**ORIGINAL PAPER** 



# The application of a mind, brain and education approach to the *Literacy for Women in Africa* programme and recommendations for practitioners

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Accepted: 7 June 2024 / Published online: 1 February 2025  $\ensuremath{\textcircled{}}$  The Author(s) 2025

# Abstract

A mind, brain and education (MBE) approach applies the best evidence regarding how people learn to real classroom settings. Much of the work in the field to date has involved child learners, but MBE is increasingly turning to the study of adult education, supported by a growing understanding of how adults and children differ in their learning styles. MBE's systematic, evidence-driven interdisciplinary approach has much to offer the field of adult literacy. The Literacy for Women in Africa (LWA) programme in Malawi seeks to improve and develop its provision for adult learners using MBE's interdisciplinary, evidence-based approach. This article reports on that programme, showing how its design and future development have benefited from the MBE framework. The authors suggest that the field of adult literacy could gain from the development of a strong, shared, scientific evidence base which allows all programme practitioners to benefit from the best knowledge available. The authors offer their experience with the LWA programme as a small contribution towards that goal. It is their hope that this article will be of use to those involved in the development, design and implementation of adult literacy programmes, particularly in the Global South.

**Keywords** MBE (mind, brain and education)  $\cdot$  Educational neuroscience  $\cdot$  Adult literacy  $\cdot$  Adult education  $\cdot$  Literacy  $\cdot$  Global South

# Résumé

Mise en pratique d'une approche esprit, cerveau et éducation dans le programme *d'alphabétisation pour les femmes en Afrique* et recommandations pour les praticiens – L'approche *esprit, cerveau et éducation* applique les meilleures données sur la façon dont les individus apprennent au contexte réel de la salle de classe. Certes, la majeure partie des travaux dans ce domaine portent jusqu'à présent sur les apprenants enfants, mais l'approche esprit, cerveau et éducation se tourne de plus en plus vers l'étude de l'éducation des adultes, étayée pour cela par une compréhension croissante des dif-

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férences entre les styles d'apprentissage des adultes et des enfants. Interdisciplinaire, systématique et fondée sur des preuves, l'approche esprit, cerveau et éducation a beaucoup à offrir dans le domaine de l'alphabétisation des adultes. Le programme d'alphabétisation des femmes en Afrique au Malawi cherche à améliorer et à déve-lopper ses offres pour les apprenantes adultes en s'appuyant sur l'approche esprit, cerveau et éducation, interdisciplinaire et fondée sur des preuves. Le présent article consacré à ce programme montre comment sa conception et son développement futur ont bénéficié des principes d'une telle approche. Les auteurs suggèrent que le domaine de l'alphabétisation des adultes pourrait tirer parti du développement d'une base de preuves scientifiques, partagées et solides, qui permettrait aux praticiens de tous les programmes de bénéficier des meilleures connaissances disponibles. Les auteurs mettent à profit leur expérience du programme d'alphabétisation des femmes en Afrique afin d'apporter une modeste contribution pour atteindre cet objectif. Ils espèrent que cet article sera utile aux personnes qui conçoivent, développent et mettent en œuvre des programmes d'alphabétisation pour adultes, en particulier dans les pays du Sud.

# Introduction

#### The problem of adult non-literacy

There are around 800 million non-literate adults worldwide (UIS 2017), a fact with profound consequences for development, health, well-being and prosperity (Blunch 2017). The cost of non-literacy is both personal (losing out on economic and cultural opportunities) and societal, since there are strong links between a country's literacy level, economic development and inequality (Lal 2015; Thomas 2013 [1994]). Two-thirds of the world's non-literate population are women (UIS 2017). For every person described as "illiterate" there are four who have a very basic, low level of literacy (Tuckett and Popovic 2015).

It is important to acknowledge that literacy is not a binary state but a continuum, from non-literacy through to fluency. In the early stages, "emerging literacy" describes learners developing the ability to decode the written symbols and structures of language; this stage might result in learners being able to "read and write a short simple statement [about their] everyday life" (UNESCO 1978, p. 18). "Improving literacy" describes the stage at which the complex pattern recognition of reading becomes faster; and "fluent literacy" is the stage at which decoding has become effortless and the focus is on comprehension. These stages are illustrated in Figure 1.

Improving literacy rates worldwide is the bedrock for success in realising several of the United Nations Sustainable Development Goals (SDGs; UN DESA 2022) in the coming decades (Oghenekohwo and Frank-Oputu 2017), particularly since women are disproportionately affected. Specifically, literacy supports SDG 1 ("No poverty"), since literate women have better work opportunities and higher salaries; SGD 2 ("Zero hunger"), since literate adults have greater access to information about good nutrition; and SDGs 5 ("Gender equality") and 8 ("Decent work



Figure 1 The continuum of literacy development: emerging, improving, fluent literacy (from Thomas et al. 2020)

and economic growth"), since literate women have greater choice, opportunity and agency. Adult literacy programmes have a key role to play in improving literacy rates, but the standard of the programmes on offer is not uniformly high. Unfortunately, many programmes are characterised by "low enrolment, high dropout and limited skills acquisition" (Aker et al. 2024, p. 1).

Malawi is one of the world's poorest countries; 80% of the population are smallholders with no income (Mariotti et al. 2018). It has one of the lowest literacy rates internationally, with overall adult literacy at 62% and among women just 55% (UIS n.d.). Although children's school attendance rates are improving, they are historically low: a decade ago, just 3% of Malawian women completed secondary education (Castel et al. 2010). The consequence of this lack of opportunity in childhood is generations of adult women who remain uneducated.

#### The purpose of the current article

Our goal is to help those involved in designing and implementing adult literacy programmes to improve outcomes for adult learners. We believe that good evidence lies at the heart of this. There are currently few experimental or observational data involving non-literate and neoliterate adults. We believe that this problem can and should be fixed if adults are to get the literacy training they deserve. The systematic, interdisciplinary, evidence-based framework offered by the *mind*, *brain and education* (MBE) approach could help to address this problem. We will demonstrate this using a programme of which we have direct knowledge and experience, the *Literacy for Women in Africa (LWA)* programme in Malawi. We first briefly introduce LWA, explaining what taking an MBE approach means in the context of the programme. We illustrate this with practical examples drawn from three perspectives on the programme, the first based on its design, the second on our evaluation of its practical execution, and the third on the potential for the programme to develop further, improving outcomes for its learners even more. For each of these sections we have chosen three out of many possible illustrative examples that we lack the space to document fully within the confines of this article. We encourage interested readers to look at the accompanying checklist (provided among the online materials available through the Open Science Framework),<sup>1</sup> which details all the factors currently understood to be relevant to successful adult literacy acquisition, the evaluation report (Rogers and Thomas 2022a) as well as the materials freely available on the programme webpage (FiBS 2023).

#### Brief outline of the Literacy for Women in Africa programme

The *Literacy for Women in Africa (LWA)* programme aims "to reduce illiteracy among women and promote lifelong learning opportunities" (FiBS 2023). The programme originated in Malawi in 2015 and now extends to Ethiopia, Kenya, Namibia and Tanzania. A full description of the programme, authored by the Finnish Bible Society (who co-designed and continues to oversee the programme with SIL International) and the Bible Society of Malawi (BSM) (who also co-designed and continues to implement the programme) is available through their online resources (SIL International, n.d.; FiBS 2023). There are many practical materials available here, including design and scheduling of the programme, lesson-by-lesson guides for teachers, examples of teaching materials (books, posters, short story booklets, literacy competency frameworks), descriptions of teacher selection and training, and operational materials (registration, monitoring and data collection documents).

In brief, the programme is a first language-based literacy programme (UIL 2013) targeted primarily at women with no or very low literacy. Learners complete a sixmonth course consisting of three 2-hour lessons per week held locally in small villages. Many villages also have follow-up "improving literacy" classes after the formal course ends, designed to maintain and embed new literacy knowledge. In collaboration with village chiefs, teachers are selected from local communities and trained by the Bible Society of Malawi (BSM) team, who run the programme on the ground. The two-week training involves instruction both in course content, with detailed lesson-by-lesson guidance, and in delivery, with an emphasis on learner engagement through active learning (prioritising hands-on experience and collaboration rather than passive listening). Teaching is monitored by programme supervisors throughout to support fidelity.

<sup>&</sup>lt;sup>1</sup> To access the Adult literacy best practice checklist and background materials, visit https://osf.io/ 2wk63/?view\_only=d7cf70a1ff264d4e9ef6e3b9a7741e7d

The programme content covers the alphabetic principle (understanding that the sounds of a language can be represented by a visual code), metalinguistic awareness (conscious awareness of the structure of language at different levels, e.g. the phoneme, the syllable), vocabulary knowledge, reading comprehension and the gradual development of reading fluency. Classes also support learners to develop basic writing skills. All course materials are designed in consultation with local communities as well as literacy experts from SIL International to ensure that they are relevant and appealing to the learner population in terms of culture, gender and religious sensitivity. Teaching emphasises the frequent repetition of materials, active learning, and the use of relevant, familiar words, stories and cultural themes. Learners are systematically assessed at the beginning and end of the course, as well as in a follow-up data collection several months after the end of the formal course.

LWA in the Yao region of Malawi has been evaluated by the Centre for Educational Neuroscience (CEN; see below) team over the past two years. In 2021 the evaluation focused on data documenting learner progress and an analysis of written course materials. In 2022 a detailed ground evaluation was carried out; this article is based largely on those findings. The evaluation involved a ten-day field trip to the Mangochi region of Malawi in September 2022. The evaluation team observed seven literacy classes, each with two teachers and an average of 29 learners. Detailed class observations were recorded under the following headings: the use of feedback, active and social learning, motivation, metacognition, lesson content and the learning environment. In addition, after each class observation, interviews were carried out first with the teachers, then with a small group of three to five learners. Teachers were asked about training, motivation, the use of specific techniques such as active learning, and their thoughts on the value of data collection. Learners were asked about their motivation and goals, the organisation, content and interest of classes, and their practice during and after classes. Several interviews were also conducted with the literacy programme coordinator.

Finally, two focus group discussions were held, each with six learners and three teachers. The first was with a group of learners who had dropped out of classes in the 2021 session. The discussion focused on their reasons for wanting to learn to read and write and why they ceased to attend classes. The second involved a group of learners from villages who had engaged in their own further practice after classes finished. Women from these villages had been identified from the data as having continued to notably improve their literacy level after literacy classes ended. The focus of discussion was their motivation and experience of continued study outside formal classes. The evaluations found that the LWA programme had been highly effective in helping learners move from the non-literate level (most learners begin the course unable to recognise single letters) to functional literacy (being able to read single words and short sentences).

At baseline (n = 592), 71.5% of learners were at level 0 (unable to name three letters), 10.8% were at level 1 (able to name letters but not read a word) and 17.7% were at level 2 (able to read a single word), such that median and mode reading level were both 0 (IQR = 1). At endline, directly after completing the six-month course (n = 1,306), median and mode reading level were both at level 3 (able to read short sentences; IQR = 1), with 7.0% at level 0, 5.8% at level 1, 33.8% at level 2, and

53.4% at level 3. It should be noted that this is likely to be a conservative estimate of skill levels at endline, since data on sentence-level reading were not available for nearly half the cohort, and where this was the case, it was assumed that sentence-level reading had not been achieved. It is therefore possible that many more learners reached the level of functional literacy than are represented here. Follow-up data were collected five months later to determine how well new literacy skills had been maintained, or improved. Follow-up data are discussed below. Raw, anonymised data are available via the Open Science Framework (the hyperlink is provided in footnote 1).

The improvement made by learners on this course makes a substantial difference to the lives of adults who have previously lacked access to written aspects of everyday life (medical leaflets and instructions, local government information such as public transport schedules, children's schoolwork, etc.). The evaluations identified a number of specific strengths of the programme: the overall course design, the high quality of teaching and teacher training, the high motivation of learners, and strong support from the local community. Some barriers to the programme included the need for further written materials for practice, the need for more revision classes and the potential for improvements in data collection to identify areas for further improvement.

#### What we mean by taking an MBE approach to adult literacy

*Mind, brain and education* (MBE) is an interdisciplinary approach that sits at the intersection of neuroscience, education and psychology. MBE commits to a theoretically based, scientifically evaluated approach to education, informed by many levels of evidence – from the molecular to the cultural, without hierarchy. The output is *usable knowledge* – that is, knowledge gleaned from these many levels of evidence that can be effectively deployed in real-life classrooms (Tokuhama-Espinosa 2017).

The Centre for Educational Neuroscience (CEN), located in London, is a research centre which takes this MBE approach.<sup>2</sup> CEN researchers have a long-standing interest in research on literacy and adult learning and in the application of this research to learning environments in the real world. Their output includes both academic papers (Mareschal et al. 2013; Knowland and Thomas 2014; Thomas and Johnson 2008; Thomas and Knowland 2014; Thomas et al. 2020) and more accessible materials designed for teachers (Rogers and Thomas 2022b). Here, we propose that the MBE model (see Figure 2) provides a useful scaffold for the study of adult literacy as a mature scientific discipline.

In the following sections we demonstrate what we mean using examples drawn from the LWA programme.

<sup>&</sup>lt;sup>2</sup> CEN is a collaboration between three institutions – University College London (UCL), Birkbeck University of London, and the UCL Institute of Education. For more information, visit https://www.educationalneuroscience.org.uk/about-us/mission-statement/ [accessed 17 December 2024].



Figure 2 The MBE model, simplified and adapted from Tracey Tokuhama-Espinosa's MBE science conceptual framework, referred to in Betts et al. (2019)

# The application of MBE in the LWA programme

# Part 1. The design of the programme

In this section we take three examples from the design of the LWA programme to illustrate its use of best practice according to current knowledge on literacy learning. We do not claim that LWA is unique in including these components. Rather, we highlight them as examples of practices that are almost certainly contributing to the success of the LWA programme and whose adoption could benefit literacy programmes more widely.

#### Phonological awareness instruction

A key foundational skill in literacy learning is the ability to deconstruct oral language into its parts and manipulate them. It is made up of the following skills:

- phonological awareness: the sounds of the language (how would the word "pencil" sound without the "p"?);
- *morphological awareness:* the structure of the language (in English, plurals usually end in "s"; the suffix "un" changes the meaning of a word to its opposite); and
- *orthographic awareness:* the visual nature of written words ("cat", "hat" and "mat" are likely to rhyme because they share aspects of orthographic form).

Ability in these three areas explains a large degree of success in literacy development in childhood (Carovalas et al. 2001; Goswami and Bryant 2016; Lonigan et al. 2000; Melby-Lervåg et al. 2012).

Each class in the LWA programme includes phonological awareness instruction, in which learners identify new sounds in a keyword introduced in the context of a story. The keyword is broken down into syllables, and learners identify the syllable that contains that day's phoneme. Learners are asked to identify whether each word in a list contains the new phoneme and are challenged to produce their own examples of words containing that phoneme. This phonemic training is a key element of each lesson and its inclusion is an important strength of the programme.

#### Spacing and retrieval

When it comes to learning to read and write, adults have a different starting point from children, with different strengths and weaknesses. Adult strengths are fluency in oral language, better developed executive function skills (so they can pay attention and follow instructions better), better verbal working memory, which helps them keep more words in mind as they move from words to sentences (Cain et al. 2004), and better metacognitive skills, allowing them to use learned strategies. Adult weaknesses centre on the reduced plasticity of the adult brain, which makes the accumulation and consolidation of knowledge across lessons more difficult (Lillard and Erisir 2011). Adults are likely to need more help to consolidate learning, through more frequent repetition and retrieval of material (Chan et al. 2018), simple repeated testing, recaps at the start of a lesson and knowledge testing at the end.

Techniques such as spacing learning, interleaving and self-testing all help to consolidate learning. They require information to be left, forgotten and then actively retrieved, each time solidifying knowledge consolidation (Bjork and Bjork 2011). The benefit of spacing is seen both within a single session and when presentations are spread over many sessions. Long and variable intervals between presentations result in optimal long-term retention (Smolen et al. 2016). In research exploring the most appropriate schedule for adults learning new words, an "extended schedule" was found to be optimal, with intervals between presentations of material getting longer over the learning period (Yan et al. 2020). Not only *when* but also *how* material is engaged with matters. Active engagement means that learners are encouraged to recall information themselves rather than being spoonfed it (Karpicke and Grimaldi 2012). The act of recall itself supports new learning and is a powerful technique for remembering new information. In the LWA programme there are many examples of good practice in the use of spacing and retrieval. In each lesson, material from the previous two lessons is reviewed, and every fifth lesson is a revision lesson. More recently, following a review of the evidence, an additional monthly revision session has been added to revise all materials covered in the cumulative course to date. Revision lessons use games and other activities to reinforce and assess what the learner has learned up to that point. Students are encouraged to participate actively, coming up with their own examples and reading a text themselves rather than having it read to them.

#### Instruction in first language

In terms of the choice of language, MBE shows a strong theoretical basis for why first-language learning is easier for learners. Strong oral skills facilitate sound to symbol mapping; students and teachers can communicate effortlessly (assuming they share a first language); the emotional connection with first languages is likely to enhance confidence and strengthen identity, both of which can boost motivation and engagement; and there is greater potential for home practice (Baker 2002; Ouane and Glanz 2010, 2011). However, local languages sometimes have limited written materials, meaning that books and instructional texts might have to be created. Moreover, learners often recognise that work and other opportunities might be greater with national languages.

The LWA programme teaches all learners in their first language (Yao), with the subsequent possibility for learners to progress to the national language of Chichewa at a later date. When asked if they would like to learn to read and write in any of the other languages that they speak, 92% of learners responded in the affirmative. LWA employs teachers selected from local villages, whose first language is also Yao. Classes are also regularly monitored by programme coordinators who are fluent in Yao. There are not many existing written materials available in Yao, particularly for neoliterates. Those involved in the programme have therefore made efforts to create appropriate new Yao materials. These booklets are designed with care and attention to both content and form. Content is relevant to learners' lives, sensitive to gender, and staged to allow learners to progress at an appropriate pace from simpler to more complex language. In terms of form, the booklets progress from highly spaced, very large letters to more closely spaced, smaller letters as learners develop greater fluency.

#### Part 2. The programme in practice

#### Literacy practice beyond the classroom

In our analysis of the data on literacy progress in the LWA programme, we saw that there were 35 learners (of 200 with usable longitudinal data) whose reading levels increased in the time between the assessment at the end of the programme and the follow-up assessment five months later. In other words, these learners continued to get better at reading even after classes were over. When we looked in more detail at these data, we noticed that all 12 learners from two small villages showed this improvement. Seeing this, we included a focus group with these learners as part of our evaluation.

The first point of this example is simply to show that systematic data collection including simple variables (such as the name of the village in this case) allows potentially important information to come to light. This information can lead to new research questions: what was it about the learners in those two villages that meant that their literacy continued to improve once formal tuition had stopped? How can this new knowledge be used to benefit others?

From our focus group, we learned that the answer lay in the fact that the women in those villages had organised their own follow-up classes. Along with their former teacher, also a village member (as with all teachers in the LWA programme), they continued to meet once a week for three hours to practise reading together. Importantly, this weekly practice commenced immediately after the end of the formal course, so there was no break in learning. This sort of sustained practice is key to developing fluency. Even though adults learn better than children during lessons – they concentrate and pay attention, they take in more information, they are often highly motivated - they retain that information between classes less well than children do. Consequently, attaining any reasonable level of fluency is likely to take longer for adults. If fluent literacy means being able to read 90-100 words per minute (as some estimates for English suggest, e.g. Armbruster et al. 2001), most adult literacy programmes provide nowhere close to the amount of time required to achieve this. Social learning provides the groundwork that is likely crucial for the long-term practice needed to become fluent (Reder 2012). The sort of active learning that these women were engaged in has been shown in other contexts to improve performance (Freeman et al. 2014).

#### The practical difficulties of data collection

By the end of 2024, the LWA programme is on track to have provided the opportunity for 20,000 learners (> 90% women) to become literate. This is not only an impressive achievement but also an exceptional opportunity for data collection to drive improvements in this and similar programmes and to understand the process of adult literacy acquisition more fully.

However, data collection in the field is not easy. For example, data were available from 592 learners at the start of the course in 2021, and 1,306 at the end of the course. This difference was due to the villages involved in the programme being spread over a very wide geographical area that was difficult to traverse. Many villages lack access to equipment such as printers, and a small delay in getting hard copy assessments ready for the start of the course meant that data collection was not possible in all villages at that point. A further difficulty arose when looking at data longitudinally – which is key to understanding change over time – such as the acquisition of new knowledge and the factors that affect it. Data that could be matched across learners at the start and end of the course were available for 100 individuals, just 7% of those enrolled.

This relatively small dataset nonetheless proved interesting: the median improvement for the group between baseline and endline was 2 (IQR = 2), indicating that the majority of learners moved up two reading levels (from being unable to name three letters to reading single words). A model was run to predict improvement, with learners' age group, their reading level at baseline, and the number of languages they spoke as predictors. Overall the model significantly predicted change (F(87,3) = 5.509, p = 0.002). The only single variable which significantly predicted change was reading level at baseline (B = -0.78, t = -4.04, p < 0.001), where readers with a lower reading ability at baseline were more likely to show a significant improvement over the length of the course. A larger dataset would have given the statistical power to consider more predictors and would therefore have warranted more confidence in the findings. The relatively small longitudinal sample size is believed to be due to differences in learners' recorded names between the two time points. This is partly due to deviations in spelling across timepoints, and partly due to the fact that learners use different given names and surnames in different contexts, making matching across timepoints challenging.

The LWA programme co-ordinators have been very responsive to the difficulties encountered concerning data collection and have implemented some practical and effective solutions. For example, all teachers now request that learners choose a consistent name at the start and end of the course, and at follow-up for all future data collection. This is also the only name recorded in class registers, so attendance can be monitored and used as a variable to predict learning. A further change has been in the way that data are gathered. In 2021, data were collected on paper and forms were then transferred to the regional office for input into a computerised database. This posed a risk in terms of transporting data as well as a labour-intensive inputting job. For the last two years, regional literacy monitors have been feeding in the data from hard copies to Google Forms on their smartphones. Data can then be automatically pulled through to Excel, reducing the need to store or transport personal data around the country, and possibly reducing the likelihood of human error in data inputting.

#### Motivation, aspirations and songs

Learning to read and write is a highly demanding task. For learners of any age, it takes a great deal of concentrated effort, practice and time to learn to process and produce a language's written form (Castles et al. 2018). We estimate that it takes roughly 2,000 hours for children to achieve fluency in reading (Thomas et al. 2020). Success relies on the individual learner's motivation (Liu et al. 2024), particularly since the prolonged cognitive load involved in effortful reading can lead to mental fatigue (Mizuno et al. 2011).

Learner motivation can be improved with positive feedback and clear, realistic goal setting (Hidi 2016; Hidi and Harackiewicz 2000). Ensuring that materials are relevant to learners' lives, and grounding stories and concepts in real experience also helps a great deal (Ambrose et al. 2010; Lovett et al. 2023). Finding a balance between consolidating existing knowledge and exploring new knowledge (Zepke and Leach 2010) is important, as is understanding learners' individual aspirations and goals.

The LWA programme has recently implemented additional data collection for all learners at the beginning of courses for teachers to understand what those starting out hope to achieve by the end of classes. Again, this sort of data collection allows subsequent research questions (e.g. Do learners with higher aspirations achieve more?) to be answered.

In our evaluation of the LWA programme on the ground, we found one of its greatest strengths to be the in-class singing. Singing helps to regulate energy levels within lessons, giving a boost when learners flag; it heartens and motivates learners; and it enhances a sense of cohesion and shared purpose. As one learner interviewed said: "It motivates and encourages us, but it also speaks to others outside the class and shows that we are happy ... so that encourages them as well." Singing was not designed into programmes from the start, but emerged organically, as a classroom extension of local cultural practice. The point of this example is to emphasise the importance of programmes being designed and improved locally.

#### Part 3. The further development of the programme and the field

In this section we discuss some ways in which the LWA programme is seeking to further develop and build on its success. This involves both applying new evidence to existing practice, and evaluating existing practice to build the evidence base.

There are many outstanding questions in the field of adult literacy. To give just a few examples of these "known unknowns": What final rate of reading or fluency level is possible for adult learners? What is the effect of a lack of prior education on executive function abilities? How much new literacy knowledge do adults forget between learning sessions compared to children? Are there differences in children and adults in terms of how quickly complex visual patterns can be recognised, and what level of expertise can be achieved? What is the effect of different script types on the rate of learning? What is the relationship between working memory capacity and rate of progress in reading speed? How similar is the reading progress of children and adults given the same amount of practice? Researchers have begun to look at questions of differences and similarities between literacy learning in different languages (e.g. Dufau et al. 2015; Perfetti and Harris 2013; Verhoeven and Perfetti 2022), but most evidence still comes from a very small sample of languages.

No single programme can hope to answer so many questions, but by combining evidence as a field of research, it becomes possible to make gradual progress. We offer the following examples in the spirit of making our own small contribution to that endeavour, outlining examples of open research questions to which ongoing adult literacy programmes such as the LWA might be able to sketch the beginnings of answers.

#### Additional phonological training

The links between phonological awareness and emergent literacy in children are fairly well established. Broadly, progress in children's reading ability is well predicted by phonological awareness at the phoneme level (e.g. Rohl and Pratt 1995). Phonological awareness instruction is known to have a significant positive impact on reading and spelling, with benefits for all children regardless of reading ability (NRP 2000). Phonological awareness is particularly important for developing links between phonemes and graphemes and spelling skills (Kamhi and Hinton 2000).

In adult literacy acquisition, there are many outstanding questions regarding the role of phonological awareness and the potential value of intensive input in this area. Based on the importance of phonological awareness in child literacy acquisition, there are sound theoretical reasons to think that a concentrated phonological intervention before literacy instruction could substantially benefit adults with little or no prior literacy training.

This is an example of a hypothesis that has the potential to improve literacy outcomes significantly and at low cost, and where efficacy could be tested through simple behavioural research in the field. As part of an ongoing programme, a subset of learners could receive pre-course phonological awareness training. The intervention should involve no written material and focus solely on manipulating the sounds of the language of instruction through activities and games. At the start and end of the trial, those receiving the intervention, as well as a control sample who receive no additional phonological awareness training, should be tested on phonological awareness skill. This measure would then be used to predict progress on the main literacy course. Discussions with the LWA team are ongoing regarding testing this hypothesis in new villages brought into the programme.

#### Testing the visual perception deficit hypothesis

Success at any level of literacy means optimising eye movements to extract visual information from a sequence of symbols in order to recognise letters and words rapidly. Once the foundations are established, literacy improvement comes through the gradual recognition of more complex patterns more quickly. This involves both differentiating between very similar symbols ("i" and "j") and grouping together different symbols which share key characteristics (all the different ways that "a" can be written). Achieving fluency means making reading automatic – moving from the high-effort tasks of decoding to rapid, instant word recognition, processing all the letters in parallel. This automaticity is essential for the sort of meaningful skill acquisition needed in the workplace (Abadzi 2016a).

The *neoliterate adult dyslexia* hypothesis (Abadzi 2012, 2016a, 2016b, 2019; Aker et al. 2024) proposes that the brain's low-level perceptual functions required for decoding letters have a sensitive period in childhood. According to the theory, adult readers struggle because when they look at a text, they do not process all the features of the letters; they detect letters very slowly and make frequent mistakes.

While some researchers (e.g. Pelli and Tillman 2008) have begun to suggest ways to position and space objects (letters) to improve effective processing, the question of whether the underlying problem is a perceptual one specific to adults remains unanswered. There are both high-tech ways to address this (using eye tracking technology) and low-tech ones, testing the effect of different sizing, spacing and design of letters on decoding speed. We suggest that the field would greatly benefit from research that investigates potential barriers to learning such as this, as well as

potential solutions to them. Research to discover the optimal size and spacing of text for learners to detect textual components quickly could be of enormous benefit. A starting point for this line of research might be to establish what reading speed it is possible for adult learners to reach over time.

#### Building evidence locally and sharing it globally

Our pre-field trip evaluation had led us to think that learner motivation might be a limiting factor in the LWA programme. This was based on theoretical knowledge of the importance of motivation to maintain the long-term commitment needed to improve literacy, and on our analysis of course materials showing that the programme had no personal goal setting. Learners' individual motivation was not tracked over the course and dropout rates were high. Our impression was that the women involved might not be minded, or able, to prioritise literacy classes.

In the field, we realised that we were wrong. We saw consistent, extremely high motivation. Learners not only came to class with great enthusiasm, but also found time to practise outside of lessons despite the enormous challenges (in terms of competing responsibilities) of doing so. Those who had dropped out had invariably done so because of tragic life-changing events (such as the death of a spouse): all wanted to continue literacy instruction when they could. We also realised that the way we thought of motivation from a Western perspective was misplaced here, where an emphasis on a collectivist rather than an individualistic approach is the norm.

We share this example to emphasise the importance of evidence being contextualised and relevant. If a meaningful evidence base for the field of adult literacy is to be developed, it needs to be done locally. The more that research can involve nonliterate and neoliterate adults in the contexts in which they are actually learning, the more useful and applicable its findings are likely to be.

# **Conclusion and recommendations**

MBE is not a magic bullet. Nevertheless, we believe it provides a useful transdisciplinary framework to build the scientific study of adult literacy with a view to improving outcomes. Its key benefit is in providing a systematic approach, founded on knowledge of how the brain changes between childhood and adulthood, to understand all the components of adult learning. Many decades of research have taught us how children learn to read and write. We are continually improving our knowledge of the relative strengths and weaknesses of adult brains. The MBE approach allows us to use this combined understanding to adapt literacy teaching to exploit adult learners' strengths (making the most of better oral language, learning with peers, using metacognitive techniques, telling stories to take advantage of better working memory) and ameliorate their weaknesses (retrieve retrieve retrieve, learn actively, give feedback well).

We urge adult literacy practitioners to do more to collect, report on and share data on their programmes for the benefit of others in the field. Analysis of simple variables can begin to answer some of the field's many unanswered questions. However well a programme might *seem* to be going, the only sure way of *knowing* how it is going is to measure it. Scientific research is not the preserve of scientists. Some of the best MBE evidence comes from studies in the real world. This is particularly true of adult literacy, since much of the current evidence base is built on completely different populations: Western/Global North rather than Global South, and children rather than adults. For practitioners interested in learning how to carry out their own simple, small-scale research projects, we suggest the resource "What works in my classroom" (Thomas and van Herwegen 2017).

This gradual accumulation of knowledge and evidence will, over time, allow all programme practitioners to benefit from the best knowledge available. Ultimately this will bring much-needed improved outcomes for many thousands of adult learners.

Acknowledgements We would like to acknowledge the World Bank for commissioning the original report, and UNESCO International Bureau of Education for supporting the work. We would also like to thank all the literacy programme participants, teachers and supervisors for giving us their time and such valuable insights. All authors contributed to the conception and design of this article. The first draft of the manuscript was written by Cathy Rogers and all authors commented on previous versions of the manuscript. All authors read and approved the final revised manuscript.

**Data availability** The datasets generated in the course of this work are freely available through the Open Science Framework (OSF) at https://osf.io/2wk63/?view\_only=d7cf70a1ff264d4e9ef6e3b9a7741e7d or from the corresponding author on request.

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**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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