their families possess them, for use outside of school. If schools cannot purchase devices, learners should use MALL on personal devices outside of class, and, in class, use printed material supported by frontal teaching, with teachers, when possible, teaching with support from the MALL app via a mobile device connected to a projector. Schools need technical personnel and maintenance routines to ensure that mobile devices are charged and available. Teachers and parents should incentivize learners, identifying extrinsic rewards that acknowledge and are meaningful to learners' human needs and that motivate and activate learners to themselves overcome avoidance behaviors. When language classes do not take place as scheduled, makeup classes should be scheduled so that struggling learners have sufficient language practice and continuity.

6.5 Directions for future research

Research into how MALL can best serve language-learning needs is a young field with much research needed, and every limitation of this study suggests avenues for future research. While the small number of teachers and learners in this study provided depth of insight, further research on participants in diverse settings and with diverse profiles would allow wider investigation of the issues in using this software. The intervention's scalability should be investigated, and how the intervention is implemented by researchers who are not personally identified with it. Where language-learning of struggling or beginning learners is highly prioritized and funding is available, versions of MSL-scaffolded MALL should be created to investigate the potential of this approach in other cultural and linguistic contexts.

Learners' reaction to the elements of the MALL app should be continuously studied to improve the app, as this cycle has led to developments in the books and app, e.g., the effect of

adding more interactive learning activities and games on time-on-task and language-learning outcomes should be investigated. Software usability research could directly observe eye movements and implement built-in analytics of activities with which learners engage to improve the MALL app's effectiveness. Focus groups would provide learner feedback to support MALL improvement, and provide insight into why device use is critical for some and marginal for others.

Learners in this study had dedicated devices but were not required by their teachers to use them at home. It would be informative to study how app usage patterns change in concert with changed requirements. Further research should explore how to adapt our educational environments to enjoy the potential power of personally- and school-owned mobile devices while controlling potential distraction. Exploring the source of learner resistance to having the MALL app installed on their phones might identify potential avenues to reduce resistance. The far-reaching implications of employing personally-owned devices for educational purposes is a subject that requires extensive study.

Longitudinal studies of learners who have used MSL-scaffolded materials, MALL or books, would yield important insights into the long-term effects of these language-learning interventions at different points in the learners' education, and possibly provide evidence supporting the prioritization of these efforts.

Scaffolding theory can be applied to more advanced stages of literacy and language learning past the foundational level. Researchers should examine how to apply these principles of scaffolded, MSL learning to support more advanced levels of language learning, develop books and MALL apps and investigate their effects. Far more research on MALL is warranted, in addition to ubiquitous MALL studies on college students for short duration interventions, to provide insight on its potential with learners at different stages of language skill development, different ages, and over longer durations.

Further research is needed to investigate how adjusting any of the components of this study – the context, the age and profile of the learner population, the target material, the technological platform, and the learning approach – would affect learning. I hope to create and research the impact of learning materials for diverse populations of struggling literacy learners by creating versions of The English Club that specifically address the needs of these populations.

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Appendix 1: Research Timeline

July 20, 2014	Ethical Review application submitted.
August 22	Ethical Review approval received
August 26	Initial meeting with school headmaster, started research journal.
October 19	Met English teaching staff, explained project/research, asked teachers to select participants, provided suggested Hebrew text of information sheets and consent forms to school administration to distribute and collect.
November	Collected signed consent from participants.
November	Interviewed learners and teachers, performed English assessments. Created baseline data on English background, English levels and attitudes on the part of the learners and teachers. Started transcribing recorded interviews with students and teachers.
November	Attempted to train English teachers in use of the MALL app and Hickey Method. The teachers were not available for the two-hour formal training I had planned, so I spoke with them individually during their free hours at school.
November	Introduced use of the MALL app and devices to the learners. Provided them devices to use during class time and at home.
November 2014- June 2015	Seven months of intervention: Weekly visits to the school as a participant (teacher) observer, working with teachers and learners while the intervention was in progress, generating observation data (fieldnotes, audio recordings, documentary artifacts) and keeping a research journal reflecting on what was occurring.

Table 6 contains the class schedule of weekly Sunday visits to the school research location (28 school visits throughout the school year):

Table 6: Class schedule of weekly Sunday visits to school research location

		Initial schedule Oct. 19- Feb. 8	**Adjusted schedule Feb 15.- June 14**
Lesson hour	**Teacher and class**	**Worked with Students**	**Worked with Students**
1st 8:00-8:45	Orna – 9th grade		Vladi & Shalom
2nd 8:50-9:35	Orna – 9th grade		Vladi & Shalom
3rd 9:50-10:35	Sarah – 10th grade 1&2	Omri, David, Ruth, Zach, Andrei	same
4th 10:40-11:25	Sarah – 10th grade 3&4	Yoav	same
5th 11:30-12:15	Sarah – 10th grade 3&4	Yoav	same
6th 12:55-13:40	Orna – 9th grade – extra support hour	Shalom, Ovadia, Sami, Pansy, later Vladi	discontinued

June 2015 Post-Test: Repeated English assessment with learners, conducted exit interviews w/ research participants (students, teachers, counselors, headmaster) on attitudes to measure changes and generate additional data.

July-Sept. Transcribed and translated all recordings, typed handwritten fieldnotes.

September Spent two weeks at Sussex meeting with supervisor and discussing data analysis and presentation approaches.

October-November Created NVivo database, imported all data, coded data

November- Drafted report of findings, submitting chapters incrementally, and corresponding

May	with advisor on changes. (Hiatus after submitting findings chapters – family health issues.)
September 2016	Spent two weeks at Sussex to work with primary and secondary advisors on draft.
October 2016-February 2017	Read further and extended literature review, with more in-depth exploration of issues related to language and literacy and the Vygotskian approach to how language is learned.
March – July 2017	Revise under advisors' supervision, submit final draft to internal and external examiners
November 2017	VIVA oral examination: Passed with minor corrections
December 6, 2017	Deadline for minor corrections to thesis

Appendix 2: Letter from Headmaster to Sussex Ethical Review Board

July 20, 2014

To: the Ethical Review Board at Sussex University

Dear colleagues,

During the past school year, one of the English teachers at my school attended an in-service-training workshop taught by Fern Levitt, an instructor at David Yellin College of Education in Jerusalem. She presented some approaches to helping English students who are having difficulty with their English skills. My English teacher felt that the approach could be helpful for our students, and asked the English coordinator and me to follow up on inviting Fern to bring the approach to our school.

Fern will train our English-teaching staff in the approach, and has agreed to lend the students participating in project mobile devices with her application, at no charge to the school. In return she requests permission to perform academic research in our school according to the accepted norms of educational research in Israel. We will follow the guidelines of the Israel Ministry of Education regarding student privacy, rights, respect and responsibility and will approach appropriate students to take part in the research. We understand that all students' participation should be voluntary and that that they can withdraw from the project at any time. We understand that Fern will protect the anonymity of our students and school in all her records and in her research report. She will be provided access to interview and make audio recordings of the teachers and students on the school campus in a private but accessible location, for her safety and that of the students; to observe and record lessons in classrooms using digital recording devices (video or audio); and her public status in the school will be that of a guest teacher.

Sincerely,

<Headmaster's name>

Headmaster, TECH High School

Appendix 3: Learner Information Letter and Consent form

This letter was translated into Hebrew and distributed to students.

Dear students,

You have been selected by your English teacher to participate in a research study on learning English using The English Club app on iPod Touch devices. We hope that it will help you to strengthen your basic English skills of reading, writing, spelling, pronunciation and comprehension ~~to help you prepare for the English matriculation exams~~*.

Participation in the study is entirely voluntary and you can stop at any time. You will continue to learn in your regular English classes. Participation in this study is considered "enrichment."

You will be loaned an iPod Touch device with The English Club application to use in and out of English class, at your own pace, following your teacher's instructions. You will have this device for individual study throughout the first semester and, if you find it helpful, throughout the second semester also. You will be expected to return the iPod Touch to the school in good condition at the end of the study. (The application is available separately if you want to continue to use it to study English.)

The person doing the research is Fern Levitt, an English teacher and the person who wrote the materials and developed the app. You can call her directly at 050-731-4843 if you have questions. Please feel free to come to me with any concerns you may have.

<Name of headmaster>
Headmaster, TECH Technical/Vocational High School

<Name of English coordinator>
English Coordinator

I _____ agree to participate in this research study.
Student's name

I agree to use The English Club on the iPod Touch to learn English skills, and will cooperate in a pre-and-post English assessment and interviews with Fern. I understand that the device tracks when and what English-learning activities are performed. I agree that Fern can record my comments on this experience of learning English in interviews or in class. I understand that my privacy will be protected in the research report. The school's name and my name will not be published and all information about me will be kept private.

I agree to take responsible care of the iPod Touch device and to return it in good condition at the end of the study.

Student signature_____ Date_____

*The English coordinator told me she was removing this line before distributing to students because she did not want to raise false expectations.

Appendix 4: Teacher Information Letter and Consent form

This letter was translated into Hebrew and distributed to teachers.

Dear teacher,

I am performing this research project to explore a potential solution to assist struggling EFL learners to overcome their challenges in mastering basic English skills. I know you agreed for your students to participate in this study because you share my interest in this goal, and I appreciate your participation in this research study.

I plan to pre-and-post test and interview your students, to observe your students in class during the intervention, and to interview you before and after the period of intervention.

Please feel free to contact me at any time at 050-731-4843.

If you have any concerns about my conduct during this research, you can contact Yusuf Sayed, the director of the University of Sussex Dept. of Education and Social Work International EdD program in which I am enrolled, at email address: y.sayed@sussex.ac.uk.

Again, I appreciate your cooperation,

Fern Levitt
Doctoral candidate, International EdD program, Sussex University

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I _____ agree to participate in this research study.
Teacher's name

I understand that Fern will interview me, and agree to my comments being recorded in audio files. I understand that my privacy and that of my students will be protected in the research report. Aliases for all names (of the town, school, my name and my students' names) will be used, no identifying information will be published and all information about me will be kept private and stored securely.

Teacher signature_____ Date_____

Appendix 5: Parent Information Sheet and Consent Form

This letter was translated into Hebrew and distributed to parents.

Dear parents,

Your child has been selected by their English teacher to participate in a research study on learning English using The English Club, a new interactive educational software application. The application is based on a proven, effective method of beginning English instruction and we believe that it will have benefits for your child's progress in learning English.

Participation in the study is entirely voluntary and your child can choose to discontinue participation at any time. Your child will continue to learn in regular English classes. Participation in this study is considered "enrichment." The learners participating in the study will be provided with an iPod Touch device with The English Club application for individual use in and out of English class, at the instruction of their English teacher. Your child will have this resource for individual study throughout the first semester and, if learners and teachers find it helpful, throughout the second semester also. The device will be returned to the school at the end of the study. (The application is available separately if your child wants to continue to use it to study English.)

This research project is being led by Fern Levitt, a doctoral student in Education at the University of Sussex in England. Fern is an instructor in methods of English teaching at David Yellin College of Education in Jerusalem and developer of The English Club application. She will generate and analyze data about the effects on the pupils' English skills, attitudes, and motivation through interviews, pre-and-post-English tests, and class observation. She may record interviews or observations but your child's anonymity will be fully protected.

All learning materials for the study will be supplied by the researcher free of charge in the context of the research and there will be no additional cost to the school or to the parents for their children participating in the study. The learners are responsible for returning the device in good condition to the school at the end of the study.

Confidentiality, privacy and identity of participants will be protected and participants' names will not be published.

You can contact Fern at 050-731-4843 if you have any questions. Please feel free to approach me with any concerns you may have. Please sign and return the tear-off below to indicate your consent to your child's participation in this study. Thank you in advance for your cooperation,

<Name of Headmaster>	<Name of English Coordinator>
Headmaster, TECH Technical/Vocational High School	English Coordinator

---

I give my permission for my child _____ to participate in this research
Child's name
project.

Parent signature_____ Date_____

Appendix 6: Questions for Semi-Structured Interview with learners

Questions for learners - Before the intervention:

1. When did you start learning English? How has English been taught to you?

2. What's hard and what's easy for you in your English learning?

3. How much English have you been exposed to in your environment outside of school (family, friends, and neighbors)? Does anyone in your family speak/read/write/understand English fluently? What do you think your family expects from you about English?

4. How important or unimportant do you think English is for you and why?

5. How do you feel about your level of English now?

6. How well do you think you will know English in your lifetime?

7. In this project you're going to learn English using an iPod Touch. What do you expect it will be like?

8. What digital/electronic devices (smartphone, music player, regular cellphone etc.) do you use? How do you feel about them? What do you like about them? What do you not like about them?

9. How do you feel about being chosen to take part in this project?

10. Do you have any questions for me about the project?

Questions for learners – After the intervention

1. How was it to learn English with the application compared to other ways of learning you have experienced? In what ways did it help you advance in English, if at all?

2. How did you feel about learning English using the iPod Touch with the app?

3. What did you like/not like about using the iPod Touch, rather than books or some other way of getting the material (Internet, etc.)?

4. What did you like/not like about this approach to learning English (letter by letter, tips, etc.)?

5. You saw that you could use this app at home to learn at your own pace, in your own time, and practice as much as you wanted to. How much time and practice would you say you put in at home? What made you decide when and how to use the device and the app? How was it similar to or different from doing other homework?

6. What role did your teacher play for your learning with the app, compared to the role s/he usually plays in your English learning?

7. Comparing the advantages and disadvantages you see of learning this way, what would you recommend to people you know about using this way of learning English?

8. Before we started, you probably had some ideas of what this project would be like. How would you compare the actual experience of learning using the iPod Touch and the app to what you expected before we started?

9. Do you have any other questions, suggestions, or comments for me?

Appendix 7: Questions for Semi-Structured Interview with teachers

Questions for teachers – before intervention:

1) What is it about this approach that interested you in trying it at your school? What learner needs did you think it might address?

2) How did you choose the learners to participate in the study? On what basis did you choose them?

3) Why do you think these learners have not mastered basic English skills given that they have been learning English in school since at least fourth grade?

3) How do you feel about this approach (the Hickey Method – structured, phonics-based, step-by-step) to teaching English? Do you have any former experience or knowledge about teaching by such a method?

4) How do you feel about using electronic technology to teach English? What kind of technology have you used before for teaching?

5) How do you think your role as a teacher is affected when learners in your classes are using individual devices? What roles do you play?

6) What issues do you anticipate might arise from use of this intervention with your learners?

7) What is your English-teaching training and background? Please describe your experience teaching English at this school.

Questions for teacher, after the learners have used the intervention for the period of intervention:

1) How did your students relate to using the devices with the app? What kind of feedback did you hear from them?

2) What outcomes, or effects on learning, motivation, participation, confidence etc., did you see in the students using the intervention, if any?

3) How closely did the intervention (the phonics approach, the app and the device use) match your expectations of what would happen? Were there any surprises? What were they?

4) What is your impression of the effectiveness of the Hickey method itself for these learners?

5) What is your impression of the effectiveness of the delivery method (the app on the mobile device) for these learners?

5) How would you compare the quality and quantity of learners' progress using this mobile-assisted language learning tool with their progress using other approaches (before and during the intervention)?

6) How would you compare the quantity and quality of learning you see in the learners using the intervention tool to the progress of other learners who are not using this tool?

7) How did you feel use of this individual electronic technology affected your role as a teacher? How did your role with this intervention compare to your role without this intervention?

8) How did you feel about your students using a pre-determined and self-contained, off-the-shelf curriculum delivered via MALL?

9) How appropriately did you think the app met learner needs?

10) How was it different from using print-and-paper materials? What tradeoffs did you see compared to constructing the curriculum yourself from available materials?

11) How do you assess the overall outcomes of this intervention from a cost-benefit point of view?

Appendix 8: Assessment of English Skills (pre- and post-intervention)

English Learners
Assessment of Basic English Skills

Student Name:_____
Date:_____ School:_____
Performed by:_____ Class: _____

I. Alphabet: Instructions in Hebrew: please write the letters of the English alphabet in alphabetical order, both capital and small:

English Learners Research – Pre and Post - Assessment Page 1

II. Letter Names and Sounds – Sheet for Assessor

Assessor ask student to look at "Letter Names and Sounds – Sheets for Student" and assessor make notes on this sheet.

1. What are these letters called?
2. What sounds do they make? (Could be more than one). How do you know when it makes each sound?

	Name of letter	Sound(s) & rules
j		
t		
p		
n		
s		
a		
d		
h		
e		
c		
k		
b		
r		
m		
y		
l		
f		
o		
g		
u		
j		
w		
v		
x		
z		
q		

English Learners Research – Pre and Post - Assessment Page 2

III. Dictation: Writing Sounds and Words

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

Word	Meaning
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
19.	
20.	

English Learners Research – Pre and Post - Assessment Page 3

IV. Reading: Miscue Analysis

- Assessor: Give student one copy the passage to read (in the "Pages to Read From" packet). (These ads are adapted from a book of texts for the 3-point English matriculation exam.)
- Note on this copy of the passage the phonetic pronunciation of any words that are misread.
- Analyze to identify reading problems.
- Attach notes and analysis here.

Jobs

Be a Salesman at the Mall

- Two times weekly in a store at the mall.
- Sell snacks, camping things, candy, or food
- You can come in after class.
- From noon to evening or weekends.

Call Jacky at 050-345-1943

Babysitter

Are you kind? Do you love kids?

Do you want to have some cash?

Family looking for a babysitter in the afternoon, until mom and dad come home

Pick up kids, make them a snack, take care of them at home.

Call Jim: try 03-785-5486 but if he doesn't answer, next try 052-8460274.

Are you Good with Computers?

The hospital is looking for teens to help with sick kids. There are a lot of computer games and you can prepare the kids to go back to class.

You can come only one time a week.

Call me if you have time! Ann, 054-234-5343

Can you fix bikes?

Our shop needs a bike fixer to help on hiking-and-biking trips. If you are good with bikes, call Abe at 053-736-5438

English Learners Research – Pre and Post - Assessment Page 4

V. Listening conversation and speaking ability:
Chat on a familiar subject:

How old are you?
What grade are you in?
How many brothers and sisters do you have?
Where do you live?
What do you like to do in school?
What do you like to do after school?

Impressions of conversational ability:

VI: Write a word, sentence or paragraph (according to ability of the student) about the above, or about any other subject.

Attach.

VII. Identifying Directional Reading Issues

הקיפו את האותיות **הדומות** לאות הכתובה בכל שורה.

i	j	i	p	s	i	l	b	t	i
t	h	t	n	t	i	l	p	t	c
p	d	b	p	s	p	a	b	p	d
n	n	u	h	n	i	m	n	n	w
s	n	s	2	s	i	z	s	8	s

הקיפו את האותיות שהן **בגודל מסוים** (גדולות וקטנות) לאות **האחומה** בכל שורה.

n	N	u	h	N	U	**n**	u	n	n
p	d	p	**b**	p	p	q	b	P	d
t	**t**	t	t	T	i	l	T	t	T
i	j	i	I	i	i	l	I	t	i
s	z	s	2	**s**	S	z	s	8	S

VIII. Differentiation of Sounds: "BME" Exercise,
Target sound (s)

Instruct student to listen for the sound (s) and to circle B, M, or E depending on whether they hear it at the *Beginning*, *Middle*, or *End* of the word.
Read aloud the following words, and point to the picture:
purse, spoon, ghost, dress, insect, glass, star, person, six, inside, mouse, song.

1.		B M E
2.		B M E
3.		B M E
4.		B M E
5.		B M E
6.		B M E
7.		B M E
8.		B M E
9.		B M E
10.		B M E
11.		B M E
12.		B M E

Dictated by assessor for p. 3

III. Dictation: Sounds and Words (sheet for assessor)

10 sounds: Write all the ways you know to write this sound:

1. (ā)
2. (d)
3. (ī̄k)
4. (m)
5. (ē)
6. (p)
7. (sh)
8. (ū)
9. (s)
10. (ē)

10 words. Please write the words.
If you know the meaning, write it in the column on the right.

11. desk
12. came
13. baby
14. quiet
15. going
16. five
17. together
18. sleep
19. blue
20. sick

Packet of Pages to Read From

II. Letter Names and Sounds: Sheets for Student

i	e
t	c
p	k
n	b
s	r
a	m
d	y
h	l

f	z
o	q
g	
u	
j	
w	
v	
x	

Appendix 9: English-Learning Attainments during Intervention

Table 7: Sarah's record of quiz/test scores for tenth-grade class
(from artifact in Appendix 21)

	Quiz: Sounds	Class work	30.10`	Class work	Test	Quiz 1	Quiz 2	Quiz 3	Quiz 4	Test	Quiz 5	am, is, are	Quiz 6
Omri	91	86	73	100	-	60	74	70	80	66	92	58	-
Zach	76	-	83.5	-	-	82	-	-	-	50	-	-	-
Andrei	88	100	96	-	-	100	-	-	-	-	-	90	-
David	93	-	94	-	100	100	100	100	100	100	100		-
Ruth	100	100	100	100	99	100	100	100	98	100	100	95	100

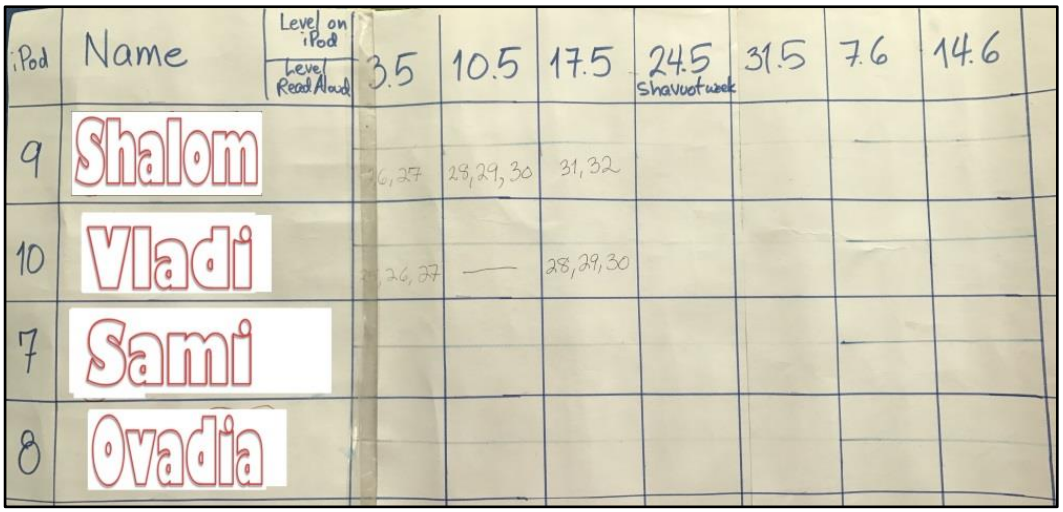
(blank spaces denote absence of student on test day)

Table 8: Progress in Levels of English Club Each Student Reached
November – March 1

Dates worked with students	11.16.14	11.23.14	11.30.14	12.07.14	12.14.14, 12.21.14, 12.28.14, 1.4.15	01.11.15	01.18.15	01.25.15	02.01.15	02.08.15	02.15.15	02.22.15	03.01.15
	Intake				winter break								
Level read aloud from book to Sarah or me													
Yoav	1	2	2	6		8	11			10		21	22
Ruth			6				10		14			21	
Omri		1	3	6		9	11	13	16				
David				6			10	11	14	19	17	21	
Andrei				3								10	
Zach							3	5				10	
Shalom						3	4	5				10	
Vladi												6	
Level unlocked in MALL app													
Yoav	1	2	4	6			11			19	25	27	29
Ruth		13	27										
Omri		1		7								17	17
David								8			21		25
Andrei													
Zach							1	5					
Shalom													
Vladi													

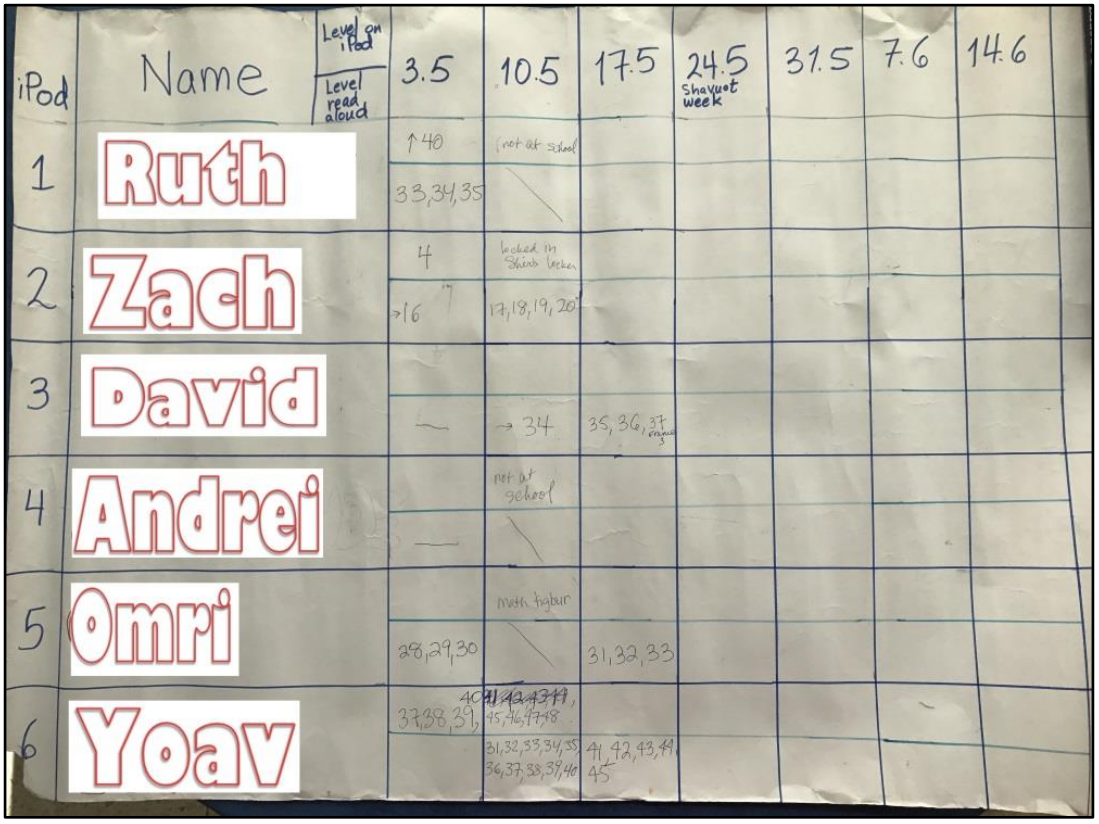
Table 9: (Continued) Progress in Levels of English Club Each Student Reached, March 8 – June 14, 2015

Dates worked with students	03.08.15	03.15.15	03.22.15	3.29.15 & 4.12.15	04.19.15	04.26.15	05.03.15	05.10.15	05.17.15	5.24.15	05.31.15	06.07.15	6.14.15
				spring break						holiday	post-intervention interviews ,tests		Last day of school
Level read aloud from book to Sarah or me													
Yoav	30		30						45				50
Ruth						34	35	40					
Omri	23		30		24	27	30		31			34	
David	24		29			34		34	37				
Andrei					19								
Zach			24		15		16	20					
Shalom		15	20		23	24	27	28					
Vladi		12	20		22		27		30				
Level unlocked in MALL app													
Yoav	30		35				37	48					
Ruth													
Omri													
David	29												
Andrei													
Zach						3	4						
Shalom													
Vladi			16										



iPod	Name	Level on iPod / Level Read Aloud	3.5	10.5	17.5	24.5 Shavuot week	31.5	7.6	14.6
9	Shalom		26, 27	28, 29, 30	31, 32				
10	Vladi		25, 26, 27	—	28, 29, 30				
7	Sami								
8	Ovadia								

Figure 11: Ninth--grade chart of levels reached in The English Club



iPod	Name	Level on iPod / Level read aloud	3.5	10.5	17.5	24.5 Shavuot week	31.5	7.6	14.6
1	Ruth		↑40	(not at school)					
			33,34,35						
2	Zach		4	locked in Shirs locker					
			>16	17,18,19,20					
3	David								
			—	→ 34	35, 36, 37				
4	Andrei			not at school					
			—						
5	Omri			Moth tafeir					
			28,29,30		31,32,33				
6	Yoav		37,38,39,	40, ~~41,42,43,44~~, 45,46,47,48					
				31,32,33,34,35, 36,37,38,39,40	41,42,43,44, 45				

Figure 12: Tenth-grade chart of levels reached in The English Club

Table 10: English Letter Knowledge - before and after intervention,
10th Grade Learners who participated actively in intervention

	Writing letters (max 52)			**Naming letters (max 26)**			**Reading letters (sounds)**		
	pretest	post-test	net delta	pretest	post-test	delta	pretest	post-test	delta
Yoav	20 (copying from keyboard)	13 (no copying from keyboard)	not meaning ful	0	1	+1 Still didn't know names of letters – the app mostly teaches sounds)	0	19	+19 ; 1 reversal; on 6 letters got ½ point because only gave one sound of two Identifies (including partially) sounds of 22/26, or 85% of the letters
Omri	**22**	**36**	**+16** **(and + th)** **-2**	26 attempted 12 correct	26 attempted 19 correct	**+5.5**	25 attempted; 13 correct	26 attempted 15.5 correct	+3.5 -1.5
David	22	42	+21 -1 net **+20**	13	18	+6.5 -1 net **+5.1**	attempted 4; none correct (approximations)	attempted 21 9 correct (plus approximations)	**+15** (improvement on **18** letter sounds even if not yet perfect or complete)
Ruth	48	52 100%	+4	23	24	+1 (u to y)	10	14	+5 -1

Table 11: English Letter knowledge before and after intervention,
9th-Grade learners who participated actively in intervention

	Writing letters (max 52)			**Naming letters (max 26)**			**Reading letters (sounds)**		
	pretest	post-test	net delta	pretest	post-test	delta	pretest	post-test	delta
Vladi	14	42	+28 (2 x .5 z reversed) -1 (m)	21.5	21.5	+2.5 -2.5 in units of .5	3	11	+9 -1
Shalom	21	24	+3 -straightened out confusion between names of t and f -learned name of u -still reversing q	10 including several where knew 1 of 2 sounds attempted 16	18 attempted 23	+9 -1	10 including several where knew 1 of 2 sounds attempted 16		+9 -6 (forgot the cap of small & vice versa)

Table 12: English Letter Knowledge – before and after intervention,
Learners who did not participate actively in intervention

10th graders: Absent from school most of the school year									
	Writing letters (max 52)			**Naming letters (max 26)**			**Reading letters (sounds)**		
	pretest	post-test	net delta	pretest	post-test	delta	pretest	post-test	delta
Andrei	12	*	*	16	*	*	3 +5 names of corresponding Hebrew letters	*	*
Zach	15	*	*	21	*	*		*	*
9th graders: Intermediate students, teacher released from active participation in intervention; stayed in regular class									
Sami	13	26	+15.5 -2.5	18	23	+5	13.5	15.5	+3.5 -1.5
Ovadia	23	18	-12 +7	0	22	+22	0	14	14
Pansy	19	*	*	16	*	*	11.5	*	*

* No post-test. Students were absent from school for the several weeks when tests were administered

Appendix 10: The Hickey Method and its adaptation for challenged EFL learners

The Hickey approach is based on the grapheme-phoneme correspondence, focusing on the sounds of the letters and explicitly teaching word-attack skills that include syllable types and syllable division patterns to help learners decode strings of letters in longer words and identify the appropriate sounds of vowels. Spelling patterns are taught to make spelling and decoding more predictable, as are meanings of the most common prefixes and suffixes to exponentially expand comprehension. The approach generally teaches one letter or letter combination per lesson (see Appendix 11): its sounds, capital and lower case shape, how to write it, and (secondarily) its name. In parallel, English rules of morphology, spelling, decoding, and syllabification in succinct, applied form are taught as needed (see Appendices 11, 17, 18), accompanied by examples of words that employ them containing only the letters learned to that point (see Appendix 15). Words taught in each level contain the letters and rules that have been explicitly taught, so that learners are equipped to decode them, and their meanings are learned together with their pronunciation. Common irregular (exception) words, that are not spelled the way they sound, are introduced as sight words as their letters are learned.

Initially, focus is on the phoneme-grapheme association (though at no point are nonsense syllables or words used for reading practice, as in other phonics-based approaches) and reading and writing practice to achieve automaticity. As reading becomes increasingly automatized and the learner reads more fluently, more attention is devoted to meaning. Comprehension is supported through pictures illuminating the meanings of individual words and connected texts as advocated by Brice Heath (2000).

After introducing new words incorporating the new letter(s), the learners read aloud the connected text in an illustrated comics-format story (see Appendices 13 & 15). The story is narrative with plot, setting and characters designed to engage the reader. Word-writing practice and a game integrate and practice the new material

The underlying philosophy of the approach follows scaffolding theory, providing learners with structured, explicit, multi-sensory language instruction within their ZPD, gradual introduction of new concepts through direct instruction, and extensive review and integration of new material. In addition to developing language skills, the approach is designed to build learners'

confidence in their ability to progress in their reading, writing, spelling, comprehension and pronunciation skills through enabling experiences of success. Success is possible because the learners are only asked to perform language tasks that they have been explicitly equipped to perform. If learners are unsure of something (such as the sound of a letter) the tools are at hand to retrace their steps and review it before using it in reading.

As the method was developed in the U.K. for native speakers in individual tutoring settings, it has been adapted for use with EFL learners. When being trained in Israel, individual teachers had previously created paper copies of lesson materials and physically exchanged them with classmates. I have taught courses in the Hickey Method at teacher-training colleges since 2006 and have created a website to facilitate sharing of free teaching materials for this method (Levitt, 2017b). The English Club interactive MALL application and books (Levitt, 2017a) is a set of materials I created to adapt the Hickey approach to individual, group, or class EFL learning and to reduce the amount of teacher training necessary to teach effectively by this method.

The English Club materials and how they implement the Hickey Method

The Hickey approach is built into The English Club materials (see Appendices 11-18), which have adapted it to EFL learners by focusing on the 500 most common English words, those most basic to beginning English language learning. The MALL application provides a new form of Vygotskian tool that supports more independent learning than printed material, as multimodal technology has affordances that books do not. The app enforces presentation of the material in sequence, and contains all stages of learning new material, practice, integration, and review. The multimodal affordances (e.g. hearing the voice of a native English speaker pronouncing the English words and modelling the fluent reading of text with appropriate prosody, and animated videos narrated in the learner's language explaining rules of English, and interactive activities with opportunity for self-check and correction) supplement the print materials in the book.

My goal in composing the stories of The English Club was to create a coherent series of stories with a consistent group of characters and setting, so that the stories would connect to each other and create an imaginary world. The stories are about the members of an extended family and their friends, as they engage in the family and youth culture of the neighborhood, their

homes, schools, and stores. The plots of the stories involve problems that might be familiar to the reader. Given the importance of cultural relevance, these materials need to be adapted for any group with whom they are used. (The English Club materials have required adaptation for use with learners in other contexts, e.g. young adults in Saudi Arabia and ultra-Orthodox Jewish primary-school boys in Israel.)

As the stories contain only a small amount of text, and the humorous, colorful pictures allow learners to identify sympathetically with the characters, the materials are designed to be attractive, engaging and non-threatening to learners with low confidence in their English-learning ability who have experienced failure in their previous attempts to learn English literacy skills.

Appendix 11: The Hickey Method/ English Club: New Material by Level

The English Club app and books introduce the letters, their sounds, and tips to English in this sequence. The story for the level includes only words containing the letters and their sounds that have been learned through the current level, and which the learner has the tools to decode. The words in the story and their meanings are pre-taught through word pages (book) and yellow cards (app), and practiced through word-writing lists (book) and green board word-writing cards (app).

Table 13: The English Club Content:
Target Letters, Rules, and Story in each Level

English Club Level Number	Target Letter(s)	Rule(s) or "Tip(s) to English"	Story Title
1	i, t, p, n, s	s 's closed syllables	It is I!
2	a	capital letters n't	Nan's Nap
3	d		Dad, Dan, and a Pit
4	h, th		Dan's Hat
5	e, sh	open syllables	Ned's Test and Stan the Pest
6	c	c	Can-Can the Cat and Ned's Hen
7	k	k	Can-Can and the Kittens
8	b	b-d	Ben's Best Bed
9	r		A Bat, a Rat, and a Rabbit
10	m		Batman Sam
11	-ck	-ck	The Snack at the Track
12	y-	name of Y	Yams at the Camp
13		vc/cv	Kittens and a Rabbit at Tennis
14	-ic	-ic vcv	The Picnic in the Attic
15	-i_e	magic e	The Kite in the Pine
16	-ike		Mike's Bike Cracks
17	-ire		Sam Hires the Kids
18	l		Plant and Animal Island
19	-ll	-ll	The Balls Spill at the Hill
20	-y (ī)	-y	The Dry Kittens
21	-y (ē)		Daddy Helps Baby Ben
22	f		A Firefly Isn't a Pet
23	-ff	-ff	The Tribe Camps by a Cliff
24	-ss	-ss	The Messy Class
25	-es, -less, -ly	-es -less	Classes at 8:00

English Club Level Number	Target Letter(s)	Rule(s) or "Tip(s) to English"	Story Title
		-ly	
26	-a_e (a-magic-e)		Sara and the Kids Bake Cakes
27	-ar	bossy r	A Car and Far Stars
28	-are		The Late Scare
29	o		Mike is O.K.
30	g (sounds like (g))	g	Eggs in the Garden
31	-o_e (o-magic-e)		Franny at Home Alone
32	-ore		Ben at the Candy Store
33	-ng		A King, his Slingshot, and his Song
34	-ing	cvc + -ing magic e + ing	Skating, Hiking, and Camping Things
35	u	-ful	Be Careful of Your Puppy
36	j		Fun in July
37	-u_e		The Cute Baby Picture
38	w, sw-		Two Friends Go Swimming
39	v	-ve	Valentina Gives Her Iguana Vitamins
40	x		David Fox's Six Boxes
41	-nk		No Skunk Stink, Thanks!
42	re- mis- dis- un-	re- mis- dis- un-	David Misdials to an Unkind Woman
43	z, -zz	-zz rule	A Prize in a Jazz Contest
44	qu	qu	I Quit!
45	ee		The Frisbee in the Tree
46	oo (short oo as in "book")		That Looks Good!
47	oo (long oo as in "spoon")		Noon on the Moon
48	th		Think of Three Things
49	sh		Jellyfish at the Shore
50	er	-er	An Answer to a Letter

Appendix 12: The English Club: Clue Words for White Cards in app

The Hickey Method uses clue words to help learners remember the sound(s) of each letter and letter combination. Learners using The English Club app chose one of these common words or cognates (words that are the same in learner's L1 and in English) for each sound of each spelling as a mediator tool for remembering the spelling/sound correspondence.

Table 14: The English Club Levels - Letters, Sounds and Clue Words

English Club Level Number	Target Letter(s)	Phonetic symbol for Letter Sound	Clue word 1	Clue word 2	Clue word 3
1	i	(ĭ)	igloo	Internet	in
1	i	(ī)	I	ice cream	iPod
1	t	(t)	ten	telephone	T.V.
1	p	(p)	pizza	pencil	popcorn
1	n	(n)	no	notebook	number
1	s	(s)	snake	seven	spaghetti
1	s	(z)	nose	dogs	rose
2	a	(ă)	apple	astronaut	and
2	a	(ā)	ABC	alien	airplane
3	d	(d)	dog	dad	desk
4	h	(h)	hamburger	hat	hand
4	th	(th) blow	three	thank you	thirteen
4	th	(th) buzz	this	that	they
5	e	(ĕ)	egg	elephant	Enter
5	e	(ē)	e-mail	eat	ear
5	sh	(sh)	she	ship	shoe
6	c	(k)	cat	coffee	computer
7	k	(k)	king	key	kangaroo
8	b	(b)	banana	ball	blue
9	r	(r)	red	run	restaurant
10	m	(m)	man	milk	money
11	-ck	(k)	black	clock	truck
12	y-	(y)	yellow	yo-yo	You-Tube
14	-ic	(ĭk)	picnic	magic	music
15	-i_e	(ī)	nine	five	time
16	-ike	(īk)	bike	hike	like
17	-ire	(īr)	fire	tired	hire
18	l	(l)	lion	lemon	love
19	-ll	(l)	bell	hill	wall

English Club Level Number	Target Letter(s)	Phonetic symbol for Letter Sound	Clue word 1	Clue word 2	Clue word 3
20	-y	(ī)	cry	sky	fly
21	-y	(ē)	happy	baby	candy
22	f	(f)	family	friend	flower
23	-ff	(f)	cliff	off	staff
24	-ss	(s)	dress	glass	kiss
25	-es	(ĭz)	boxes	dresses	glasses
25	-less	(lĕs)	homeless	sleepless	strapless
25	-ly	(lē)	happily	finally	slowly
26	-a_e (a-magic-e)	(ā)	cake	plate	game
27	-ar	(âr)	star	car	far
28	-are	(ār)	prepare	share	care
29	o	(ŏ)	on	olive	orange
29	o	(ō)	open	old	O.K.
30	g	(g)	green	grapes	girl
31	-o_e (o-magic-e)	(ō)	home	smoke	bone
32	-ore	(ōr)	store	more	snore
33	-ng	(ng)	ring	angry	morning
34	-ing	(-ĭng)	smoking	parking	sleeping
35	u	(ŭ)	umbrella	up	under
35	u	(ū)	U.S.A.	university	uniform
35	u	(o˘o)	push	pull	put
35	-ful	(fo˘ol)	beautiful	careful	wonderful
36	j	(j)	jacket	jump	jeep
37	-u_e	(ū)	use	cube	excuse me
37	-u_e	(o¯o)	June	rule	tune
38	w	(w)	woman	water	walk
38	sw	(sw)	swim	swing	swan
39	v	(v)	video	van	vegetables

English Club Level Number	Target Letter(s)	Phonetic symbol for Letter Sound	Clue word 1	Clue word 2	Clue word 3
40	x	(ks)	six	box	index
41	-nk	(nk)	drink	think	bank
42	re-	(rē)	return	rewind	review
42	mis-	(mĭs)	mistake	misdial	misunderstand
42	dis-	(dĭs)	disabled	discount	discover
42	un-	(ŭn)	unusual	undo	unbelievable
43	z	(z)	zebra	zoo	zipper
43	-zz	(z)	jazz	buzz	fizz
44	qu	(kw)	queen	question	quiet
45	ee	(ē)	sleep	week	tree
46	oo	(o˘o)	book	cook	good
47	oo	(o¯o)	school	food	moon
48	-th-	(th) blow	bathroom	math	mouth
48	-th-	(th) buzz	clothes	mother	brother
49	-sh-	(sh)	fish	finish	wash
50	er	(êr)	teacher	taller	river

Appendix 13: The English Club™ app - Screenshots

It is difficult to capture multimodal MALL resources in print format. This appendix contains screenshots to provide a visual representation of the app contents, though they do not provide the full multimodal experience.

To experience the multimodal MALL app used in this research, The English Club app can be downloaded from the Google Play Store on Android or the Apple Store on Apple mobile devices (smartphones or tablets). Installation instructions are in Appendix 14. The app has changed minimally since the research.

The app displays a learner's personal study space in an imaginary world with desk and bookcases.

Levels shelves –From here access the Introduction and Levels 1-50, with the boxes for each level opening as the learner completes each previous level.

Narrator Franny explaining how to use the app. She speaks aloud in the learner's L1. Here she explains the confetti that celebrates finishing all the learning activities in a level.

Learner's personal albums containing learned material, trophies (that fill with color as levels are completed), medals and connection to the Apple Game Center (deactivated for the study intervention)

Figure 13: The English Club App - Learning Environment

Review: When the level is first opened, the purple review box is on the desk. The box contains letter, word, and rules (tips) cards learned in the previous levels. (The number of levels back to review, and the maximum number of cards per color, can be set in the app settings to suit the learner's learning profile.) Tap the box to open it and display the cards. The number of remaining cards to review of each color appears in a circle above the card displayed.

Learn new material: After the review in each level, the boxes for the new material to be learned in that level appear on the desk. The white box contains cards for the new letters to be learned, the yellow box contains word cards with common and exception words, and the pink box contains the tips animation cards (rules of spelling, syllable types and division patterns, the meanings of prefixes and suffixes, patterns of specific letters, general rules of English.)

Practice New Material: The learners desk for Level 2. Here all the new material has been learned (letter, words, and tips cards have been completed, the cards stamped, crossed off the checklist on the board, and moved up to the shelf, and can be accessed any time.) The "practice new material" activities have appeared on the desk: story, word-writing board, and game. They can be done in any order, and the learner can go back and forth among them.
The Help drawer contains tutorials of how to do any activity, the word card conventions list, a family tree of the characters, etc.

Figure 14: The English Club App –Desk Activities:
Review, Learn New Material, Practice New Material

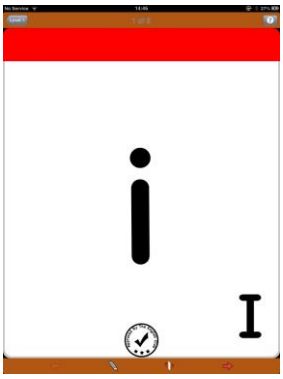
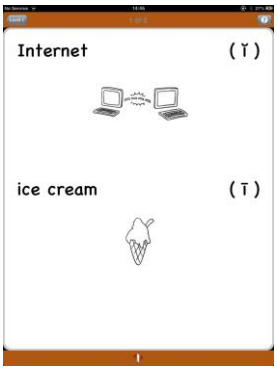
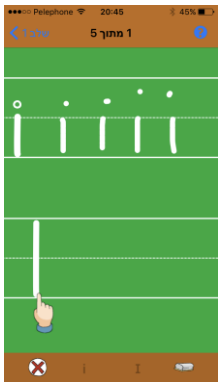
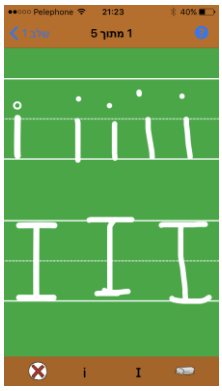
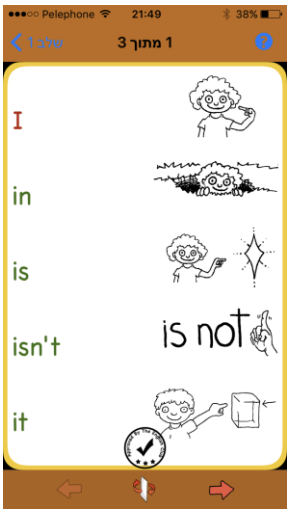
Letter reading)		Letter-writing	
Letter on front,	**Sound(s) on back**		
			
Front of letter card for letter i, with graphemes for lower and upper case. Red line reminds learner that it is a vowel and has multiple sounds. The lower-case grapheme is in the center (since most text appears in lower-case graphemes) and the upper-case grapheme in the lower right corner.	Back of letter card for **i** with the chosen clue words for the two phonemes it typically represents. Learner taps to hear each phoneme and clue word spoken aloud. After learning the letter, its sounds and clue words, the learner should first try to recall the sounds and clue words by looking at the letter (grapheme) on the front of the card, then flip the card for a reminder or to check that they remembered correctly.	Tapping the pencil icon on the front of the letter card displays the letter-writing board. Tapping the upper or lower-case letter icon plays the name of the letter spoken aloud, and an animation of the correct way to write the graphemes.	The learner can write the graphemes with her finger or with a touch-pen, imitating the animated model. The learner can erase and rewrite the grapheme as many times as desired to practice.

Figure 15: The English Club App: Learning new material: Letter Cards – Reading, Writing

Word cards – front with pictures, back with translations



A word card from Level 1. Regular words are green and irregular in red. Tap the word or picture to hear it spoken. Flip the card to read word translations. As words are played, the accented syllable is shown in bold.

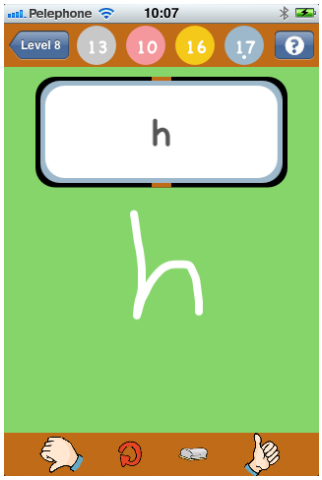
The back of the word card displays the word meanings (translations, definitions) in the learner's L1. Tap the word to hear it spoken while you read the definition.

In the Help drawer is the explanation of the conventions used on the yellow cards for the words and pictures (green words are regular, red are irregular, silent letters are transparent; past tense verbs have a sand clock beside the verb picture, etc.

Figure 16: The English Club App -Learning new material: Word cards

Letter-writing practice

During review, learner hears a phoneme and writes all the ways that have been learned to that point for encoding that phoneme. Learner can request clue word hints displaying a picture of their clue word(s) and hearing it spoken aloud, for all the ways that have been learned to encode that phoneme.

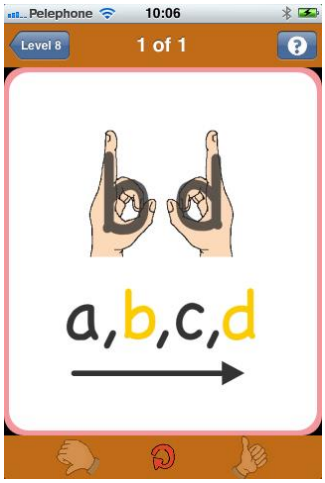


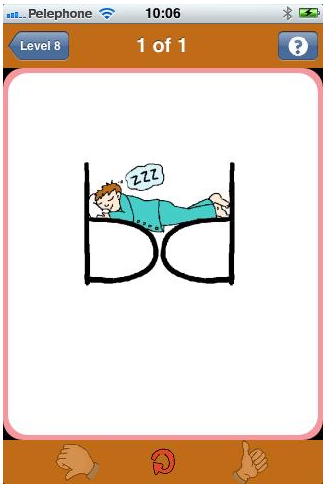
Encoding phonemes with graphemes: Valentina (top) says the sound of the letter or letter combination. If the learner needs a reminder of his clue word, he can hear the sound and his clue word from Dan (below).

Then the learner writes the grapheme(s) that he thinks spell(s) the phoneme. The learner can flip Valentina to check himself, erase and correct as needed. "Thumbs up" means he knew it; "thumbs down" means it should come up again at the end of the series so it can be practiced again. Learners thus develop awareness of what they know well and what they need to practice more – "metacognition."

Figure 17: The English Club App: Review of encoding phonemes by writing letters

Two graphics from the "b-d" tip animation, to help learners remember the directions of these commonly reversed letters





Three graphics from the "Capital Letters" tip animation, showing when to use capital letters in English (first letters of names, sentences, or important words in titles.)

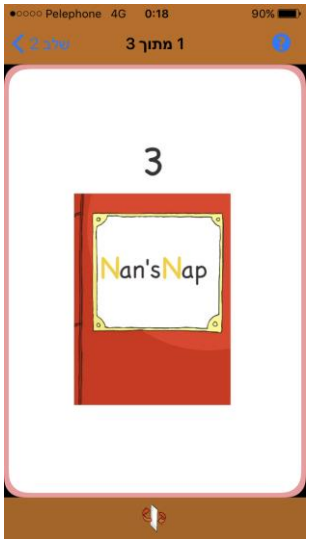
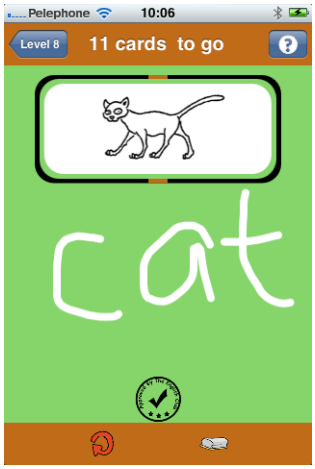


Figure 18: The English Club App- Learning new material:
Rules of English "Tips" cards: Animated videos

Pages of the L3 story, with words containing only letters i, t, p, n, s, a, d.
Learner can read the text, hear the text read aloud, record herself and play back for comparison, and flip the picture to see the translation of the page.

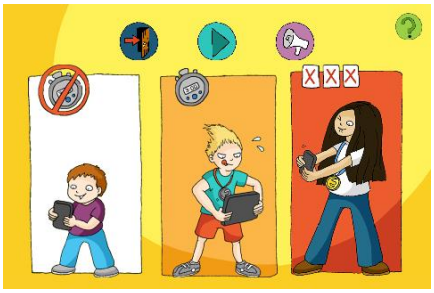
Figure 19: The English Club App: Practicing integrating new material: Reading a story



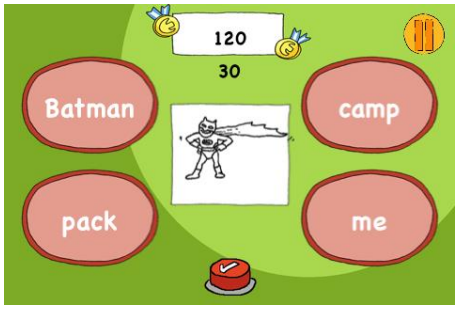
Word-writing practice: Learner sees a picture of the word and hears its sound, and writes it with her finger.

The learner can flip the picture to check her spelling of the word, erase and correct as needed.

Figure 20: The English Club App- Practicing new material: Writing words



Game modes - users can choose according to their learner profiles: "Take your time", "Play against the clock" and "Play to three mistakes." This accommodates a learner's preference for excitement, competition with herself, or "no pressure" modes. (This choice of game modes was available on the Apple iPod devices used in the current study. They are not available in the later port to Android devices)



Game screen from Level 11: Learner hears the word and sees its picture, and chooses the correct way to write the word. Learners can replay the sound of the word as many times as desired until they are confident they can find the way it is spelled.

(The above game was available on the Apple iPod devices used in the current research. Two additional games are available, on a rotating basis, on Android devices.)

Figure 21: The English Club App-Practicing New Material: Game

Appendix 14: The English Club app - Installation instructions

To experience the MALL intervention used in this research, install The English Club app on an Apple or Android smartphone or tablet. The app and the first two levels are free. On your mobile device:

- You need an account (username, password) to download apps from the Apple App Store or Google Play Store.
- Connect to a stable Wi-Fi connection. (Tap Settings or similar; verify that there is a name next to Wi-Fi.)

  Android: Tap the **Google Play store** icon Apple: Tap the **App Store** icon

- Search for **The English Club.** Tap on **The English Club** - Fern Levitt
- Tap on the icon for **Install**, and watch the progress marker complete the download
- Tap **Open**
- Tap **Confirm** if you are willing to share anonymous data to help improve the app
- Nell invites you to choose among **English, Hebrew, Arabic, or Spanish** – the available learners' languages
  - Tap the **language** that your English learners understand. The app "talks" to learners in this language, displays translations of the stories and words, and plays aloud all explanations. (For the current research, Hebrew was selected.)
  - Tap **Download** to confirm.
- The first two levels in the chosen language download, free.
- To install more of the 50 levels, tap the **Store** icon in the lower right corner of the screen.
  - Nell's store appears, with packages on the table and on the shelf.
  - The easiest and most economical way (a 20+% discount) to download the rest of the 50 levels is to tap the **Gold Pack** on the shelf . Enter your username and password to authorize the purchase. (The price as of printing is $14.99 USD in US App Store).
  - If you prefer, you can instead download the individual packs as you are ready to use them. Yellow Pack 1 contains 8 levels and costs 12 NIS, the other packs 2-5 – red, purple, blue and green, each contain 10 levels and cost 16 NIS each. Download the packs in sequence and authorize the purchases by entering your username and password. (The Play Store or App Store needs your credit card information for you to make purchases.)
- The **Multi-User Pack** turns on Add Users and Log-In in the app, and enables an unlimited number of learners to share one device in turn. Each learner's progress, clue words, medals and points are tracked separately. It costs the same as one additional Gold Pack. (This was not installed for the current research.)

When the packs are installed, you can start using The English Club.

Note: You must complete all the activities in a level (the cards must be "stamped" and the activity crossed off on the wall board) before the next level is opened and available for use.

Appendix 15: Format of book pages for typical English Club level (Level 6)

1. Lined letter-writing page (sky, grass, ground letter heights) with rule on sound of "c";
2. lined word-writing page; 3. comics-format story page; 4. dictation word list

Level 6 Tips: c (sounds like (k))

c c

C C

The following example shows a "tip", previously only in the app in animated video form, that was added to the second edition of the books, as it was evident from the research that the learners did not always bring their devices to school and often used the books instead:

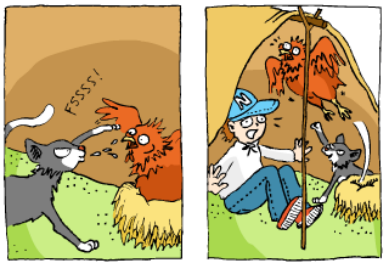
Tip: c	*טיפ: c*
c makes the sound **(k)** before all letters <u>except</u> e, i and y. cat can act	**c** משמיעה את הצליל **(k)** לפני כל אות <u>חוץ מ-</u> e, i, y cat can act

Level 6, Target letter: c (sounds like (k))

Can-Can the Cat and Ned's Hen

Ned naps in his tent, in his cap.
Ned's pet hen sits in the nest.

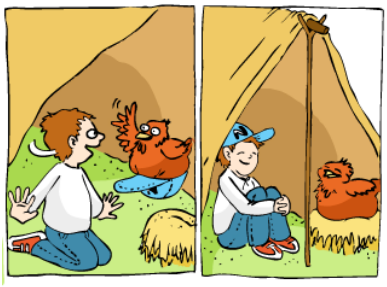
This is Can-Can the cat.



Can-Can spits at the hen.
Ned can't nap.

Ned stands, he spins!
"Scat, Can-Can!!!" Ned said.

The hen isn't in the nest.
"Hen, hen!" said Ned. Ned is sad.



The hen is in Ned's cap!
Ned can nap.

can can

can't can't

cat cat

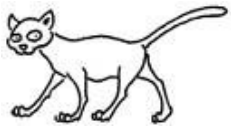
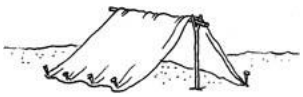
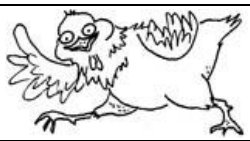
cap cap

act act

Can-Can Can-Can

scat scat

Words - Level 6

1		Can-Can	
2		cat	
3		can	
4		can't	
5		cap	
6		scat	
7		tent	
8		nest	
9		hen	
10		said	
11		this	
12		the	

Appendix 16: Narrative texts in The English Club stories

Each level of The English Club follows the Hickey Method approach of providing a meaningful, connected text at the reading level of the learners to practice the integration of the newest target letter(s) learned. The text is in narrative story format and has a beginning, middle and end with characters, a setting, and a plot with a problem to be solved, a climax and resolution (denouement). I created engaging stories to the extent of my writing abilities, given the quite constrained vocabulary available (with constraints most severe at the beginning, and gradually relaxing as the learners become familiar with an increasingly rich repertoire of letters and, consequently, words).

The lens of critical pedagogy points out that often there is a certain cultural imperialism of English language teaching materials from 'the centre,' the U.K. and U.S., which does not consider the cultural values and needs of the learners. This observation caused me to reflect on the values and choice of topics that underlay the stories I composed for The English Club. Though I attempted to keep the stories in an imaginary setting, without reference to a real country or city, my own cultural assumptions, values and references shaped the choice of subjects and content of the texts. Creating beginning language materials for older learners with minimal English knowledge was a challenge in composing the stories.

Overall, I tried to build into the stories humor and acceptance of human nature with both its noble sides and 'evil inclinations,' affection for the variegated types of human beings, the importance of relationships with family and friends, of mutual acceptance, of each family member's right to be seen and appreciated in the family and in society, of people's right to pursue their own interests and to have fun, and respect for creative problem-solving. These might well not be the values or humor of another country context or society, and the educators there could build an entirely different progression of stories around the high-frequency 'allowed' words for each level.

I tried to balance the genders and ages of the characters in the stories and to be sensitive to gendered behaviors and not imposing 'normative' family structures (among the characters are a single-parent family headed by a white man and one headed by an Ethiopian woman) but no doubt there are gender biases in the stories. Grandma Sara bakes with the kids, while Grandpa Sam takes them camping or to see the stars from a light-pollution-free observation point; the

mothers worry about the kids returning late, while a father reassures them that the adult with them is responsible and that there is no cause for concern. I tried to write stories that would appeal to all genders of learners. There are many group activities – hiking, biking, going to a sporting goods store to buy equipment for active vacation hobbies, baking cakes, camping, and going to school together – that are engaged in by mixed-gender groups equally.

Here are some of the values, concerns, and inferred deeper meanings in the stories I wrote and that Julia Filipone, a talented educator and illustrator, thoughtfully depicted (as much of the inferred meaning was brought out through the illustrations):

- set in a neutral, imaginary place (assumptions about houses, clothing are Western)
- modern time
- concerns interactions among family and friends
- multiracial (white, blond, red and dark hair), Ethiopian, Latino, Caucasian
- mixed ages from young children to elderly
- mixed genders
- daily human concerns
- Problematics of names – names in English to practice target letters and sounds, since often local names employ non-English sounds (e.g. of vowels).
- I wrote the English Club materials based on the life experiences familiar to the students in my country, basing the problems in the stories largely on real events in daily life I had observed – Ethiopian multi-culturalism, grandparent-grandchildren relationships, parent-child, sibling relations.
- Values of kindness, respect for children's interests, peaceful coexistence, autonomous/independent youth culture, protecting the environment, helping strangers, cautious driving, animal rights, universal human concerns (Native Americans looking for their tribe), the strength of family and friends, abilities of people of all ages to solve problems, display their competence, autonomy and to teach these to others.
- My bi-culturalism impacts these, as does the limited vocabulary at each stage, and the need to focus on high-frequency words in the new target material of the story.

Standard WH questions are asked by the teacher after reading every text: Who, When, Where, What, Why, How? e.g. Who are the people in this story? What are their names? How are they

related? (with answers often inferred). Inferences about setting from text, plot and pictures: Where does this story take place? When does it take place?

The following table presents three examples of the simple, brief stories in The English Club with the plot, inferred cultural references and values, and WH questions that might be asked about each to scaffold comprehension.

Table 15: The English Club Stories – examples of inferred cultural references, values, and WH comprehension questions

English Club Level Number	Story Title	Plot	Inferred cultural references and values	WH questions
1	It is I!	A child notices that someone is imitating his movements, until he realizes that it is his reflection in the mirror.	Sometimes it takes us time to understand puzzling reality, but we can feel relief and pleasure when we do. We like to recognize ourselves.	Who is talking in the story? How do you know? Where does this story take place? What is the child doing? Why does the child put his hands up at the end? How does the child know that this is his reflection in the mirror?
3	Dad, Dan, and a Pit	Father and son go to the beach together, and each does his own "thing" but when the son gets himself in trouble, the father comes to his aid.	Leisure activities such as visiting the seashore are normative activities for families together. Children can be mischievous and don't always exercise good judgment, but parents are supportive and helpful without being punitive. Creative solutions to problems are sometimes found through unconventional thinking (such as how to use available resources).	What is Dad doing? How does Dan get into trouble? How does Dad get him out of trouble? Why is Dan sad when he is in the pit but not at the end of the story?
5	Ned's Test and Stan the Pest	A boy's personal refuge where he does his homework and rests is "invaded" by a mischievous cousin, but the boy has the last laugh.	Children have a right to their personal spaces; children can activate their agency to fulfill school requirements at home; some children take pleasure in doing deliberate mischief; people have a right to defend their personal space and don't have to be victims of unwelcome guests; it's possible and desirable to anticipate problems and plan solutions employing ingenuity (including by children).	What is Ned doing in the tent? How does Stan make trouble? How did Ned prepare for trouble? Why is Ned laughing at the end of the story?

Appendix 17: The English Club Tips to English (viewable on YouTube)

Search in YouTube for "The English Club App" (for English) or "The English Club App in Hebrew" "…in Arabic" "…in Spanish")

Table 16: The English Club Tips to English in YouTube Playlists

Vowels, Consonants, and Syllables	
1	Vowel
2	Consonants
3	Syllable
4	Closed Syllable
5	Open Syllable
6	vc/cv
7	v/cv
8	magic e
9	doubling rule
10	cvc + ing
11	magic e + ing

Doubling Final Consonants	
1	Vowel
2	Consonants
3	Syllable
4	-ck
5	-ll
6	-ff
7	-ss
8	-zz

Tips on English	
1	capital letters
2	a / an

Suffixes	
1	-s
2	-es
3	's
4	n't
5	-less
6	-ly
7	-ful
8	-er

Tips on Letters	
1	c
2	k
3	b-d
4	y
5	bossy r
6	g
7	-ve
8	qu

Writing the (k) sound	
1	c
2	k
3	-ck
4	-ic
5	qu

Prefixes	
1	mis-
2	un-
3	re-
4	dis-

Appendix 18: The English Club/The Hickey Method Rules of English

Following is the content of the Tips to English as explained in The English Club app in the learner's language (Hebrew, in this study). Since the study these have been added to The English Club books for greater accessibility by teachers and learners.

Introductory Concepts

Tip: Vowels A vowel is a letter that you say by opening your mouth. Nothing touches inside your mouth when you say a vowel. The vowels are: **a, e, i, o, u** and sometimes **y**. We mark vowels with a **V.** A **long vowel says its name**. We show a long vowel sound with a straight line over the vowel letter. **(ā) (ē) (ī) (ō) (ū)** A **short vowel is a more gentle sound** of the vowel. We show a short vowel sound with a **smiley** over the vowel letter. **(ă) (ĕ) (ĭ) (ŏ) (ŭ)**
Tip: Consonants All the other letters that are not vowels are consonants. Usually **something touches in your mouth** when you say their sound: your tongue, teeth, the roof of your mouth, or your lips. **We mark consonants with a C.**
Tip: Syllables A syllable is a part of a word with one vowel sound. Put your hand under your chin. Say a word. How many times does your chin drop to your hand? That's the number of syllables in the word.

Level 1

Tip: Closed Syllables Closed syllables end with a <u>consonant</u>. This closes in the vowel and keeps it <u>short</u>. **is it in pin tip pit**
Tip: -s We use "s" at the end of a word to show: 1) plural of nouns: **pins, tins** 2) an action that <u>*he, she or it*</u> does regularly: **sits, spins**
Tip: 's We use **'s** at the end of a word to show: 1) ownership: The pin of Adi =**Adi's pin.** 2) a contraction of two words: **it is = it's**

Level 2

Tip: capital letters
In English, a capital letter is the first letter
of every name: **Ann**
every sentence: **It is a tin.**
and the important words in titles: **Nan's Nap**

Tip: n't
n't at the end of a word means **not**
isn't=is not didn't=did not can't=cannot

Tip: a / an
a and **an** before a word mean "*any one*" of what comes after (not *which* one).
Use **a** before words that start with
consonant sounds: **a pan**
Use **an** before words that start with
vowel sounds: **an ant**

Level 5

Tip: open syllables
Open syllables end with a vowel.
The vowel is *open*, so it is long and says its name: **I hi he she me**

Level 6

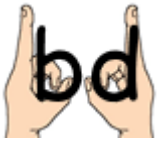
***Tip:* c**
c makes the sound **(k)** before all letters
except e, i and y.
cat can act

Level 7

***Tip:* k**
We usually use **k** to write the sound **(k)**
before e, i, and y.
kit kind kept

Level 8

Tip: b - d
The ABC goes from left to right.
b comes before **d**
a **b** c **d**
Hold up your hands like this:



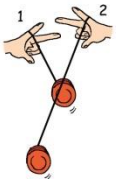
Your left hand is **b** and right hand is **d** .
If they are facing the right way,
they make a **bed**

Level 11

Tip: -ck
We use **–ck** for the sound **(k)**
at the end of words with one syllable,
after one short vowel.
back kick neck

Level 12

Tip: the name and sound of y
Y at the beginning of a word makes the sound in the word **yo-yo,**
but its name sounds like **"why?"**
Write **y** as if you are throwing a yo-yo:



Level 13

Tip: vc/cv
In **vc/cv** words (vowel, consonant, consonant, vowel) we divide the syllables
between the two consonants.
rab/bit kit/ten nap/kin bas/ket

Level 14

Tip: -ic
We use **-ic** for the sound **(ĭk)** at the end of words with more than one syllable.
picnic basic Arabic

Tip: vcv
vcv words (vowel, consonant, vowel):
We usually divide syllables between the first vowel and the consonant (so the vowel is **long**).
(If you know the word and it has a short vowel, divide it vc/v instead.)
v/cv: i/ris ba/sic vc/v: hab/it pan/ic

Level 15

***Tip:* magic** e
vc**e** at the end of a word:
1) the magic -**e** makes the vowel long,
so the vowel says its name.
2) the **e** is silent.
ride cake bone cube

Level 19

Tip: -ll
We use **–ll** for the sound **(l)**
at the end of words with one syllable,
after one short vowel.
(-ll changes the sound of the **a** before it to **(aw)**)
all ball ill pill sell yell

Levels 20 & 21

Tip: -y
"**-y**" at the end of a word says:
1) long **(ī)** for a one-syllable word.
my by sky cry
2) long **(ē)** for a word with two syllables or more.
baby happy many pretty

Level 23

Tip: –ff
We use **–ff** for the sound **(f)**
at the end of words with one syllable,
after one short **vowel**.
cliff stiff staff

Level 24

Tip: –ss
We use **–ss** for the sound **(s)**
at the end of words with one syllable,
after one short vowel.
class dress kiss

Level 25

Tip: the suffix -es
–es means the same as **–s**.
We add **–es** instead of **–s** for words ending with hissing sounds (ch, ss, x, sh…):
boxes dresses dishes
and with **o**: **goes does**

Tip: the suffix -less
–less means without (the word that comes before)
hatless friendless homeless

Tip: the suffix -ly
The suffix **–ly** tells us about the way an activity is done: **hungrily sadly happily**

Level 27

Tip: Bossy R
r often changes the sound of the vowel before it.
Compare the vowel sounds in:
time – tire can - car

Level 30

Tip: g
g makes the sound **(g)** before all letters
except e, i and y.
go garden glass

Level 34

Tip: the doubling rule
Double consonants keep short vowels **short**
by closing syllables.
(Never double x, y, w.)
big > bigger pat > patting hop > hopped

***Tip:* adding –ing to words ending in cvc**
To add –ing, to words ending in cvc:
1) one-syllable words: **Double** last consonant
(never double x, y, w.)
sit > sitting
2) two-syllable words: *if* the stress is on the last syllable, double the last consonant.
begin´ > beginning, hap´pen > happening

Tip: magic e + -ing
To add –**ing**, to words ending in **magic e**:
Drop the **e**, then add –**ing**.
bake > baking come > coming ride > riding

Level 35

Tip: -ful
The suffix-ful at the end of a word:
the word is an adjective meaning "full of the thing that comes before in the word":
beautiful=full of beauty careful = full of care
hopeful = full of hope

Level 39

Tip: -ve
Words that end with the sound **(v)** are written ending with –**ve**
(though the vowel may not be long)
save have live love move

Level 42

Tip: mis-
mis- **=** mistakenly or wrong
misread = to read incorrectly

Tip: re-
re-= again
reread = read again

Tip: un-
un- = the opposite
pack ≠ unpack do ≠ undo usual ≠ unusual

Tip: dis-
dis- = the opposite
like ≠ dislike able ≠ disabled respect≠ disrespect

Level 43

Tip: -zz
We use **–zz** for the sound **(z)**
at the end of words with one syllable,
after one short vowel.
jazz buzz fizz

Level 44

Tip: qu QU
The letter **q** always comes together with **u**
in English words.
Together they sound like **(kw)**:
quiet quick queen

Level 50

Tip: -er
-er at the end of a word can mean two things:
1) **more** :
tall -tall**er** = **more** tall fast -fast**er**= **more** fast
2) **someone who does a job or an activity:**
If you drive, you're a driv**er.**
If you bake, you're a bak**er**,

Appendix 19: Sample interview transcript

Baseline interview with teacher Sarah

November 16, 2014, 1:11 pm, 1:49 duration – "Sarah, after the kids exposed"

Location: Faculty lounge

(translated from Hebrew, English words are in bold)

This informal pre-interview was delayed and took place two weeks after the initial "pre-intervention" interview with Orna, after the kids had already started with the iPods.

F: So, up until this point… what have been your impressions…how did they react afterward?

S: [Enthusiastically] They really liked it, immediately connected with it, there were some who understood it a little less. But it seems to me that it will go well, it will really do the trick, it will move them to a really high level, it looks like.

F: If they are willing to invest in it…it will really work

S: Yes, only then

F: But I think that the risks here are that they will think it's too babyish, we talked about that just now in the office, that there aren't a lot of materials for this age group at a really entry level of English. I said that I'll be very happy to do a new version with more "mature" pictures and stories, but in the meantime, that's what we have, and we'll try it. We have to convince them that it's worthwhile to get through this, so they will be able to do something more advanced. But for example, I saw that Yoav, for half an hour, was really focused…he almost completed…

S: So that's it, he really concentrated on it, with his full attention

F: Yes

S: It will be really, really good for him.

F: I think it's "davka matim" (actually extremely suitable) that out of all the group, he's doing it alone out of his class,

S: OK.

F: I haven't interviewed you yet, right? Shall we do that, or shall I first show you how it works?

S: I don't care, either way.

F: Let's do that first, [in the background the welcome tutorial to the app starts to play in Hebrew; Sarah probably turned it on], so I won't …

November 23, 2014, 9:49 (?), duration of recording: 15 min 59 sec
Location: Faculty lounge (a lot of background noise)
(translated from Hebrew, English words are in bold)
This interview was delayed and took place after the intervention had already been running for about three weeks.

F: So, Sarah, what, in your opinion, interested you about this approach? To try it here in the school, and which needs of the learners do you think it will help with?

S: umm…I think it's very good because the students really take an interest in it. All the thing about the game, and moving up levels, and the competition with each other is really good. And it will help them learn because it will help them to read, less to understand meanings because that is less important now, but really to understand how to read correctly – because it works well.

F: yes? You see that?

S: Of course, of course.

F: You've already had time to see that?

S: Yes, I see it.

F: How did you select the learners that you wanted to participate? On what basis did you choose?

S: mmm…I know them already from last year, and they don't identify certain letters, they still don't read with confidence in their reading. Mainly by that. It's really clear.

F: So you didn't choose those that already identify the letters, and chose those who you know still don't identify the letters…

S: Yes, exactly.

F: Ok. You know, when I asked them to read, some of them said "mah pitom" (that's ridiculous to even ask) (laugh) "mah pitom"

S: (laughs)

F: I showed them …

S: Because they don't have confidence in their reading, they don't…

F: Right, right. I hope that this will give them the confidence…I think that (this isn't in the interview) it's important, for example, that Ruth, who said that she's already up to lesson 13,

S: I know

F: Still to read with her the stories at the lower levels because that will give her the confidence. Because she wasn't ready, for example, at all, to try to read the text in the pretest, even though it wasn't so hard. Ok. Why, in your opinion, haven't these learners managed to attain the basic skills in English, even though they learned English in school since perhaps fourth grade? What kept them back until now, in your opinion?

S: I think "vitur atzmi" (letting themselves off the hook, not demanding of themselves) and difficulty with languages. They have that generally, like…

F: Also in Hebrew?

S: Also in Hebrew they have a very hard time, a lot of spelling mistakes, a lot…they have trouble also reading in Hebrew, and it's hard for them also in other subjects that have a lot of text.

F mm hmm

S: And English, in general – like, it's something that they haven't even tried to understand, though they were in lessons.

F: So that's learning disabilities.

S: Yes.

F: They have a difficulty in learning languages. And you know, there is this approach, there are many other approaches by which it would be possible to work with them, and until now it didn't happen because…why? There weren't sufficient resources? Why? What do you think?

S: I, that's the thing, I'm only with them since they're at this school here, umm, I think simply a lack of motivation on their own parts.

F: of the students themselves?

S: Yes, that they didn't push themselves (they let it go), and didn't try at all, that's what happened.

F: So the gap opened…

S: Exactly, and now we're trying to close it, yes.

F: Ok. How do you feel about this approach, the Hickey Method, it's called, which is structured, based on phonics, step by step.

S: mm-hmm.

F: Do you – have you been exposed to this at all in the past?

S: Just in the iPod now, it seems to me from what I've seen, it's a really good system. Like they tell me that they've worked with it at home too, and it gives them motivation, really, and gets them to understand better, like that they draw the letters,

F: more sensory

S: Really good, yes.

F: You know that the definitions of the words appear there on the yellow cards

S: yes

F: So if you want to do a kind of a quiz with them, or simply to work on these words together, too, to try to …you can make up games on paper of "concentration" (matching), a word and its meaning, or present and past tense, when you get a little further and there's…

S: Oh, is that in there too?

F: For example, "sit – sat", right?

S: yes

F: But to also do something multi-sensory. If you want, I can bring you…I have..I can show you the site. There are games in every lesson in the website that you can print and …do you have a laminating machine here somewhere?

S: There's one here upstairs, yes.

F: Well, before I did the app, there's a website of my course in David Yellin, with hundreds of lessons, in every level at least four or five games, that you can make, and it's pure practice…

S: it's really good

F: Orna, listen, you can make games not only in the device, there are also games on the website – I'll show it to you – and there are all kinds of games on the website. And you can print and laminate them, cut them up, and play the games. Because games are actually practice, right?

O: Can you send it to my mail?

F: I'll send the link to both of you, yes. Ok. What do you think, how do you feel about digital technology for the purpose of teaching English; have you used technology in the past for teaching?

S: No, not really. I hope that it will go well. I don't want it to turn into a free-for-all kind of lesson, and for that reason I want to add…

F: they should take it seriously…

S: exactly, so I want to only do it one lesson per week and in the other lessons regular, even if I teach the material from the iPod, frontally or in writing to do something for them because even so they need that framework, but it's really suited to their working at home, in my opinion, to get it in more. Like, in the lessons in class…it's good to do them like an hour a week [out of the four scheduled English hours] but if it's just this, they're not the most…they can't work just on their own.

F: yes

S: Like we sat with them today, it was supposed to…Omri really got it, and also David. When you sit with them they work great. But…

F: I think it also depends; those who have the ability to concentrate, like Yoav, so he less needs that

S: To listen to instructions. David can't listen to instructions. When your daughter speaks (in the app) and explains,

F: because they don't have patience

S: He looks for the game

F: He's not the only one, but, what I think is, if you sit with them, the material is there, and the relationship with you only reinforces what they can get out of the material, right?

S: Right

F: How do you think your role as a teacher is affected when the learners use devices? Which roles do you play?

S: (laughs demurringly) umm, I can tell them what it means, and whether they are reading it right or not, like...

F: So you're the accompanier,

S: Yes, and the reading passages they don't even listen to them, they just skip over them so they can move on to the next level.

F: yes

S: Like, when I sat with them, the reading passages, they skip them just like that

F: right. If they don't have motivation…

S: Like Yoav. But to hear him read… that's something else entirely.

F: So you bring the framework,

S: I can check them every time

F: the checking, the accompaniment, and

S: and they have to learn how to work alone

F: mm-hmm. Um. Yes. It really relies on…they have to know that someone will hear them read in the end, that it's worth

S: Making the effort. Exactly.

F: For them to invest some effort and pay attention and not just skip. Because everything is really based on self-checking, that's true. Okay. Which subjects or problems do you think will arise from using this with the learners? Is there something that you think will be a problem?

S: I'm trying to think. It's hard for them…I noticed today that it's hard for them with the American accent, they usually hear me [she speaks English with an Israeli accent] and I don't have a proper accent, like with the "t-h" or all kinds of things that it doesn't sound to them like, they can't pronounce it really,

F: Generally, about the "t-h" tell them to stick out their tongues and then either to blow or to buzz (demonstrates each). But actually this is the accent, there is also a British accent, which is also correct, but how she pronounces it, actually, is the way it should be said, so that they learn to say it correctly

S: That's it, of course, the fact that David was stressed because he didn't understand it well, because of the accent

F: It's hard sometimes to hear it because you don't see the mouth. I always say to them "look at my mouth" and I try not to spit at them

S: giggles

F: But that's, he also said that he didn't hear "tap", because she says "tap" and it's not clear enough (the sound at the end)

S: So there are a lot of little things like that; -I hear it but they need clarification

F: yes, yes, and the earphones help too, I think.

S: right

F: and…how did you learn to teach English, what experience do you have, and which experience do you have here in this school. You started last year…

S: So that's it, because I haven't learned in any course, I had a course in the army in teaching, I didn't really study teaching or something, I'm only 19.

F: (laughing) You're 19!

S: (laughing too) I'm 19, in a month I'll be 20, like…

F: Like my daughter (laughing)

S: I'll be 20 in December.

F: mmhmm.

S: So like I haven't had the information

F: it's a lot of responsibility

S: so like, I came to this job because they asked me what my matriculation exam scores were, what was my highest score, so I said English, and so I came to teach English!

F: outstanding student in English!

S: It started from 2 or 3 students, and then I got…

F: But what kind of training did they give you?

S: I had a one-month course in teaching.

F: Teaching, not especially English?

S: No, just teaching, not especially English. Nothing.

F: So no one told you how to teach English?

S: No. Nothing. Nothing. I do it…Rena helps me sometimes, like, in what I should be trying to get across to them, or something, but from the moment I started with the students, like these are my students from last year, whom I already know and know what their level is and what they don't know? So I know what to do, like, grammar, like, basic things.

F: How did you identify what they don't know?

S: Like I read them a story and it had "have" or "has" and they didn't even know what that meant. I did a lesson on what goes with what [matching verb conjugations to subjects] and something is missing, in the tenses, or

F: That's what a good teacher does! You're a natural!

S: I adapt myself to, I don't have a plan that I can follow because these are students who I discover every time anew don't know something. So that's what I do with them, with the older ones I'm preparing them for **Module A, Module B, Module C,** like, which is easier for me because it just means reading the texts and vocabulary

F: because they are already at a higher level

S: Yes, with them I just read texts all the time and reinforce their vocabularies.

F: mmhmm

S: but with the tenth-graders, it's hard. Like, their foundation is very weak.

F: Yes. That's what I feel too – that if you manage to get them past this first obstacle of reading and writing, then if they begin to read then their vocabularies can grow, automatically

S: exactly.

F: And how do you feel about it that they threw you, that way, into the water, and

S: I'm fine with it, I'm already used to it, I'm in my second year already…

F: You started when you were 18!

S: 18. The same age as the twelfth graders.

F: Right! How do they relate to you?

S: Really good. Like, because I'm close to them in age, so, I'm like their friend, a little, it's very …kind of …fun.

F: mmhmm. You manage to find the way to have authority, but don't overdo it

S: Exactly.

F: And all the boys must be in love with you.

S: (giggles modestly)

F: Do you feel that, that they want you to like them, so they act like…

S: They try to get, like, to cross the boundaries of that "**distance**" [used in Hebrew as a concept to maintain a professional relationship with people whom you might otherwise be buddies with – not to be too buddy-buddy]

F: And you keep it. You're not a student here. So, do you have any questions for me?

S: No

F: Ok, so simply during this intervention, feel free…

S: How long is it supposed to last?

F: Uh, I will be glad to let them keep the devices until the end of the school year, if they use them.

S: So, if they complete all the levels? Let's say, Ruth is really advancing quickly

F: If she finishes, and you feel that she doesn't need it for review or reinforcement…you have to hear her read aloud.

S: Read everything.

F: Read – not everything. Let's say Level 5 and 10 and 15…that you hear her read the story.

S: Of course.

F: Because actually that's the indication that she has internalized what she heard there. And if she wants to work on her vocabulary, the question is whether she can already identify what the meaning is, to translate the words, or to read a story and tell you what it means, to understand it

S: exactly. So I'll do that.

F: That's the goal. If she can read a story and tell you what it's about, we always ask them the questions who, what, where, when, how, why – (repeated in English) – and if they can answer those questions, it's a sign that they understood. And that's the goal. And if she can read, it shows that she remembers the sounds of the letters

S: the rules also

F: the rules also, I think that maybe it's a good idea to discuss the rules in class

S: So right, I went over with them all the "s" rules, I saw the a and an, I'll do that with them, I plan

F: Yes, I was there when you did with them "a, an and some"

S: Yes, with David, who didn't know it at all; I tried to explain that it meant it's not that specific one

F: You did it with the other group.

S: Yes, they already know how to read,

F: So you see that the rules start from the most basic things, like when to use a capital letter, that's something that no Israeli knows automatically, because there are no capital letters in Hebrew, right?

S: Right.

F: So you can review because the explanation is there. But whether they really understand it I don't know, and so you can go over it with them and to bring in other examples like you did then- that they should offer examples, and you write them on the board –

S: That's it, it's…

(end of recording]

Appendix 20: Sample Research Journal Entries

The journal included fieldnotes, transcripts of my dictated pre- and post-visit spoken notes and reflections, memos showing where recordings were made, and typed journal entries. Following are samples from two days toward the beginning of the intervention.

SUNDAY, NOVEMBER 23, 2014

(Typed from fieldnotes) Arrived at school 9:00 am

Sent SMS to ask if we would have a Barco (2x) per the meeting last Sunday with Rebecca Dewey (English Inspector for the TECH chain) Yigal (headmaster) and Rena (English coordinator) when they said "Whatever you need, we want to make this work"

Orna: "Andrei is Christian, Sally from a mixed family – her mom is Turkish/Moslem, married several times, brother committed suicide; she's only in school half the time." I haven't even met her yet. Shalom is from a well-to-do family ("padded") and his dad really looks out for him. He's in Kazakhstan now looking after the grave of an uncle. Didn't want to go – he likes school. He speaks his mind assertively."

The teacher to whom I gave a copy of Pack 1 book approached me. Her son is working ahead level by level. A teacher at another TECH school is interested. She saw a student in a class (ADHD) poking at (the app). The kids "partzu" (broke into) the app.

First Tenth-Grade class:

- Ruth got to level 13 in one day and says she can read the story. She came and went in class and didn't stay.
- Sarah sat with David and I with Omri.
- (recorded on iPhone:).

I worked with Omri, showed him how to use the app, return to look for answers if he doesn't know them. He got to the game. He was very conscientious in word-writing to check and correct himself, and when he tapped that he didn't know a word, he tried to bring it back. I explained it would come at the end and it did – he was triumphant.

He confused the sound of I but he invented a mnemonic – like "ay" in Hebrew (it hurts!) – after several repetitions he started to recall it more easily.

We recorded him on Sally's device (try to save the recordings) – worked on her device because he left his at home.

Another student wanted to know why the devices are locked and offered to show me how he could break it open. I explained (again) the agreement with the headmaster that the devices would be locked so that they would be dedicated to English learning.

Orna told me that once in a computer lesson, two kids got into a hacker program and took control of the school computer – they did mischief. "Don't ask what happened!"

Second tenth-grade class:
Yoav: Got up to L2 alone, understands how to do it, wants to see the movie in class and not come to work with me. I agreed.

So sitting one-on-one is still effective – the question is whether this really empowers untrained tutors to work effectively with students (like Sarah with her minimal training)

Chatting with the house mother (from Tunisia)

Orna: correcting papers. I offered her some training and she said "you're coming to give training in class, no?" I said yes, but I can also show her and she'll then be able to show them – and she said, "I have to do this now. Later we'll do the training." Will there ever be time? OR will she always be busy with her last-minute urgent tasks?

The wall clock hasn't been reset to winter time.

Teachers in the teachers' room share information on students and strategize on how to "reach" them.

Students gather at the door of the teachers' room and peer in between classes. They're not supposed to come in but the restriction is flexible. Girls "have permission" to get tea. There is a place on campus to buy it too, but the house mother notes that some of the kids don't have money to buy it. She says she gives them bread and tea, she says "take two slices" and they take three because they're hungry.

The student body has some Arab Moslems and Christians and some other Christians (Andrei is Russian).

I wonder if I should go to the kiosk and socialize with my participants – I feel that being on good terms with them, coming across as a support person and not as an authority figure, will advance their cooperation.

Omri asked me with admiration, "how did you think of this app? Did you really do it yourself?" (find it on the recording).

He expressed amazement at how I could have made this happen.

11:50: Three teachers in the teachers' room are discussing a disciplinary/behavioral issue with a student, that when he takes Ritalin he's okay. One talked to his dad, if he will take it on the annual class trip or not. They share information like the New Educational Environment system (Rami Sulimani's thesis) advises.

Orna asked, who from my class isn't here?

Yonah (the tech support person's) phone number xxx-xxx-xxxx

Orna left her phone in her car. Question still open: can we get a Barco?

Orna said to come Sixth Hour to 2nd floor room 209 (?)

I talked to Yonah, the tech support person. She said there's no infrastructure in the classrooms (except for the electricity outlets near the front board) to hook up a projector.
Yonah: "Do you need it permanently?"

F: "No, but sometimes to focus their attention and today for training in how to use the app"

Yonah clarifies: "The Learning Center and caravans have projectors or at least electricity"

In the additional assistance hour maybe they will go to the caravans.

I explained that Sarah's first tenth-grade class is all using the app, so can we have a Barco there?

Yonah "Okay, it's easier in classes where it's built in, and in fact there will be 2 new classes built with projectors built-in. Maybe we can use those." She asks me about times and places. I say I don't know, she needs to ask the teachers about who's teaching in which caravans, when.

Comment from one of the teachers in the teachers' room who overheard me interviewing one of the students, who responded briefly: "Don't worry, they answer briefly in Hebrew too." (She thought I was interviewing in English but I was interviewing about English.)

Rebecca Dewey (English Inspector for the TECH chain) said (on 25) "We've never had a good solution for weak learners and most schools just give up on them. This school is the most serious about English and sends the most students to the English Bagrut, but still hasn't had a way to help the weakest learners. If your trial works, we'll use it in the other schools too. This is the best school in the TECH system – it has the best students. Here they have an entrance exam so there's some minimum level, elsewhere there isn't even that, they take everyone."

Orna at 12:15 is still busy with printing and photocopying. She doesn't interact with me, though we're the only two people in the teachers' room.

Earlier, I told Sarah, Omri and David that it's my daughter's voice in the recording. Sarah asked how old she is. F: "Now she's 20 but she was 18 when we recorded."

Omri said: "So it's not so new."

Kids come knocking on the doors of the school counselors, often no one is there, but this end of the hall with the teachers' room and the yoetzet (counselors') rooms draws a lot of student traffic.

Rena (the English Coordinator) didn't come today – they said that she hadn't felt well since Thursday.

Research note: I need to know enough about the school routine to manage the activity with our participants. But if there are changes in the routine, I need more information to enable flexible re-planning.

Sarah told me that the final hours were cancelled again last Thursday (no English in the double hours for our full class using the iPod, Tenth Grade 1 and 2; half their English hours for the week). She went to the doctor last Tuesday (so they missed that class also). She was supposed to go Thursday but "there was no point" – I didn't get the reasoning.

*So we all want this to succeed and my role as an action researcher is also to push, to make sure enough learning time is devoted to the project. So I'm putting pressure, not just giving it to them and seeing how they activate it – I'm pushing.

Transcription of recording: Baseline interview with Sarah, 15:58 duration, 11:49 am

See transcripts of interviews document

SUNDAY NOVEMBER 30, 2014

Transcription of dictated thoughts on way up: (Total length of 2 recordings about 15.5 minutes; took about 45 minutes to type transcript)

I'm recording now on Sunday morning, November 30, on my way to Ramat Shalom. I don't want to lose control of the number of visits I've made there and what happened in each visit, so I want to record what happened last week so I can keep it separate from what happens today.

Last week I interviewed Sarah in the teachers' room in the morning, and we went to a substitute classroom because the Learning Center was being used for a meeting with a Barco, which we used later in the day. So we went upstairs to a classroom – this is extremely disruptive, moving classrooms for these kids disrupts their routine and they responded by –

Ruth showed up at the room with her iPod, said she had gotten up to lesson 13 over the weekend – I took some notes about this. I asked her if she did it all weekend. She said no, she did it all in one day. I advised Sarah that she really had to hear Ruth read because Ruth's issue, in the assessment that we did, that she didn't have the confidence to read out loud, although she wrote all the letters very beautifully. So we know that, in the app, that the students have the ability to passively consume what's there, and even to identify the words in the game is passive; it's not producing language, it's not reading out loud, it's not recalling words that they have to say. So we'll find out today whether Sarah was able at any point during the week to sit individually with Ruth and hear her read out loud. What I'm afraid of is that she's going to go ahead so fast, without really integrating the material, that she'll get to the end and say "I still

can't read" and then she'll be angry and she won't be able to go back and work on the reading lesson by lesson. So I hope to make sure that doesn't happen.

So Sarah came and then left. I sat with Omri, and I think I took notes about that experience. He was very sweet. He kept saying that the letter "I" is called "e" and makes the sound ē, and we went over it a number of times. I showed him that he could go back to remind himself if he doesn't remember how to write sounds, etc. He showed a lot of motivation, we got through lesson 1. One of the teachers had said to me in the teachers' room, before, the woman with the white glasses, had said that in one of her classes one of the boys was sitting and poking at the screen and she said to him, "not like that, you have to concentrate more." She didn't tell him not to use the iPod in class. Maybe she did later. Sarah sat with the other boy who actually came to class and worked with him individually, so there were two students in the whole class, of about five that actually have the iPods. Sarah came and went and I don't know where the other two boys were who were supposed to be there. So I don't know if they were at school and simply didn't show up at class because of the disruption in the room, or what. So that was one class.

Then for the second class, the one boy (whose name I can't remember, something like Yaniv (sic, Yoav)) was supposed to come and work with me in the teachers' room but because Sarah was showing a movie in the "caravan" (prefab classroom) he didn't want to come, he wanted to be in class, and he's pretty independent working, so we let him stay with the class. We'll see today – he has another double lesson today, so perhaps I'll get to sit with him today and see what he's up to and if he's internalizing. Because the key is the active use of what they're learning, and not just the passive consumption. Another question that I have is – I'm an "expert" in this field, I'm coming and helping Sarah, and Orna, and Arnon [my husband] points out, "bring volunteers to do this" and I said "there are no volunteers" and he said, "there are **lots** of volunteers" so I said there are no volunteers at this school, he said "perhaps." But the concept that he has, which I think is good, and something we should try at Kannot (a residential agricultural school) is that you don't have to have trained teachers. Like Sarah herself, who really was not trained in teaching English. She's a young person, she has energy, she has good rapport with the kids, and her English is not bad – but she's not an English teacher. That's the population that can be given some basic instruction in how to

accompany the kids with the app, and then see how it goes. So if Sarah can do it…of course, she has the authority of being the teacher, but this is another thing that we need to investigate.

With Orna's class, they also were disrupted because we asked them to come down to the room with the Barco. As far as I recall, only Ovadia came. I don't know where the others were – Shlomo (sic – Sami), etc. This was during the "siyua" (remedial assistance) period and Ovadia said he didn't want to come to the siyua period because he would be missing his workshops. Now, the siyua period is extra individual help for students who are not doing well in English, and it's meant to reinforce, give them personal attention and help them, but it does mean that they're missing something that they really like, and so its seen more as a disadvantage than an advantage. They don't understand that this is something that's a benefit for them; they see the disadvantage. And he was unhappy about having to stay, and when Orna had him demonstrate, now I don't remember what it was – we got the iPhone hooked up to the Barco and it does work, but he said that he understood – or that he went through a lesson on his own, while I was showing Orna how the app worked – and when he said he understood, and he could do it on his own, Orna let him go to his workshop and not stay for the siyua.

So the whole day was quite flaky, the kids didn't really attend their normal lessons, there was not full attendance, the ones that were there were in rooms that weren't their normal classrooms, so I don't know what the outcome of this is going to be. Because I am there, and this is action research, I'm going to continue to try to help the teachers to get the kids on track and make sure they know how to use the app, and hear them read aloud, and watch them do the spelling, and make sure that they know that they can go back and check things, if they didn't remember it, which turns out to be a big advantage of the app, that the information is included so if they forget something, it's like going back to your physical cards, in the days that we used them; if you forget how to write a sound, you can go back and check out your clue words in that lesson or in other lessons, and remember how to spell that sound. The theory, at least, is that the active search for the sound, and locating it, will help them to remember it better, because it more actively engages their brain and makes them responsible for their own learning.

I don't know where Orna's other students were. I sat with Orna during that assistance lesson and familiarized her with the app, showed her how to operate it. We did get it hooked up to

the Barco, but she was looking at the actual iPod rather than the Barco. She had expressed a lot of anxiety about using technology; now we have to see whether that half an hour of explanation was sufficient to familiarize her with it. Again, Orna is more familiar with Hickey, while Sarah is more familiar with technology, so it will be interesting to see how they manage. The kids in Orna's class the first day that she gave them the app, and they saw Franny [the narrator character] in the explanation tutorial, were delighted because they said that Franny looks like Orna, and in fact when Orna put her hair back in a hairband and her hair was sticking out on the sides she really did look a lot like Franny, it was really quite remarkable! The kids got a big kick out of it. We'll see what happens today.

Pansy came to the door, and said, "I don't want to do this" so I have to find out what's going on with her, whether she's participating in English class, whether we can get her to sit down and spend some time with me, because I don't know what she was saying she doesn't want to do: the "assistance hour?" Perhaps it's that, because, again, I wasn't there for Orna's initial classes, but for the assistance classes in the afternoon. Perhaps what I have to do is change my day there so I can be there also for the classes that Orna's kids have the actual class time, and not only the siyua hours. I think that it's the first two hours on Sunday, I have to check this.

That's it. (And about 45 minutes later) Another thing I wanted to discuss was the locking of the device so that it could only be used for The English Club. I had a method of setting limitations, where I would just allow the user to choose the app and a few other built-in apps – the Notepad, the calendar, the things that are installed on the iPod that can't be locked or removed. But it didn't allow the user to install anything new or to use Safari, and I thought that was sufficient. And then one of the soldiers who works with the students there showed me this other way to lock and make it "guided," and it locks them into the app itself, and they're not even able to get out of the app. The problem is that it also causes a situation that the iPod can't be turned off, and it runs down the battery, I believe. So I need to look into whether the kids have been using them, whether they managed to plug them in and use them even when the battery's run down, or whether I need to really unlock the "guided" function and allow them to just use the iPod with "limitations" so that they can turn off the device. I'll check that today. I should also check what lesson each of the students is up to, and see if I can check, maybe ask the teachers, what's been going on – it's two weeks today since we gave them the devices, so it would be interesting to touch base.

Written fieldnotes:

Arrived 9:20 for 9:50 class. During break before class:

1) Rena: "Did you hear that they הצליחו לפרוץ?" [managed to break out of the guided mode on the devices]
2) Orna: "I only do it with them some of the lessons – that's why I didn't want the iPads. Only during assistance hour, not during class." (we tried to reconstruct when she might have done it with them)

Zach and Andrei have been absent a long time (they weren't here last Sunday either) since they got the iPod – perhaps they have it at home and are practicing.
Yoav leaves his with Sarah, now we'll see how it goes.

Class hour 3 10th graders – Ruth said, "אין לי כוח לקרוא" (I haven't got strength to read)

She's up to L27. Said she does it in bed when she's bored.
We went to the car to get books.
She read me L1 "אין לי כוח" (I have no strength)
then – went out to talk to friend
I sat with Omri
She came back and sat with Sarah and read the word lists and story up to L6! from the book
They asked me what does "pest" (L5) and "scat" (L6) mean?
She read to Sarah.

Omri is quite good at the game (usually can find the word the first time)
b & d confusion
showed him mnemonic of hands (in L3, d)

He kept saying, "אין לי כוח לקרוא סיפור" (I haven't got the strength to read a story)
though he heard and wrote and repeated all the individual words in the cards
ADHD
He skipped the review entirely
I told him about rusty gears.
I promised pizza when everyone can read stories through L10 (because I felt that without an incentive, they will never find the "koach" (strength) to read. It's hard for them. What makes it worthwhile to overcome that inertia?)

Yoav: two hours one-on-one
Started in Teachers' room, read me the story of L1
He asked to look for an empty class (more private)
We went up and worked
His iPod is totally stuck.
He charged his iPhone with my charger. (He's totally addicted to his phone, as I've seen.)
He asked to be released five minutes early, then went for a break.

We went to a classroom next to 202 where Sarah was – empty the whole time. Great!
I rejected two phone calls in the middle to set an example.

He did well in the games of L1 & L2, started to recognize words quite quickly.
Read me L2 story, Nan's Nap, has trouble in blending sounds together.
Said it makes him tired, but his concentration and ability to continue with a task without variety is quite good.
Wonder if he is Asperger, perhaps low intelligence? or dyslexic?

He asked me what I would do to someone who hacked the iPod and figured out the password. Not clear if he did that or was hoping to.
He took the stuck iPod out of the case, examined it from every side, tried pressing every button – stuck! He asked if I ever took the battery out (and he would have if he could have opened it.)
I'm going to take it home and see if charging it more will make the 3 presses to unlock work, if not, take it to repair.

Doesn't make eye contact – that's why I suspect some form of autism.
Omri, for example, is very personable, looks into my eyes, smiles and jokes. Yoav never smiles.
He claimed tiredness and wouldn't try to read L3 story.

So – Sarah has given him to me to work with (the "volunteer" that Arnon raised this morning)
I'm now the tutor for this boy.
Does this relieve Sarah of working with him? The other days he's still with her
but then less challenging
Yoav got to L4 h/th white card sounds, yellow cards to read words.

A teacher went out " מה יכול להיות, תגידי לי. (What can happen, tell me.) Another day in Paradise"

Spoke to Orna about what her lesson will look like. She said, "only for siyua" (assistance hour) Sami,…
I asked, "what about Pansy?"
Orna: "She'll come. Also all the rest- Sami, …, and Vladi"
F: "I haven't met Vladi"
O: "Oh, right, he's new – you need to talk to him?"

Remember to bring books every time – Sarah said she has books I gave her but not here.
She's printed some lesson materials from the Hickey website (Orna got my permission to photocopy from the books)
Sarah said this way she'll also review, give sheets and work on the app material, vocabulary, etc.
Sarah "I'm learning too" (re pest, scat)
The app alone isn't enough, clearly. It's one element in the composition including teacher, books, papers.

Transcribed recording of thoughts on way home (39 seconds length at 1:49 pm): I'm in the car on my way home after about four hours – only four hours – at the school. And I have to say that all I want to do is just get away from there, get out of there, I can't wait to leave. I don't know how the teachers do it! It seems to me like it's very suffocating to be in a school, even though for only the four hours I was there, and I'm already exhausted and anxious to go home.

Appendix 21: Sample Artifact documents

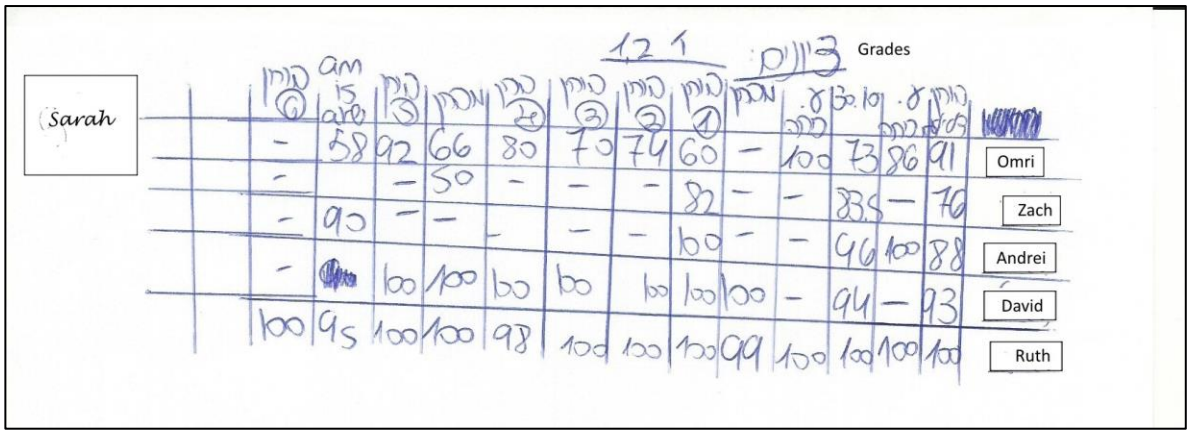


Figure 22: The record given to me by Sarah of the 10th grade class's grades on quizzes and tests for the year (translation in Appendix 9)

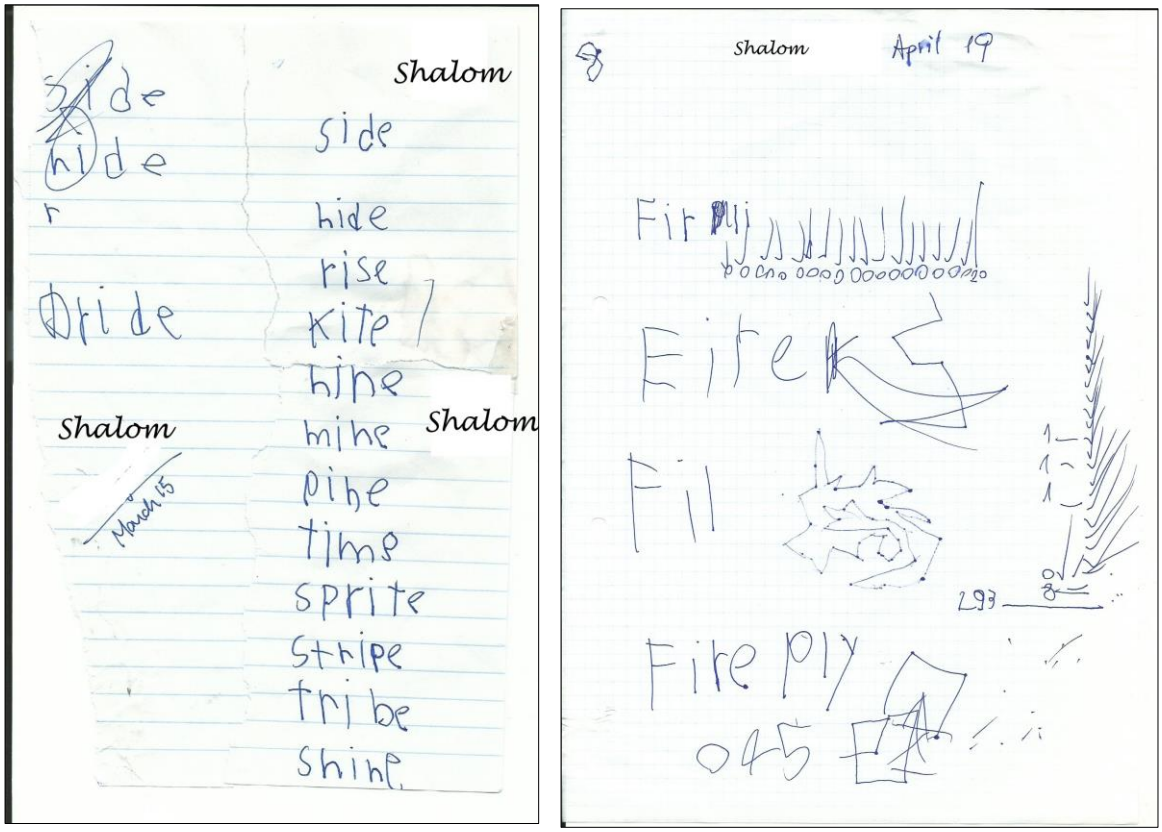


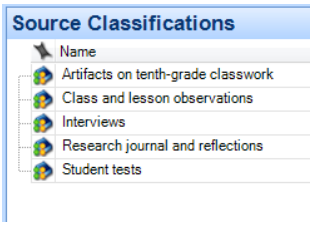
Figure 23: Samples of Shalom's writing, March 15 & April 19
(note f-p confusion, a common mistake for L1 Hebrew EFL learners, as f & p are both written with the same character פ in Hebrew, with p dotted and f undotted; and E-F confusion)

Appendix 22: NVivo Data Sets (Sources), Analysis (Codes) and Findings (Nodes)

Following are the codes I created when coding/analyzing the data sets generated by the research methods (see "Source Classifications" below for data sets) in NVivo, and the nodes (representing the "findings" in Chapters 4-5) into which I grouped them.

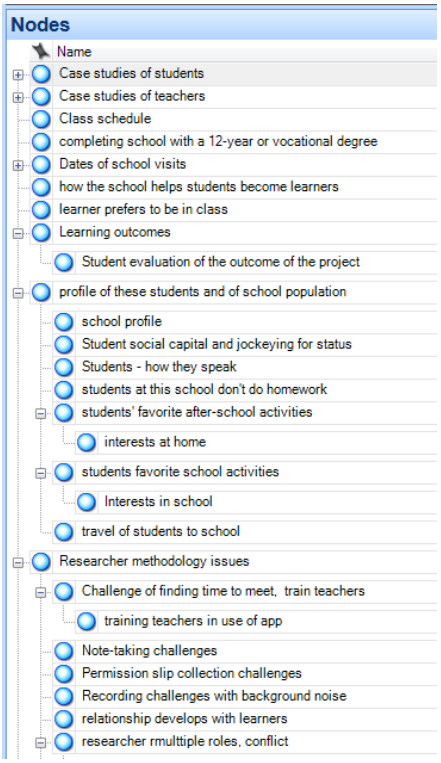
Figure 24: NVivo sources, codes and nodes

Data Sets:

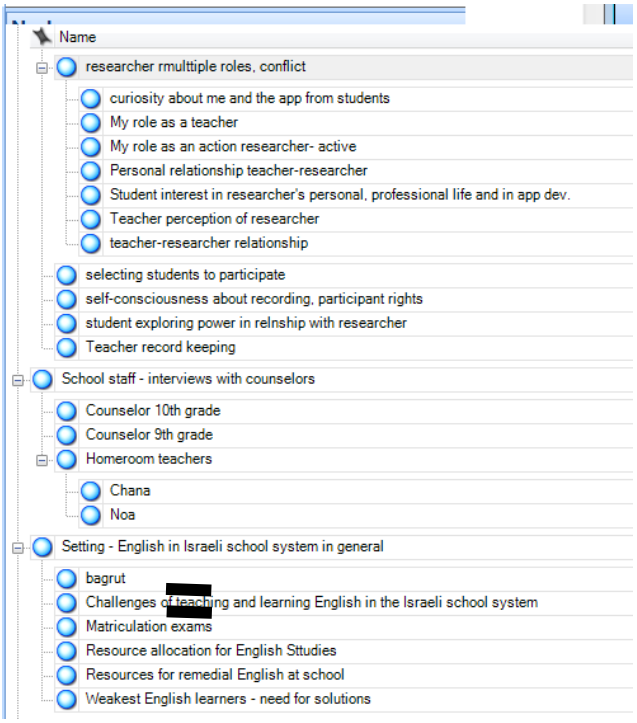


Codes and Nodes (code groupings from which findings were drawn):

1.



2.



3.

Nodes

Name

- Setting and Background English-learning of students
  - Confidence in English
  - English knowledge when students start at school
  - English profile of school students
  - Expect to know English
  - teacher opinion of why students came as nonreaders
  - What is hard and what is easy in English
  - When started to learn English and history
  - why high school students are non-English-readers
- The role of a teacher with technology
- v Finding - Ed tech -Teachers attitude to ed tech use and approach determined whether they used and supported the intervention
  - Teacher attitudes
    - Attitude to edtech use - teacher
    - attitude to Hickey Method
    - Teacher attitude to approach
    - teacher attitude to edtech
    - teacher attitude to rewards
    - Teacher attitude to workbooks
    - Teacher decision about how to use app with learners
    - Teacher fears about edtech loss of control
  - Teacher English teaching background
    - reason for teaching weak students
- v Finding - ed tech - Getting students to pay attention to the affordances of the app is a process over time
  - iPod - interface understanding
  - not paying attention to tip animations
  - training students in use of app

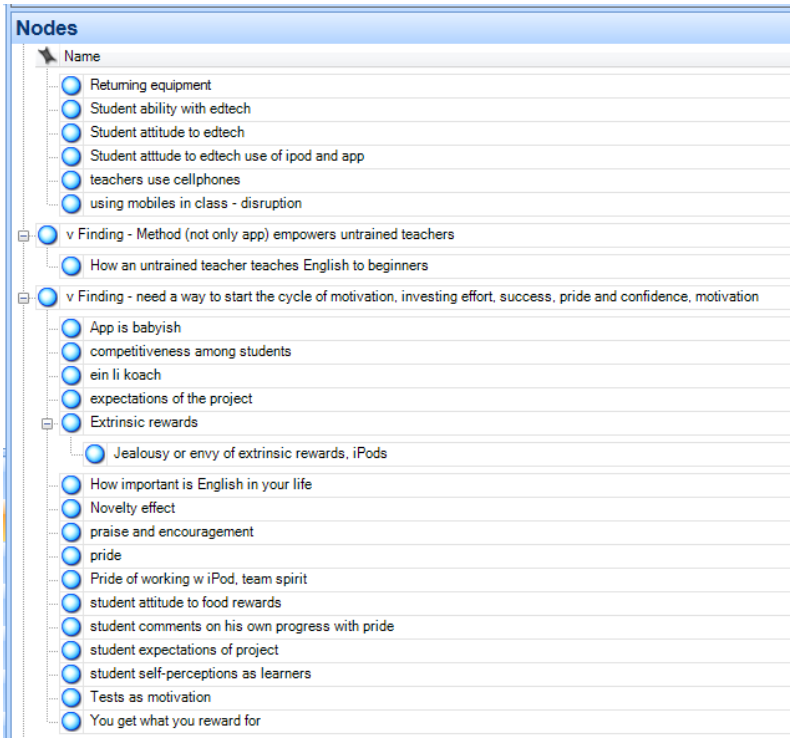
4.

Nodes

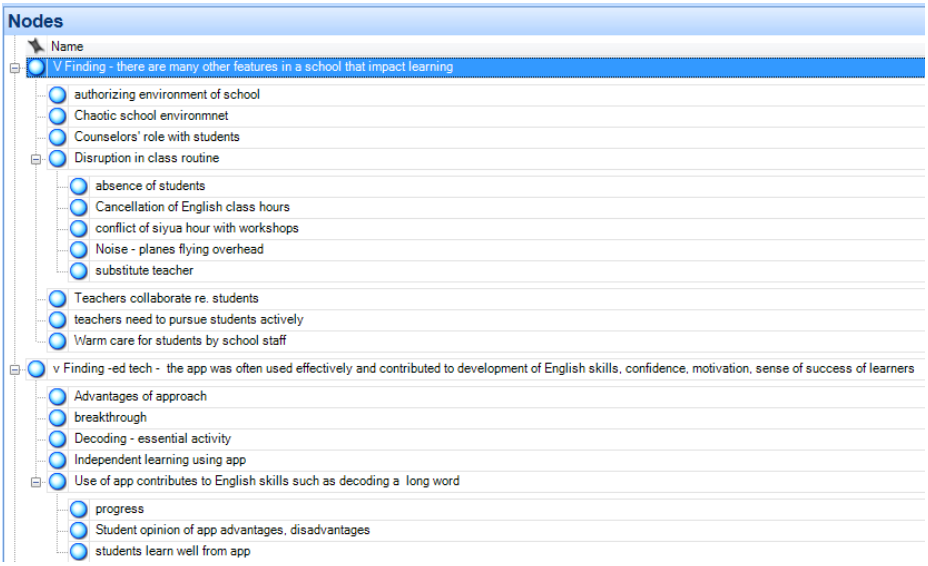
Name

- v Finding - ed tech - use of app enables learning in multi-level classroom, students returning from absences
  - frontal vs. individual learning
  - Need for & lack of private quiet study space
  - student prefers to be with class, not out for special help
- v Finding - Edtech - potential for greater in-school use
  - Devices they use now
- v Finding - Edtech Mobile devices - issues of using them must be managed, considerations when using them in schools
  - cellphone activities of students
  - charging personal iphones - precious electric outlets and chargers
  - Cost of tech devices
  - Edtech - hard to limit access to other uses of device
    - Edtech - challenge of keeping the students on task
    - Hacking iPods
    - Student desire to use devices for other purposes
    - student drive to do other things on iPod
    - students hacking devices
    - students want to do more on device than the app
  - edtech distracts students in other subject classes
  - Edtech teacher fears of issues - cheating, won't work in the middle of class
  - equipment issues - equity, jealousy, status
  - equipment managemen,bringing to class, charging
  - Equipment management - technical glitches
  - iPods - students don't bring them
    - missing
  - missing, broken equipment prevents use
  - Mobile devices - students want to use them for other activities than app
  - need for tech support resources at school
  - Returning equipment

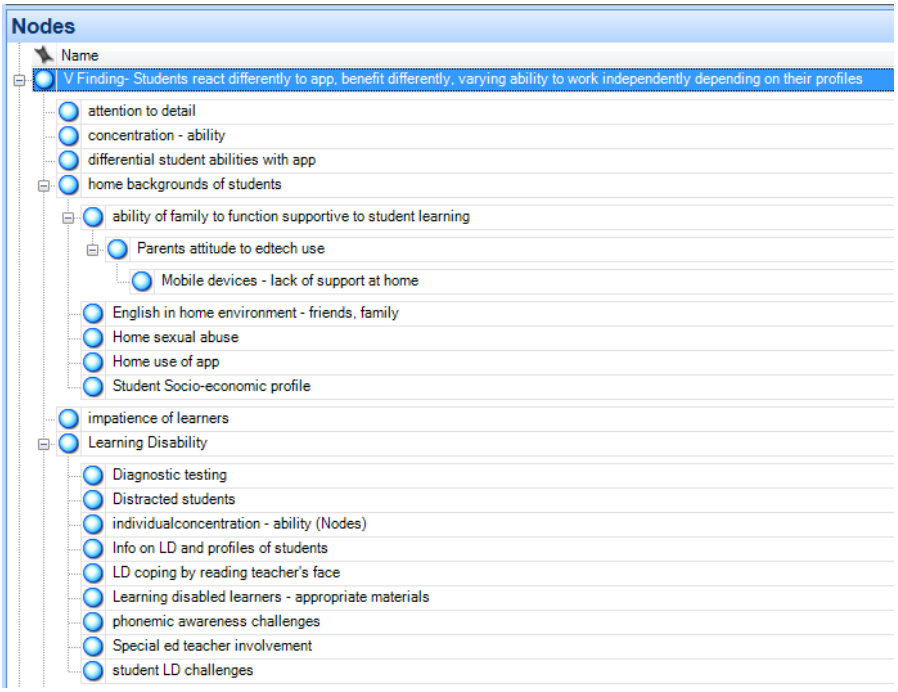
5.


Nodes
Name
Returning equipment
Student ability with edtech
Student attitude to edtech
Student atttude to edtech use of ipod and app
teachers use cellphones
using mobiles in class - disruption
v Finding - Method (not only app) empowers untrained teachers
How an untrained teacher teaches English to beginners
v Finding - need a way to start the cycle of motivation, investing effort, success, pride and confidence, motivation
App is babyish
competitiveness among students
ein li koach
expectations of the project
Extrinsic rewards
Jealousy or envy of extrinsic rewards, iPods
How important is English in your life
Novelty effect
praise and encouragement
pride
Pride of working w iPod, team spirit
student attitude to food rewards
student comments on his own progress with pride
student expectations of project
student self-perceptions as learners
Tests as motivation
You get what you reward for

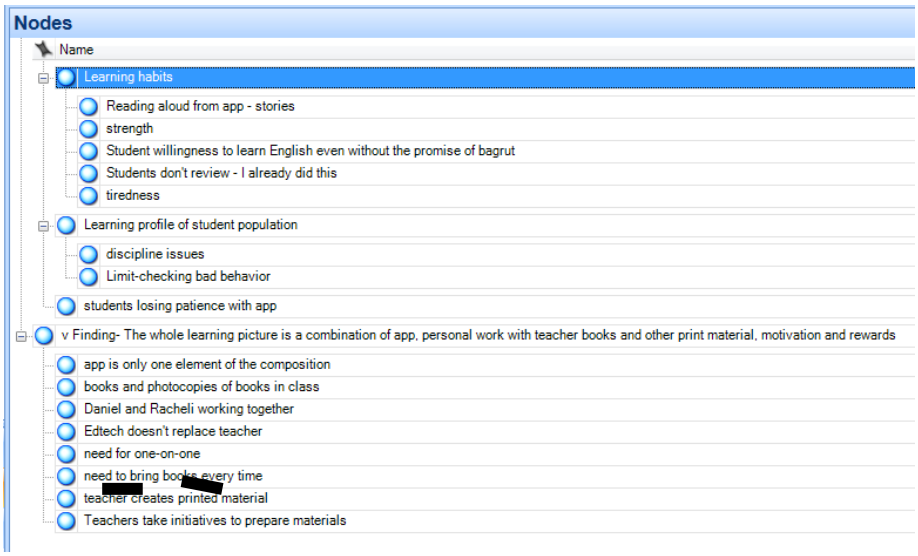
6.


Nodes
Name
V Finding - there are many other features in a school that impact learning
authorizing environment of school
Chaotic school environmnet
Counselors' role with students
Disruption in class routine
absence of students
Cancellation of English class hours
conflict of siyua hour with workshops
Noise - planes flying overhead
substitute teacher
Teachers collaborate re. students
teachers need to pursue students actively
Warm care for students by school staff
v Finding -ed tech - the app was often used effectively and contributed to development of English skills, confidence, motivation, sense of success of learners
Advantages of approach
breakthrough
Decoding - essential activity
Independent learning using app
Use of app contributes to English skills such as decoding a long word
progress
Student opinion of app advantages, disadvantages
students learn well from app

7.


Nodes
Name
V Finding- Students react differently to app, benefit differently, varying ability to work independently depending on their profiles
attention to detail
concentration - ability
differential student abilities with app
home backgrounds of students
ability of family to function supportive to student learning
Parents attitude to edtech use
Mobile devices - lack of support at home
English in home environment - friends, family
Home sexual abuse
Home use of app
Student Socio-economic profile
impatience of learners
Learning Disability
Diagnostic testing
Distracted students
individualconcentration - ability (Nodes)
Info on LD and profiles of students
LD coping by reading teacher's face
Learning disabled learners - appropriate materials
phonemic awareness challenges
Special ed teacher involvement
student LD challenges

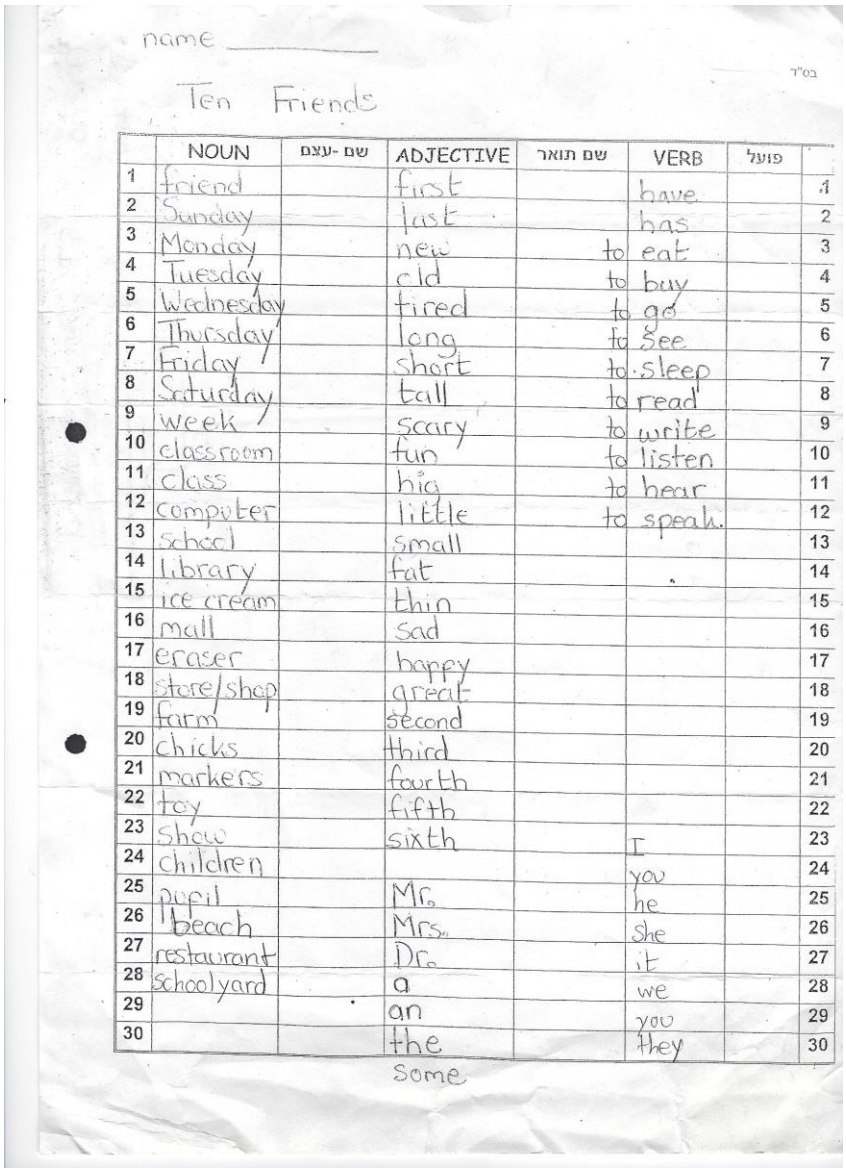
8.


Nodes
Name
Learning habits
Reading aloud from app - stories
strength
Student willingness to learn English even without the promise of bagrut
Students don't review - I already did this
tiredness
Learning profile of student population
discipline issues
Limit-checking bad behavior
students losing patience with app
v Finding- The whole learning picture is a combination of app, personal work with teacher books and other print material, motivation and rewards
app is only one element of the composition
books and photocopies of books in class
Daniel and Racheli working together
Edtech doesn't replace teacher
need for one-on-one
need to bring books every time
teacher creates printed material
Teachers take initiatives to prepare materials

Appendix 23: A typical primary school weekly EFL vocabulary list

Why do students who have ostensibly studied English in school for six years reach high school as non-readers? Evidently the EFL approach and material by which they were taught was out of (beyond) their Zone of Proximal Development and was not appropriately scaffolded to their learning needs.

Example: This is a typical non-Hickey, non-MSL-scaffolded weekly vocabulary list given to 10-year old Israeli EFL students to memorize for a test. Note that it contains 78 words (too many for struggling learners) with no attention to spelling patterns nor phonetic regularity/ irregularity.



name _____

בס"ד

Ten Friends

	NOUN	שם -עצם	ADJECTIVE	שם תואר	VERB	פועל	
1	friend		first		have		1
2	Sunday		last		has		2
3	Monday		new	to	eat		3
4	Tuesday		old	to	buy		4
5	Wednesday		tired	to	go		5
6	Thursday		long	to	See		6
7	Friday		short	to	sleep		7
8	Saturday		tall	to	read		8
9	week		scary	to	write		9
10	classroom		fun	to	listen		10
11	class		big	to	hear		11
12	computer		little	to	speak.		12
13	school		small				13
14	library		fat				14
15	ice cream		thin				15
16	mall		sad				16
17	eraser		happy				17
18	store/shop		great				18
19	farm		second				19
20	chicks		third				20
21	markers		fourth				21
22	toy		fifth				22
23	show		sixth		I		23
24	children				you		24
25	pupil		Mr.		he		25
26	beach		Mrs.		she		26
27	restaurant		Dr.		it		27
28	schoolyard		a		we		28
29			an		you		29
30			the		they		30

Some

Figure 25: A typical weekly EFL vocabulary list for 10-year old Israeli students

Appendix 24: EFL learning in Israel & the EFL Matriculation Exam (Bagrut)

Hebrew and Arabic are the first languages of the majority of Israeli students, but EFL is a required subject for matriculation in all government schools in Israel (US_Israel_Educational_Foundation, 2014). The study of English is mandated in order to enable students to communicate in the common global language (Spolsky & Shohamy, 1999a&b).

English became an official language in Israel during the period of the British Mandate, which caused both familiarity with and resistance to the language, leading to its conflicted role. "Contact plurilingualism developed, with English serving both communities as a potential language of wider communication" (Spolsky & Shohamy, 1999b, p.15). Language ideology in Israel today results in mixed feelings toward English:

> The revival of Hebrew as a major component in Zionism and Jewish nationalism guaranteed the language a status that is ideologically highly privileged… and the active discouragement of public (or even private) use of any other languages known by the population…This anti-English ideology continues to show up…" (ibid., pp. 161-162).

Between 1948 and 1967, the MoE English Inspectorate's curriculum emphasized elite classical literature, e.g. Shakespeare's Julius Caesar, and there was a high failure rate of 43% on the English matriculation exam (ibid. p. 162). Antagonism toward English might have led to its eventual de-emphasis, had other factors not led to a growing focus in Israel on English as an important life skill.

The perceived importance of English rose after 1967 with the influx of English-speaking immigrants, increased tourism to and from Israel, and the importance of communication for business and diplomatic purposes with English-speaking countries. English as the global language of communication or lingua franca in the modern world (Baker, 2009; Blair, 2012) has led to popular pressure among Israeli parents to teach English for functional purposes. This is now considered an important skill,

> …English [is] the principal international language desired, it seems, by all, used by many, and taught as the first foreign language throughout the educational system (Spolsky & Shohamy, 1999b, p. 29).

Like Freire & Macedo (2013) , the Israeli public believes that learners should be empowered with literacy in a dominant language that will ensure their political and economic power, therefore parents theoretically want their children to learn and know English, though many students and parents lack awareness of how to ensure this.

Learners in the Israeli public school system generally start learning EFL in third or fourth grade (ages 8-9), by which grade they are expected to have acquired literacy in their L1 of Hebrew or Arabic, but despite several weekly hours of English, many learning-disabled (LD) and disadvantaged learners reach junior high or high school without having mastered basic English literacy skills. The participants for the current research were learners in this category.

The minimum EFL requirement for a full High School Matriculation (Bagrut) diploma is 3 units, testing basic English skills, e.g. the ability to read simple advertisements and to answer multiple-choice questions. Students who plan to continue to tertiary education must pass a 4-unit English Bagrut that tests comprehension of more advanced texts, listening comprehension skills, basic conversational skills, and the ability to write brief essays. The 5-unit English exam contains yet more advanced English texts and requires the learner to demonstrate a higher level of mastery of English skills. Students take these exams in eleventh and twelfth grades. The pace and skill level of their English studies is designed to prepare them for the English Bagrut level their teachers expect them to be capable of passing by the end of twelfth grade. Less advanced students take the 3-unit English Bagrut in twelfth grade because they need more years of preparatory EFL study to pass.

To receive a full high school matriculation diploma, students in Israel must pass at least the 3-unit English Bagrut, and, for acceptance to tertiary education, a minimum of the 4-unit English Bagrut (US_Israel_Educational_Foundation, 2014). Some students at the school where the study was conducted take the 3-unit English Bagrut; a few take the 4-unit exam.

In 2014, the most recent year for which outcomes have been published, 58.3% of the country's students enrolled in 12th grade earned a full Bagrut diploma (in Hebrew education, 68% of enrolled girls and 57.5% of enrolled boys; in Arab education, 67.3% of enrolled girls and 47.8% of enrolled boys) out of the 80.8% of the total number of enrolled 12th grade students who sat for the Bagrut examinations (CBS, 2016). Though well over half of Israeli high school students obtain a full matriculation diploma, students from some population sectors attempt

the exams and qualify for Bagrut at far lower rates (e.g. 9.3% of ultra-Orthodox qualify out of the 28.6% who sit for the exams; 12.1% of Hebrew education students from the 2/10 lowest socio-economic clusters of locality of residence qualify, out of the 35.9% who sit for the exams; and 42.6% and 50.6% qualify in the Hebrew and Arab education systems, respectively, whose mothers have fewer than eight years of education (Brookdale Institute, 2013; Israel Central Bureau for Statistics, 2016). These statistics do not reflect the rate of students taking the Bagrut who have formal diagnoses of learning disabilities, for whom there are testing accommodations, depending on their learning differences, e.g. time extensions, being allowed to take the test on a computer with enlarged font display, to hear text read aloud and to have a writer record their spoken answers. To obtain these accommodations, students must present a formal professional diagnosis of their learning disabilities. The diagnosis process is expensive and often not feasible for low SES learning-disabled students.

EFL Education for struggling learners in Israel

The Israel Ministry of Education attempts to accommodate the needs of learners with special educational needs (MoE 2008, 2014). When trained special education teachers and resources are available, they primarily intervene with struggling learners having difficulty with basic literacy skills in their L1. Learners with mild language-learning challenges are often able to compensate in L1, due to their early and constant exposure and high level of comprehension, so sometimes dyslexia is not noticed until the learners attempt to study L2 (Hebrew, for Arabic speakers) or EFL, where literacy problems are more widespread. Learners who have difficulty learning literacy skills in their first language are likely to have similar difficulties in subsequent languages (Verhoeven & van Leeuwe, 2012; Sparks, 2015).

There is competition for scarce resources in the Israeli education system, and an increasingly acute shortage of qualified English teachers. English learners in elementary school are rarely grouped by skill or ability level, which would allow weaker learners to be taught by an English teacher trained in a method more appropriate to their needs, were one available. Education officials acknowledge that English for struggling learners has largely been addressed by parents through private after-school tutoring though educational reforms have been enacted to increase the number of individual or small-group sessions in the school system (Davidovich-Weisberg, 2013). Thus, the gap in English literacy abilities and skills is not addressed via sufficient early intervention in primary school, and, short of private tutoring, becomes

increasingly difficult to close. By eighth grade (middle school) from which time English classes officially may be separated by skill level, weaker students have developed an expectation of failure and many already suffer from learned helplessness that is difficult to overcome (Ben-Rabi et al., 2014).

There is a high rate of failure of Israeli students on their Matriculation exams. In 2014, 83.2% of the students enrolled in twelfth grade undertook matriculation examinations, including English, with only 61.5% of the twelfth-grade population earning full matriculation (CBS, 2016). The English Inspectorate of the Ministry of Education has made some attempts to reduce this high rate of failure. The English Inspectorate's website mentions adapting the standard curriculum for special needs English learners (e.g. MoE, 2008), and recently, further steps were taken towards acknowledging that some students are at risk of English reading failure. In February 2015, the ABLE kit (Assess Basic Literary Skills in English) was developed by the English Inspectorate to facilitate early identification of English reading problems (Steiner & Gvaryahu, 2015) as English is written with a different character set and direction from Hebrew or Arabic. However, once these learners have been identified, an allocation of resources and a concrete program is still required to provide appropriate learning support. Recent declarations by the current Minister of Education state that English skills are the next high-priority target for the school system (Madad, 2016). Discussion of how to improve English knowledge is a subject of ongoing interest, but focus is consistently on high-achieving learners who will participate in Israel's startup economy, and not on the weakest learners who are challenged to learn English even at the most basic functional level.

There is often a feeling in Israel that students "learn to the test" with a focus on success on matriculation exams. Many schools allocate more teaching resources to the students who take more advanced exam levels, rather than to the weaker students who need more or specialized instruction to succeed in even basic material (Menahem, 2011; Ayalon & Shavit, 2004). The English teachers at the school where the research was carried out expressed the opinion that students who reach high school with weak English skills, and therefore are not expected to take the Bagrut, do not normally have the motivation to devote energy to their English studies.

Israel has many teachers who are knowledgeable about scaffolded MSL approaches to English learning, albeit only a small proportion of all EFL teachers and not as many as are needed.

These approaches to differential teaching methods for struggling readers have not been institutionalized by the English Inspectorate of the MoE nor been required topics in EFL teacher training (Roffman, 2012). They are seen as more suited to individual tutoring than to classroom instruction, and the MoE has not prioritized this issue highly enough to devote the resources needed to comprehensively address the differing needs of struggling English learners, as evidenced by the high rate of failure on, and the large segment of learners who do not even attempt, the minimum-level English Bagrut.

The English Inspectorate was directed for the recent two decades by a Chief Inspector of English under whose leadership it returned to the English literature orientation of earlier historical periods. To date, the weakest learner segment is not one for whom the English Inspectorate has succeeded in finding a solution, whether due to inadequate resource availability or lack of sufficient prioritization for use of existing resources. The new Chief Inspector of English was formerly responsible for English teaching in one of the technical-vocational chains of schools, so it is to be hoped that her experience with students like those in this study will lead her to make effective policy and resourcing decisions that will better support their learning.

The Inspectorate's position appears to be that teachers should use the class textbook in mixed-ability classes with differential expectations of learners of various levels, and that teachers are not expected to provide a fully differentiated teaching approach based on a systematic MSL method. Compensatory English classes that teach English in smaller groups by a specialized method are not normally available in elementary school, when the problems first appear, and MSL approaches are viewed by some English-teaching professionals as too slow or too difficult to use with a large class. Due to the lack of dividing classes by ability levels in elementary schools, teachers are expected to manage and cope with multi-level English classrooms, resulting in many weak learners simply being left behind, unless parents have the means and ability to locate qualified, trained remedial tutors.

In the meantime, the majority of English teachers have not been trained with systematic tools to address the needs of struggling learners by scaffolding instruction in the learner's Zone of Proximal Development (Vygotsky, 1978), a proven, effective approach to building foundational literacy skills. English-learning outcomes suggest that insufficient attention,

training and resources have been devoted to the needs of struggling EFL learners in Israel, although they comprise a high proportion of the learner population.

In my professional experience, I have observed that relatively affluent and educated parents of students in the privileged classes of Israel are attentive to difficulties in school English studies experienced by their children, particularly problems due to organic language learning issues. Among this community, there is a high rate of private tutoring, and many of these learners receive appropriate help to overcome their obstacles to English acquisition. Thus, these children inherit their families' cultural and social capital via social reproduction, enjoying a greater rate of access to higher education than that of less privileged populations. Some educational policy-makers acknowledge that the school system has basically left to parents the problem of ineffective English teaching in school. This is a situation I hope to change through research that will identify cost-effective, practical ways to reach more of the literacy learners who can succeed if we can align the factors identified in this study and provide appropriate scaffolded instruction in their Zones of Proximal Development.