

Deloitte Access Economics

Evaluation of the
Early Learning
Languages Australia
trial

Final report

Department of Education
and Training

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Acronym list

ACARA	Australian Curriculum, Assessment and Reporting Authority
ACEQA	Australian Children’s Education and Care Quality Authority
ACT	Australian Capital Territory
ASD	Autism Spectrum Disorder
ARIA	Accessibility/remoteness Index of Australia
BYOD	Bring your own device
DAE	Deloitte Access Economics
ECA	Early Childhood Australia
ELLA	Early Learning Languages Australia
ESA	Education Services Australia
EYLF	Early Years Learning Framework
ICT	Information communications technology
ID	Identity
HCC	Health care card
LDC	Long day care
LOTE	Language other than English
SES	Socioeconomic status

Executive Summary

The Early Learning Languages Australia (ELLA) trial, which ran throughout 2015, was an Australian Government initiative that involved the development and use of language-based mobile applications (apps) for preschool children. The primary aim of the trial was to provide language exposure for preschool children, in order to encourage further language learning in later years of schooling, and to help address barriers to language education in the early years of education.

Deloitte Access Economics was engaged to conduct an evaluation of the ELLA trial, to consider whether it was appropriately designed and effective in achieving its objectives.

ELLA trial overview

At the broadest level, the ELLA trial was developed by the Australian Government in the context of a commitment to expand the teaching of languages in Australia. The Australian Government has a specific goal of at least 40 per cent of Year 12 students studying a language other than English within a decade. The ELLA trial was established as one part of the Australian Government's endeavours toward achieving this.

During the evaluation, the *objectives of the ELLA trial* were confirmed as being to:

- expose preschool children to languages other than English through an online platform, to improve cognitive development, encourage further language education and develop in children an understanding of other cultures; and
- contribute to transforming language education in Australia in the early years of schooling, by addressing barriers to language education and initiating end-to-end language learning opportunities for children.

In 2014, the Australian Government Department of Education and Training appointed Education Services Australia (ESA) to manage (1) the design and development of language apps for preschool children and (2) implementation of an ELLA trial at 41 preschool sites across the country.

Five languages were selected for the trial – Chinese (Mandarin), Japanese, Indonesian, French and Arabic. Seven apps were developed for each language, with the apps being progressively released to preschool trial sites throughout 2015. Trial sites were located in each state and territory, with a mixture of metropolitan, regional and remote locations, and a range of settings such as school-based preschools, stand-alone preschools and long day care (LDC) services. For the duration of the trial, each site used apps in one language. Each site was supplied with iPads, which the children used to access the apps. The first app commenced operating in the week of 22 February 2015. Apps were subsequently released approximately every four to six weeks, with the final app being released in early November 2015.

Each app featured the same characters 'the polyglots' in a different setting, including the playroom, beach, birthday party, zoo, circus, park and town. Within each app, children could explore various activities, designed to encourage learning in a play-based manner.¹

¹ Further information about the ELLA programme is available at the [ELLA website](#) or from the [Commonwealth Department of Education website](#).

The overall usage profile of the apps comprised 1,868 children who used an app at least once. Key usage statistics include 234,956 total user sessions and 27,661 total hours of use. On average, each child used the ELLA apps for 29 minutes per week during the trial, comprising an average of four sessions of around seven minutes each.

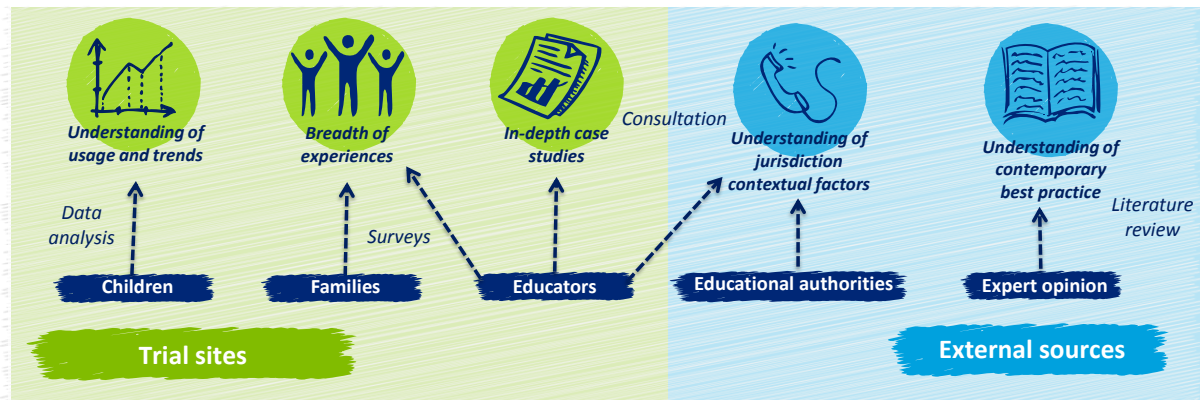
Evaluation overview

The *evaluation* of the ELLA trial was conducted over the course of the 2015 school year, and drew upon on a *range of information sources*, enabling a mixed-method qualitative and quantitative evaluation approach. These sources comprised: comprehensive app usage data; three rounds of online surveys of educators at trial sites; two rounds of online surveys of parents and guardians of children involved in the trial; two rounds of face-to-face visits with a sample comprising just over half of the trial sites; a literature review on the use of digital technology for language learning in preschools; information provided by ESA, including records from the ELLA help desk; and, consultations with state and territory education authorities.

To establish the evaluation approach, a comprehensive evaluation plan was developed. This document outlined the evaluation objectives and purpose, set out a programme logic model, put forward a series of evaluation questions, and discussed the evidence sources and analytical approach. The evaluation plan was approved by a Human Research Ethics Committee (Bellberry Limited) and research approval was received from relevant state and territory education authorities.

An overview of the key evidence sources for the evaluation is shown in Figure i.

Figure i: Overview of evidence sources



Evaluation scope

Relative to the period over which benefits from participating in a programme like ELLA will materialise, the trial occurred over the relatively short time period of time (one year). Consequently, findings on the trial’s impact are based on early and emerging evidence. A more robust impact assessment can only be undertaken after a longer time period has elapsed and outcomes have more fully manifested.

Consistent with the objectives of the trial, this evaluation has focussed on children’s participation and usage of the apps. It was not within the scope of the evaluation to assess the extent to which

children became proficient in the language, although educators and parents were asked to provide observations of language usage where possible.

As described above, the ELLA trial and this evaluation occurred in the context of the Australian Government's broader goal to significantly increase the proportion of year 12 children studying a language. There are two primary ways the ELLA trial, and any subsequent expansion of the initiative, can contribute to this objective:

1. provide a foundation for expanding interest in language education among pre-school children, in the expectation that some of these children will consequently be more likely to continue with language education throughout their schooling; and
2. providing a platform which could potentially be expanded to enable broader access to language education, as a complement to language education teachers.

However, each of these points would require more detailed assessment and consideration over a longer time frame. Therefore, while this evaluation cannot determine the extent to which these points have been achieved, it has assessed the extent to which the trial has contributed to creating the preconditions that would enable them to be realised.

Evaluation findings

Design of the ELLA trial

Evidence from surveys and site visits suggests that the ELLA trial has demonstrated promising results in providing a model of enabling language exposure in preschool environments where the educator is not a trained language educator and is usually not proficient in a language other than English. Children and educators have found the iPads and apps easy to use, with educators consistently stating that the ELLA apps are engaging and age-appropriate. These observations are supported by the app usage data which shows children quickly adapted to using the apps and had were able to use them in a relatively self-directed manner.

A review of literature pertaining to digital technology for language learning in preschools identified features of best practice. The design of the ELLA trial features most of the identified best practice elements. However, program design could be further strengthened through increased guidance for educators on what to expect from children's interactions with the apps and how the language learning process typically transpires for preschool-aged children.

Implementation of the ELLA trial

The timeframe for implementation of the ELLA trial was relatively limited. Trial development substantively occurred in the months leading up to the beginning of 2015. The first app was released in February 2015.

Despite the compressed timeframe, implementation of the ELLA trial was relatively smooth. An exception to this however was experienced in a few sites which encountered network issues (due to state or territory government protected internet connections). This problem was more likely to arise at sites operated by state education authorities, although they were limited to only two jurisdictions.

Engagement with sites through site visits and surveys indicated a relatively consistent view that the support mechanisms available to sites were accessible and useful. In particular, the introductory face

to face training workshop for two educators from every site and the consistent point of support provided by ESA were considered valuable.

Delivery of the ELLA trial

Trial sites were provided with flexibility in many aspects of programme delivery within sites. This approach was adopted so that each service could utilise the ELLA resources in a manner which suited their local context and circumstances. Reflecting the flexibility afforded to sites, there was a relatively high degree of variation between services regarding:

- The manner in which the ELLA trial was introduced and delivered, such as whether sites had designated times of the day for using the apps and whether they placed time limits on usage.
 - While many sites welcomed the ability to introduce and use the apps as they saw fit, some sites would have liked more guidance on the optimal ways to support the ELLA trial in their site, including on screen time, and in interaction with children while using the apps.
- Use of complementary activities to support the ELLA apps, which refers to the degree to which sites ensured the apps were used with accompanying activities in order to reinforce app content.
 - In the first round of site visits, the evaluation observed widespread variation in the use of complementary activities, with some sites ensuring this was part of the ELLA experience, while others had not explored this to any significant degree. However, sites tended to become more systematic in their approach to integrating the ELLA apps with their broader learning programme following a second face to face workshop for all sites held by ESA in September 2015, where two educator representatives from each site were given opportunity to share ideas, including the use of complementary activities. This is explored further in Section 4.3.

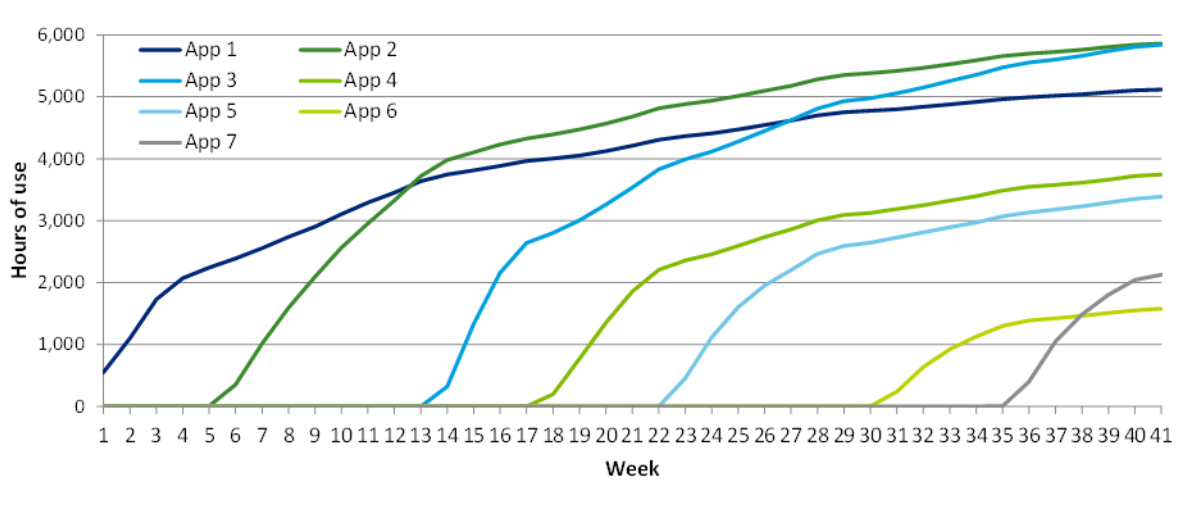
Engagement with the ELLA trial

Almost three-quarters of children participating in the ELLA trial used the apps at least once a week, as revealed by the detailed app usage data. App usage (as measured by minutes per session) remained relatively consistent throughout the trial, supporting educator observations made during site visits that children maintained a steady interest in the apps over the course of the year.

Some children spent a relatively short period of time with the apps, while others used them more regularly and for longer periods. Overall, the most active 10% of children accounted for 33% of total app use.

Each app was most popular when it was first released, with usage typically sharply increasing, before plateauing gradually over time. Overall, App 3 (Polyglots at the Birthday Party) was the most popular among the children throughout the trial, as measured by usage (see Figure ii). This seems to be a function of the timing of this app's release and inclusion within this app of activities that resonated with children, including 'cake' – an activity which involved making and decorating a cake – which was the most popular activity in the ELLA trial.

Figure ii: Cumulative app use by app



Impact and efficiency of the ELLA trial

The ELLA trial has shown positive results in *increasing language exposure for preschool children*. This is demonstrated by educator and parent/guardian observations on child engagement with, and interest in, other languages and cultures, along with analysis of app usage data:

- Engagement with the ELLA programme was high and sustained over the course of the year for a considerable proportion of children, resulting in continued language exposure.
- Most trial sites reported that at least some children were producing words and phrases from the ELLA apps.
 - Although the evaluation cannot make definitive findings on language production, observed use of the app language by some children indicates that language exposure has been effective and children’s interest has been piqued.
- In addition to the language exposure benefits, observations by educators and parents/guardians also suggested that the ELLA trial was associated with the development of a range of skills for participating children, including: care for property, sharing, digital literacy, English literacy, collaborative learning and social skills. However, these observations were not consistent across all educators, and some children experienced some or all of these benefits to a greater extent than others.

With regard to the *objective of transforming language education in the early years of schooling* by addressing barriers to language education, the ELLA trial also appears to have been successful to the extent that an educator need not be language proficient in order for children to participate in, and benefit from, language exposure.

- As reported during site visits and through the educator surveys, over 60% of educators stated they had increased confidence in incorporating language learning and a focus on multiculturalism into their learning programme.
 - It is important to note however that a number of educators suggested that additional training or guidance to enable them to familiarise themselves with the language at a basic level, including correct pronunciation, would be beneficial and help increase their confidence in delivering the trial.

- Some concerns were expressed about a lack of continuity of language learning for the children once they leave preschool and commence school. It was noted in consultation with both educators and jurisdictional education authorities that the potential impact of any ongoing ELLA trial on language learning would be heightened if stronger language pathways existed for children from preschool through primary and secondary education.
 - Given the trial has only been delivered to a single cohort of preschool children thus far, it is too early to definitely assess the likelihood of the ELLA trial influencing children’s language learning experience in subsequent years of education.

With regard to the **cost of the ELLA trial**, the cost during the trial phase was \$9.8 million. It reached 1,868 students, representing a cost per student of approximately \$5,246. The relatively novel nature of the ELLA initiative means it is difficult to make a definitive finding regarding the cost effectiveness of the ELLA trial at this time. However, there is potential for the ELLA trial to become progressively efficient if it undergoes managed growth through extension of the trial phase – or if it were to eventually become an ongoing programme under an appropriate business model.² This is because:

- a significant proportion of the cost associated with the ELLA trial has already been invested in the development stages;
- the marginal cost of distributing the trial to additional participants is low;
- the evaluation has found positive indications that children are gaining language exposure through participation in the trial; and
- a range of benefits associated with participation may materialise over the longer term, including for example, improved cultural awareness.

Future considerations

On balance, there appears to be a case for extending the ELLA trial period for a further two to three years, should language exposure in the early years remain a policy priority for government. This longer period of trialling is required to more definitively assess the outcomes resulting from increased language exposure in preschool.

Several trial extension options were assessed against three key criteria: accessibility; cost efficiency and effectiveness. The results of this analysis suggest a recommended expansion approach which includes:

- A staged expansion over the next three years, providing opportunity to establish a more comprehensive understanding of demand for the trial and the level of resources required to support the rollout (e.g. the extent of the marketing campaign required).
- The development of high-quality online resources which form the basis of the support provided to services, complemented by a technical help desk and face-to-face workshops in the early stages of expansion (if funds are available).
- Targeted financial assistance provided to support low socioeconomic status services in the purchase of devices.

² Note that it is not yet possible to undertake a definitive analysis of the ELLA programme’s *cost effectiveness*. While the ELLA programme has clearly been well received over the trial period, and shown positive signs regarding language exposure, the actual outcomes achieved will not become known for a longer period of time, and cost effectiveness analysis would require a comparison group, so the value of these outcomes could be compared.

This extended trial period also provides opportunities to build support for the ELLA programme from potential interested stakeholders, such as state and territory governments, and to further develop communities of practice in order to increase the sustainability of the ELLA programme over time.

The evaluation also found that there would potentially be merit in expanding the scope of the ELLA trial to include other age groups, and potentially additional languages. However, given the immediate priority is to extend access to preschool children and further evaluate the potential impacts of the ELLA trial, this option should be revisited at a later point in time.

The recommended approach would result in an approximate spend of \$7.9 million over the next three years. However, the recommended option holds a degree of flexibility which allows the format of the expansion (and associated costs) to be refined over time as further information regarding demand for the ELLA trial comes to light.

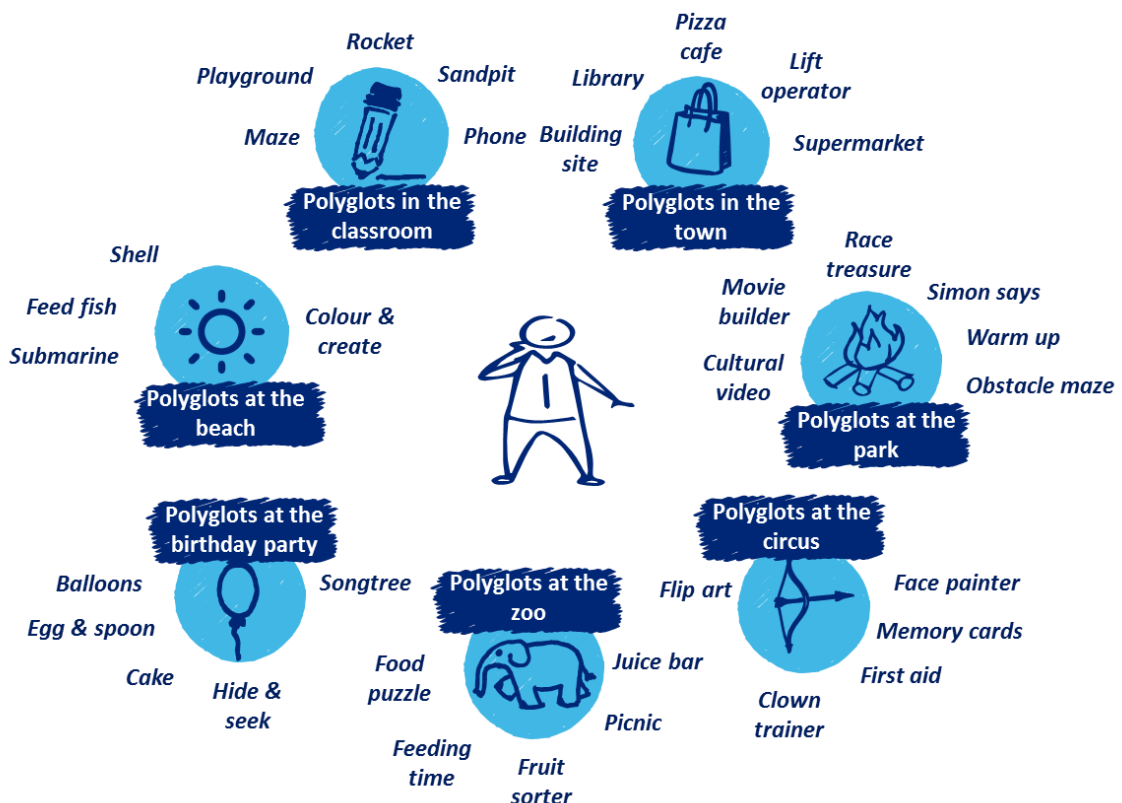
Deloitte Access Economics

1 Introduction

The ELLA trial is an Australian Government initiative that involves the development and use of mobile applications (apps) which aim to (1) expose preschool children (i.e. children in the year before primary school, typically aged four years old) to languages other than English and (2) raise interest in further language learning in later years of schooling.

Five languages were selected for the trial – Chinese (Mandarin), Japanese, Indonesian, French and Arabic. Seven apps were developed for each language, with the apps being progressively released to 41 preschool trial sites throughout 2015. Each app was made up of four to six activities (see Figure 1.3). Trial sites were located in each state and territory, with a mixture of metropolitan, regional and remote locations, and a range of settings such as school-based preschools, stand-alone preschools and LDC services. For the duration of the trial, each site used apps in one language. Each site was supplied with iPads, which the children used to access the apps. A snapshot of the ELLA trial’s scope is provided in Box 1.

Figure 1.1: Summary of ELLA apps



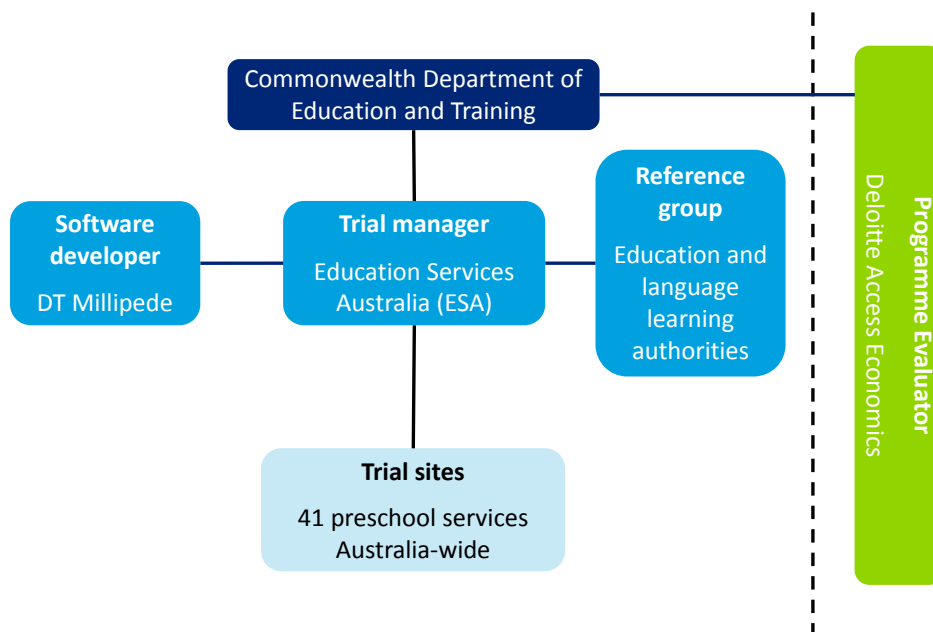
Box 1: Snapshot of the ELLA trial’s scope

- As at December 2015, 1,868 children had used the apps at least once throughout the year, and 162 educators involved in the trial.³
- The largest site had 135 eligible children, while the smallest site had seven.
- There were 41 sites involved in the trial, with the children spread across 74 preschool groups. Some sites had only one group, while bigger sites had as many as six groups.
- There were 12 trial sites in NSW, nine in Victoria, eight in Queensland, six in Western Australia, three in South Australia, and one each in Tasmania, the Northern Territory and the ACT.
 - By geographic distribution, 22 were located in metropolitan areas, 17 in inner and outer regional areas, and two in remote and very remote areas.
 - By service type, 13 were stand-alone preschools, 11 are preschools attached to a school, and 19 are LDC services with a preschool trial.
- The tablet used in the trial was a 16GB iPad Air 2.
 - A set of six iPads (one educator iPad and five children iPads) was allocated for approximately every 25 children at a preschool.
 - A total of 336 iPads were issued for the trial (56 educator iPads and 280 children iPads).

1.1 Evaluation approach

In late 2014, Deloitte Access Economics was appointed by the Australian Government Department of Education and Training (the Department) to undertake an evaluation of the ELLA trial. The purpose of the evaluation is to consider whether the ELLA trial was appropriately designed and effective in achieving desired outcomes. A summary of the key parties involved in the ELLA trial is shown in Figure 1.2

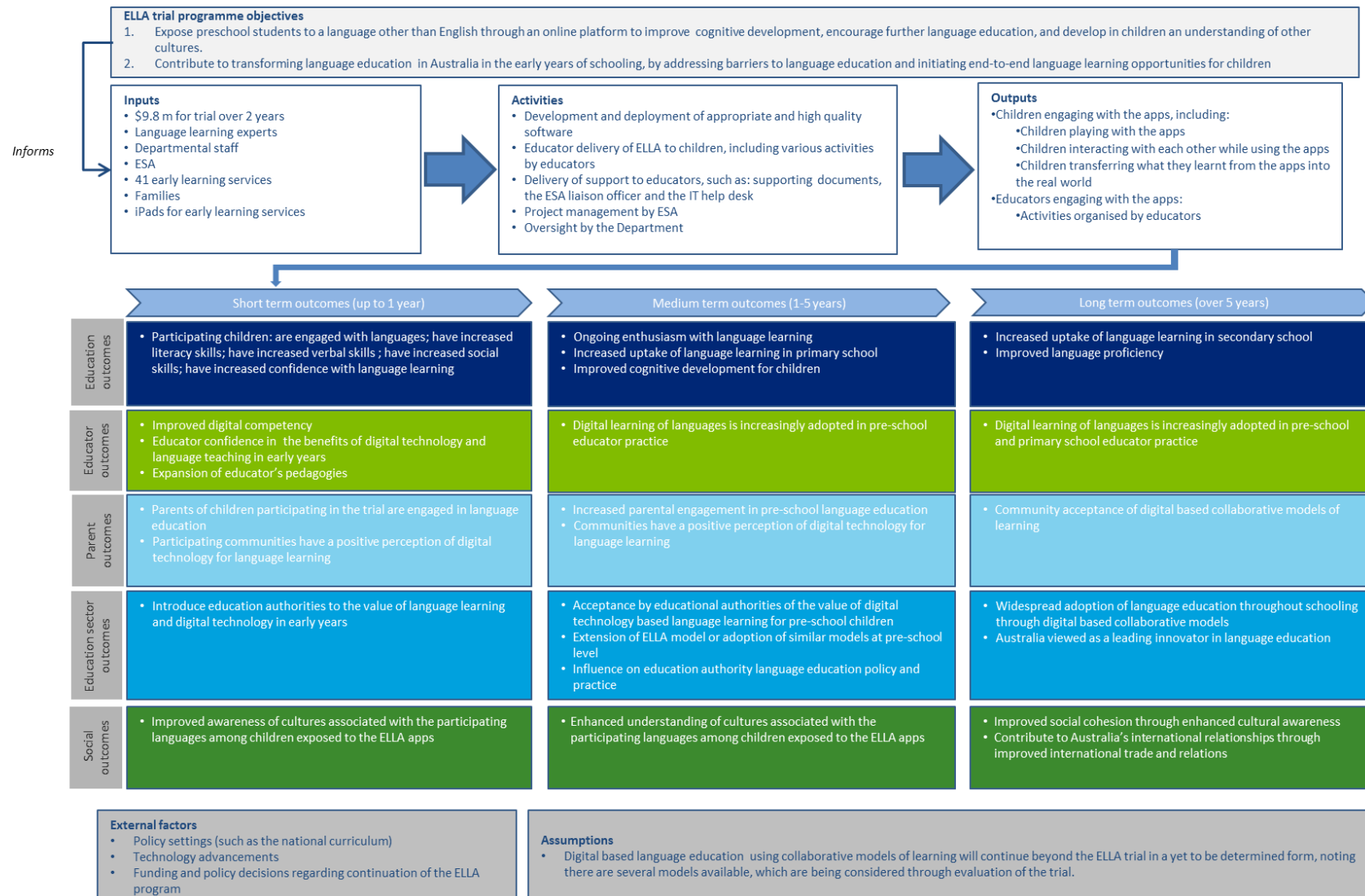
Figure 1.2: Structure of the ELLA trial



³ Throughout 2015, 97 of these children left their preschool and therefore did not participate in a full year of the ELLA trial.

The ELLA trial programme logic, which provides a detailed summary of the trial; including the trial objectives, inputs, activities, outputs and expected outcomes is provided in Figure 1.3 below.

Figure 1.3: ELLA trial programme logic



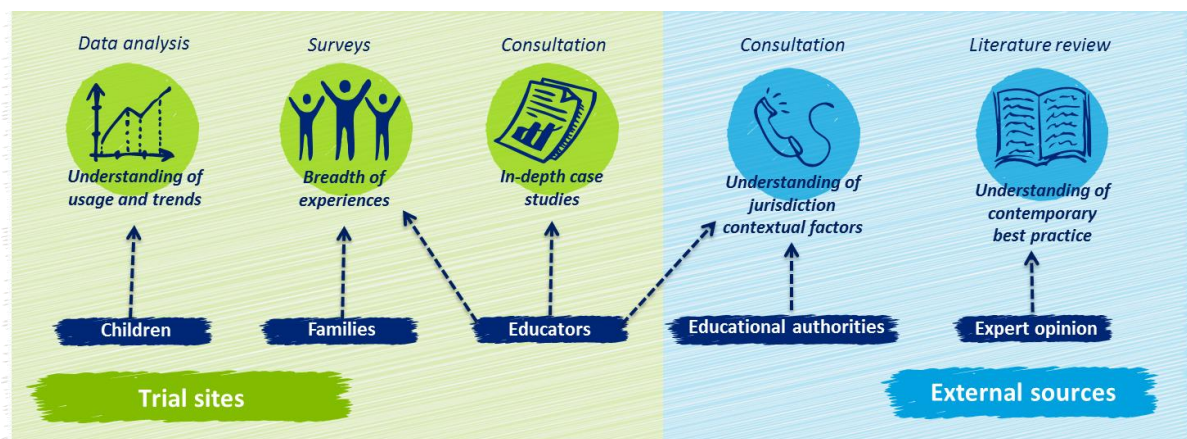
To establish the evaluation approach, Deloitte Access Economics developed a comprehensive evaluation plan. This document outlined the evaluation objectives and purpose, set out a programme logic model, put forward a series of evaluation questions, and discussed the evidence sources and analytical approach. Following the development of the evaluation plan, Deloitte Access Economics obtained ethics approval from a Human Research Ethics Committee (Bellberry Limited) and research approval from state and territory education authorities.

The evaluation questions underpinning the approach are provided in Appendix B.

1.2 Evidence sources

This evaluation drew upon on a range of information sources, which each contributed a distinct evidence base. These sources, described below, enabled a multi-faced qualitative and quantitative evaluation approach and are summarised in Figure 1.4.

Figure 1.4: Evidence sources for ELLA trial evaluation



Source: Deloitte Access Economics

1.2.1 Usage data

Over the course of the evaluation, Deloitte Access Economics has been provided access to non-identifiable app usage data. This report includes an analysis of app usage data associated with the ELLA trial (i.e. from 8 March 2015 until 27 December 2015).

- At the beginning of the trial, each child was required to select a unique avatar to represent them (typically a photo of themselves or a picture of a toy they like to play with) Every time an avatar was selected, all usage data was then attributed to that child’s unique identity (ID). This allowed for each child’s usage habits to be captured and analysed over time.
- The data captured included what time the interaction took place, which app and activity were being used, and what kind of interaction took place (i.e. – it captured if the child was listening to a recording of the target language, or popping bubbles).
- Several key measures of child engagement and usage were generated from this data (henceforth referred to as the ELLA app data). These measures included number of sessions per child (indicating how often children would return to the apps), minutes per session (indicating how engaged a child was with the apps once they had logged on), and the

proportion of language exposure (which indicated the share of time spent with the apps children spent listening to the target language).

- By comparing these measures across apps, and across time, the ELLA app data reveals patterns of use and engagement levels among children involved in the trial.
- Usage measures were also compared against several explanatory variables sourced from the educator surveys, to attempt to identify factors that explained differences in iPad usage among children.
- Usage data from specific activities (which rewarded correct responses from users) was used to represent child learning outcomes. This data was also compared against several explanatory variables, to attempt to identify factors that may influence child outcomes.

A profile of the app usage data which informed this report is provided in Appendix A.

1.2.2 Online surveys

Three rounds of surveys were undertaken over the course of the evaluation. Specifically:

- A baseline survey of trial sites was undertaken by ESA in April 2015 (the Baseline Educator Survey). This survey sought to establish a baseline understanding of the implementation process at each site and any relevant contextual factors (such as educator language and technology knowledge).
- In August/September 2015, Deloitte Access Economics conducted two mid-point surveys. One of educators and directors (the August Educator Survey) and another of parents and guardians of children participating in the ELLA trial (the August Parent/Guardian Survey).
 - The purpose of the mid-point surveys was to develop a comprehensive analysis of the effectiveness of the implementation process, to flag any current issues and to provide a preliminary indication of any impacts of the ELLA trial.
- A final survey of educators and directors (the December Educator Survey), as well as parents and guardians (the December Parent/Guardian Survey), was conducted by Deloitte Access Economics in November/December 2015.
 - The final surveys sought to gauge educator and parent reflections on the trial in its completeness. This included assessments of the trial's impacts, learnings as to how children can be most effectively engaged with the trial and any suggested improvements.

A profile of the Baseline, August and December survey responses (i.e. the number of responses, by variables of interest) is included in Appendix A.

1.2.3 Site visits

Consultations were held with a sample comprising over half of the 41 trial sites, in which each selected site was visited at two points during the evaluation. The first round of site visits occurred during June and July 2015. The second round took place in November 2015.

The sample comprised 21 trial sites, which were selected to provide a relatively representative distribution of characteristics such as state or territory, ELLA app language, geographic location and service type.

During these consultations, interviews were held with directors of the service, and any educators who had been involved in the delivery of the ELLA trial. The purpose of these site visits was to explore operation and performance of the ELLA trial from a site perspective in depth. The visits also allowed for the evaluation team to develop a deeper understanding of the contextual factors underpinning trial delivery through on-site engagement.

A profile of the trial sites which were engaged through site visits is included in Appendix A.

1.2.4 Literature

A review of literature on the use of digital technology for language learning in preschools was undertaken. The purpose of this literature review was to develop an understanding of whether the ELLA trial aligns with the available evidence on best practice approaches to:

- language exposure in preschools; and
- digital technology use in educational settings, focussed on preschools.

The findings of this literature review are *provided at Appendix B*, and referenced in the analysis of trial design in Chapter 2.

1.2.5 Resources from Education Services Australia (ESA)

ESA was contracted by the Department to manage the design and development of suitable apps and implement the ELLA trial. In its role as trial manager, ESA undertook several functions including oversight of app development and release, and support for educators at trial sites (such as employing a dedicated Early Childhood Liaison Officer, holding workshops and webinars, and providing a helpdesk for technical support).

Information collected by ESA, such as trial service profiles and ELLA helpdesk reports, has been shared with Deloitte Access Economics and forms part of the evaluation's evidence base. A consultation with ESA was also undertaken to ensure that any relevant knowledge acquired by ESA in its role as trial manager was incorporated in the evaluation.

1.2.6 Education authorities

Deloitte Access Economics consulted with representatives from each state and territory education authority, to understand how the delivery of the ELLA trial may be influenced by factors unique to each jurisdiction. This included a discussion of the alignment between the ELLA trial and any existing language education or technology policies within each state or territory, as well as relevant considerations for any future development of the programme.

1.3 Report structure

The evaluation findings have been organised under several key headings, as outlined below.

- **Chapter 2: Trial design.** This chapter analyses the available evidence supporting the appropriateness of the design of the ELLA trial, with a focus on the use of tablet technology and the software design, as well as the alignment of the ELLA trial design with best practice principles.

- **Chapter 3: Trial implementation.** This chapter considers the available evidence supporting the effectiveness of the ELLA trial’s implementation, including the implementation process, the level of support received and any implementation issues.
- **Chapter 4: Trial delivery.** This chapter examines the available evidence supporting the appropriateness and effectiveness of the delivery of the ELLA trial across sites, including how the trial was introduced within sites, methods of trial delivery, the use of complementary activities and how parents and guardians interacted with the trial.
- **Chapter 5: Trial engagement.** This chapter analyses the available evidence on the appropriateness and effectiveness of children’s engagement with the ELLA trial, including an overview of children’s usage of the apps and an analysis of the factors potentially driving differences in use.
- **Chapter 6: Trial impact and efficiency.** This chapter provides an overview of the evidence supporting the impact of the ELLA trial on child, educator and service outcomes across trial sites. The chapter also includes an analysis of trial cost-efficiency, in light of the outcomes achieved.
- **Chapter 7: Future considerations.** This chapter analyses the options for the future of the ELLA programme and draws on the evaluation findings to identify a possible way forward.

2 Trial design

This chapter analyses the available evidence on the *appropriateness* of the design of the ELLA trial, with a focus on the use of tablet technology and the software design.

The **key evaluation questions** this chapter seeks to answer are:

- Was the use of tablet technology to deliver the trial appropriate?
 - How user friendly were the iPads for the children and educators?
 - Were the iPads appropriate as an educational tool?
- Was the design of the software appropriate? Is it fit for purpose?
 - Did the apps incorporate a level of functionality that was appropriate for their purpose?
 - How user friendly were the apps for preschool aged children?
 - How user friendly were the apps for educators?
- Does the ELLA trial design align with best practice principles for language learning and the use of digital technology in preschools?

The evidence supporting the evaluation of this element of the ELLA trial has been drawn from ESA documentation, the literature review, survey responses and site visit findings.

General findings on the design of the ELLA trial

- Evidence collected from the ELLA trial suggests that the trial does provide a model which can enable language exposure in preschool environments where the educator is not language proficient.
- Tablet technology appears to be an appropriate digital tool in the context of the ELLA trial, with both the children and educators finding the technology highly functional and easy to use.
- There were initially some concerns among parents and educators about the impact of children using iPads in preschool, particularly in relation to the risk of excessive use. However, it was generally found that when supported by basic use guidelines and supervision, the iPads and ELLA apps were an appropriate and effective play-based learning tool.
- The ELLA apps were found to be easy for both children and educators to navigate, with children often helping each other to explore the apps, supported with minimal educator guidance.
- Educators found the ELLA apps to be appropriately targeted to the preschool age group, incorporating a play-based design and themes relevant to the children’s interests and broader development level.
- Overall, the ELLA trial design is aligned to the majority of best practice elements in language learning through digital devices in preschools – however, there is scope to increase guidance to educators to further increase the utility of any such programme.

2.1 Tablet technology

There are two key aspects to the appropriateness of tablet technology within the ELLA trial: (1) the extent of their functionality (including user friendliness); and (2) their use as an educational tool, particularly for this age group of children.

2.1.1 Functionality of iPads

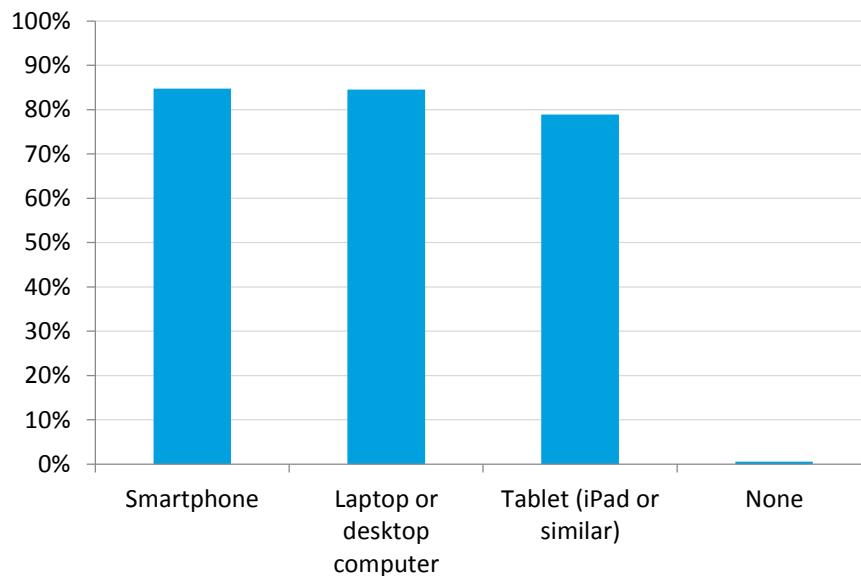
Prior to the introduction of the ELLA trial into the sites, there was already a moderately high level of comfort in the use of touchscreen devices at both the educator and child level. Supporting this, the Baseline Educator Survey found that 70% of educators were 'very comfortable' with using touchscreen devices, while 30% were 'somewhat comfortable'.

A minority of preschools mentioned in site visits that not all educators in the room were initially confident using iPads. In some cases these educators were less engaged in the trial as a result, but this was not seen as a significant issue as other educators could support the trial delivery. As a rule, the vast majority of educators (as evidenced in educator survey results) were either already familiar with iPads or were quickly able to familiarise themselves.

Regarding the use of the iPads and apps by children, the findings were even more positive than that of educators. It was found that children were typically easily able to use the iPads and apps, with many children already familiar with the functionality of the devices prior to the beginning of the trial.

The Baseline Educator Survey indicated that more than half the trial sites estimated that at least three-quarters of their participating children had access to a touchscreen device at home. Responses from parents and guardians themselves supported this, showing that the majority of respondents to the surveys used digital devices within the home (Chart 2.1 below). Additionally, most survey respondents (68%) stated that they use a tablet with their child at home frequently or most days. As the survey was undertaken online, it is possible that the response is biased towards more technology savvy users, however, all evaluation sources indicated a high and growing prevalence of technology within the home.

Chart 2.1: Prevalence of digital devices within the home of ELLA participants



Source: Combined and weighted results from August Parent/Guardian Survey (276 responses) and December Parent/Guardian Survey (241 responses)

Educators consistently indicated during interviews that almost all children were immediately able to use the iPad without any significant difficulty. While children who had not used tablets before sometimes required additional guidance in the early stages of the trial, it was stated that these children became proficient very quickly, reflecting that children found use of both the iPads and apps to be intuitive.

A number of educators also mentioned that they had initially been concerned that the iPads would be easily damaged through everyday use. However, the cases supplied with the iPads were found to be durable.

In recognition of the ease with which children were found to be able to use the iPads, there was a consensus across survey responses and site visits that iPads were a suitable tool for use by preschool aged children in the ELLA trial, noting that this also relied upon the suitability of the apps themselves.

2.1.2 iPads as an educational tool

A number of educators stated, in both survey responses and site visits, that they had initially been concerned about the appropriateness of iPads as an educational tool within the classroom. These concerns were primarily centred on:

- children using the iPads at the expense of other important learning activities, such as physical activities and playing outside; and
- children reducing their level of social interaction due to the individual nature of iPad use.

In most cases, however, these fears were allayed during the trial. Based on site visits, educators were generally found to be able to ensure that the amount of use was appropriately balanced with other activities. It was noted that the iPads were commonly used in a social manner, with children often seeking guidance from each other in pairs or small groups, encouraging social interaction and joint learning experiences. However, the social use was limited somewhat in those sites that encouraged

use of the apps with headphones. Overall, the ease with which children interacted with the iPads, and the swiftness with which learning outcomes could be observed, raised educator confidence in the use of digital technology in the classroom.

On conclusion of the trial, educators were asked during site visits to reflect on the value of digital technology and apps as a way of exposing children to other languages and cultures. The response to this question was positive; with almost all educators noting that the high quality of the ELLA apps had ensured the trial was effective in their site. It was stated that the apps kept the children continually engaged and the incorporation of digital technology into the classroom had not proved difficult, in fact resulting in some additional benefits as children and teachers began incorporating technology into other learning areas such as research or storytelling.

Despite the alleviation of concerns over iPad use, there was a widespread view among sites that additional guidance would have been beneficial regarding: how best to incorporate the iPad into the learning environment; and, what was considered appropriate screen time for preschool aged children. However, preschools typically emphasised that the apps and iPads were a supporting tool only, which could not replace educator engagement with children. Indeed, the apps were generally seen as complementing educator engagement. Isolated incidents of overuse of the iPads continued to highlight the need for constant supervision by educators.

Parent and guardian perceptions on the use of iPads are outlined in Box 2.

Box 2: Parent/guardian perceptions regarding iPads

Site visits and educator survey responses indicated that there was some level of concern about how parents and guardians would perceive the introduction of iPads into the preschool, particularly in sites which had not used such technology prior to the ELLA trial.

Specific concerns were that parents would think the educators were performing a less active role than would otherwise be the case as a consequence of the iPads being available, or that this would lead to an undesirable amount of screen time in general for their children, particularly given the widespread availability of digital devices at home. Most educators who voiced these concerns stated that after the trial had been implemented, it became easier to communicate the benefits of the trial to parents as they could see the high quality of the apps, and how much the children were engaged with them, first hand.

The August and December Parent/Guardian Surveys confirmed that the majority of respondents did not have significant concerns about the use of iPads as a learning tool for preschool children. At the conclusion of the trial, 76% of respondents to the parent and guardian survey stated they agreed that iPads were a good way for preschool children to learn, with reasons for this stated to include:

- Technology is the way of the future and developing digital literacy is important for all children.
 - It was also noted that the use of iPads in preschools helps to teach children the educational value of digital devices, rather than simply being a passive instrument to be watched.
- The functionality of iPads is engaging for children, encouraging play-based learning and self-discovery.
- If appropriately supported in the classroom, iPads can complement other ways of learning (such as educator led discussion, games or storybooks).
 - It was noted by a sizeable portion of parents and guardians that a balanced approach to iPad use is necessary, with monitoring to ensure no overuse or misuse.

Opposition to the concept of iPads being used in preschools was voiced by only a minority of parents and guardians (with 8% of survey respondents – averaged across the August and December Parent/Guardian Survey disagreeing that iPads were a good way for preschool children to learn). In these cases, the most

common reason for this objection was a view that children would have an opportunity to engage with technology in later years and that these formative years of childhood should be free from screen time and focused on developing skills through social, play-based activities. However, there was a relatively consistent message from parents and guardians, through the surveys, indicating that they felt the use of iPads in preschools, if carefully monitored, was a positive addition.

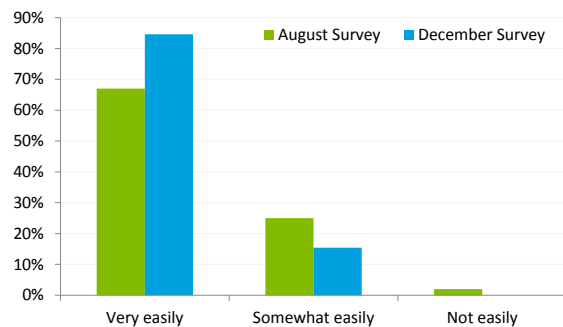
2.2 Software ('app') design

There are two key elements to the appropriateness of software design within the ELLA trial: (1) the ease with which *educators* can use and engage with the apps; and (2) the ease with which *children* can use and engage with the apps, particularly in a setting in which educators are not required to have an understanding of the languages being conveyed through the apps.

2.2.1 Educator navigation of the apps

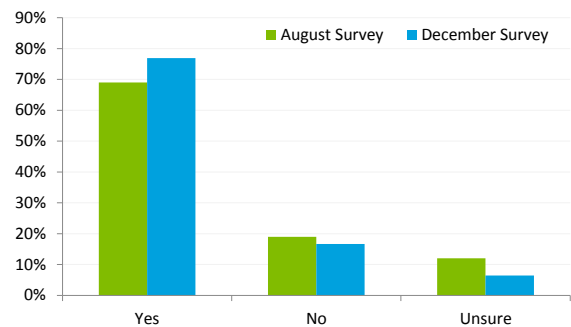
As a general rule, educators found the ELLA apps quite easy to use. As illustrated in the charts below, a clear majority of educators who responded to the surveys stated that they could navigate the ELLA apps easily, with this proportion increasing over the course of the year until 85% of educators could navigate the apps 'very easily' and there were no reported difficulties. As such, it is understood that the reason a number of educators stated that their ability to navigate apps had not improved since the trial began was due to an already proficient level of ability at the trial inception.

Chart 2.2: How easily can educators navigate the apps?



Source: Educator August Survey (105 responses) and December Survey (78 responses)

Chart 2.3: Has educator ability to navigate the apps improved since the trial began?



Source: Educator August Survey (105 responses) and December Survey (78 responses)

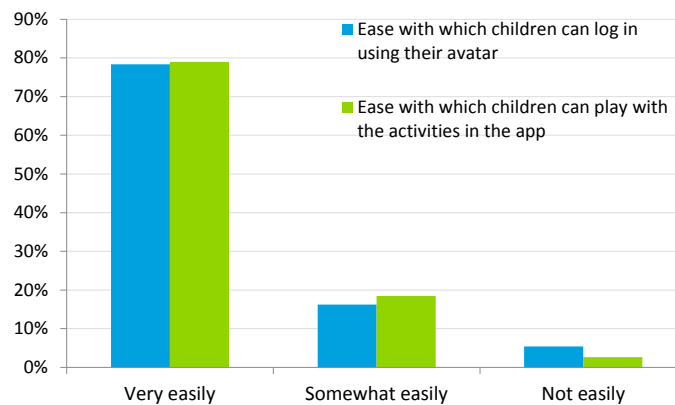
It was also noted by several educators that children would often learn the functions within each app more quickly than the educators. This often created an environment in which children demonstrated use of new elements they had discovered in the apps among educators and other children. This instilled confidence within the children and fostered collaborative learning.

Reflecting on this concept, one educator stated during site visits that *'Learning the language together is great for teacher/child relationships – it's wonderful for the children to see the adults learning and fosters true collaboration. It empowers the children. We both respect each other's knowledge.'*

2.2.2 Child navigation of the apps

Children used and engaged with the ELLA apps easily, with this finding supported through the site visits, surveys and usage data. Drawing on the Baseline Educator Survey, a clear majority of children were reported as successfully navigating the apps, even in the early stages of the trial (Chart 2.4).

Chart 2.4: How easily can children navigate the ELLA apps?



Source: Baseline Educator Survey (37 responses for avatar login, 38 responses for ease of play)

Site visits confirmed this message, with a consensus that children were usually able to select their own avatar, enter into the apps and navigate through various activities without any problems. It was noted that in the beginning of the trial, it took some time for all children to remember to switch avatars to their own each time they used the iPads. A minority of educators also stated that some children sporadically needed help to work through an activity, but that these problems were easily overcome. Educators found that children generally worked through any functionality issues by watching and helping each other, rather than seeking guidance from the educator. This meant the children often explored the apps together and used shared learning experiences to navigate their way through the apps.

The apps themselves were almost universally considered to be appropriately targeted to preschool children, and mostly easy for the children to navigate. Educators consulted during site visits generally reflected that the app design and content were of a high standard, with the apps often described as being ‘great’ or ‘fantastic’. It was also commented on during site visits that the apps seem to become progressively more engaging for children as the year progressed. A number of educators particularly noted that the play-based design of the apps was suitable for the age-group, encouraging social interaction and providing useful links to the Early Years Learning Framework (EYLF). In this vein, the content of the apps frequently aligned with the learning priorities of the respective site – reflecting that each site had applied to utilise that particular language – and therefore complemented the existing learning programme at each service.

A small number of educators stated during the site visits, predominantly in the early stages of the trial, that they felt children were clicking buttons and flicking through the different app components too quickly, ‘like a game’, rather than engaging with each of the activities in the manner intended. While it is acknowledged that the ELLA apps were designed to be play-based and promote immersive learning, these educators were concerned that children were not properly listening to the language, which in turn, limited the effectiveness of the apps as a learning tool. However, some educators also

stated that the tendency to ‘flick through’ the apps reduced both (1) when an educator sat with the child and asked them to explain the activities and what they were doing within each app; and (2) as time progressed and the children became more familiar with the workings of the apps and their favourite activities.

There was also a concern in a small number of sites that children were not being sufficiently prompted to speak the target language, and occasionally reverted to English while engaging with the app. It is noted, however, that responding to the apps in English does not necessarily mean that the child using the app does not understand the language prompts. As such, this concern suggests that increased guidance for educators on what to expect from children’s interactions with the apps, and the language learning process, may be required, as opposed to being a design issue with the ELLA apps.




2.3 Alignment of the trial to best practice




A literature review, included at Appendix B, identified a range of best practice principles in relation to: (1) the integration of digital technology in preschools; (2) optimal app design features for early learners and language education; and (3) teaching additional languages in preschools.

This section compares these best practice principles with the design features of the ELLA trial and provides commentary on the alignment between the two. Additionally, feedback from parents and guardians on the ELLA trial design is provided.

Findings for each area are outlined in Table 2.1, Table 2.2 and Table 2.3, and compared with the design of the ELLA trial.







Table 2.1: ELLA design relative to best practice principles in integrating digital technology in preschools

Best practice principles	ELLA trial	Alignment
Tablets should not replace good teaching	The ELLA trial was designed so educators did not have to be familiar with the target language. However, several educators have acknowledged the importance of educator involvement while children engage with the apps. As such, the alignment of the ELLA trial with this principle depends upon the extent to which supporting resources encourage and support educator engagement.	 <i>Partially aligned</i>
Provide a range of pedagogical support for teachers	ESA offered a range of materials to support educators’ use of the apps. While most educators found the support helpful, there were some educators who felt there could have been more support materials made available. The additional support material could have included tips for integration with the learning programme, research summaries and a list of resources to support child learning.	 <i>Partially aligned</i>
Provide technical support to schools	ESA was contracted to operate the ELLA Helpdesk as part of its contract management role, which was designed to support sites encountering technical difficulties. This was widely considered to offer timely and appropriate support.	 <i>Aligned</i>

Best practice principles	ELLA trial	Alignment
Tablets are most effective when used in a supportive school and home environment	While the preschools were supportive of the use of the apps, they were not made available for use at home. A number of parents stated that they feel the trial could be more effective if available for use outside the preschool setting.	 Not aligned
The ratio of tablets to students matters	ESA distributed approximately five iPads per group of 25 children. A ratio of one device for several children is generally considered to be optimal for preschool children, so this ratio is consistent with best practice.	 Aligned
The choice of app is important	ESA, in conjunction with the Department and Millipede, designed apps specific for their purpose, rather than relying on publicly available apps.	 Aligned

Source: Deloitte Access Economics literature review, ELLA trial app data, August educator survey, consultations

Table 2.2: ELLA design relative to best practice principles in app design for early learners

Best practise principles	ELLA trial	Alignment
Allow content creation	There are some activities within the ELLA trial which allow the children to create their own content (such as <i>Sandpit</i> or <i>Colour & Create</i>).	 Aligned
Mixed learning methods	The ELLA apps are consistent in providing children opportunities to learn through a variety of means. The apps allows children to learn via visual means (through the imagery on the screen), via aural means (by listening to the target language), and via oral means (by speaking into the microphone).	 Aligned
Personalised pathways	The ELLA trial offers four to six activities within each app. The variety of tasks offered to children across these activities allows them considerable scope to personalise their learning experience.	 Aligned
Engaging content	Given the frequency and length with which the apps have been in use, it appears the content is engaging for children. This is supported by positive reviews from educators and parents/guardians.	 Aligned
Appropriate hardware	Educators have commented the screen size is appropriate for children of this age and that iPads are intuitive and easy to use.	 Aligned
Encourage skills development	The apps offer children opportunities to develop a variety of foundation skills, such as colours, counting and greetings. They are encouraged to develop their skills by speaking the words when prompted by the apps.	 Aligned

Source: Deloitte Access Economics literature review, ELLA trial app data, August educator survey, consultations

Table 2.3: ELLA design relative to best practice principles for teaching additional languages in preschools

Best practice principles	ELLA trial	Alignment
Play based learning is important in early language learning	The ELLA apps allow for children to engage in play-based activities while being exposed to additional languages.	 <i>Aligned</i>
Repetition	Language learning through apps allows for more repetition than through learning from an educator, as the apps allow children to re-listen to the words and phrases as they choose.	 <i>Aligned</i>
Develop listening skills	Language is learnt best through oral and aural means, rather than through reading and writing, especially considering most preschool children are preliterate. Most language exposure through the ELLA trial is done orally and aurally, allowing children to develop their listening skills.	 <i>Aligned</i>
Use contextualised language	Contextualised learning plays a large role in the ELLA apps. The characters often use hands and facial expressions, in addition to the target language, to convey meaning.	 <i>Aligned</i>
Social and cultural context	The apps are designed to display the culture associated with each language.	 <i>Aligned</i>
Use of decontextualised language (language removed from context)	The app does not offer children the opportunity to use decontextualised language. Such learning (such as children developing stories or recalling past events in the target language) must be educator led, and personalised for each student. App-based learning cannot provide this opportunity for children. As such, this is dependent on the level of engagement of the educator and the resources provided to support decontextualised language use outside the apps.	 <i>Not aligned</i>
Language production	Several activities employ the use of a microphone, which rewards children for attempting to speak the target language. Such activities encourage language production, consistent with best practice.	 <i>Aligned</i>

Source: Deloitte Access Economics literature review, ELLA trial app data, August educator survey, consultations

In summary, across all three facets of best practice, the ELLA trial appears to have been designed and implemented largely in accordance with best practice principles.

- While there is scope to offer more guidance to educators, the introduction of iPads and apps largely appears to have been consistent with much of the evidence in the literature as to effective use of digital devices in preschools.
- Best practice in language learning is achieved in all but one facet (encouraging the use of decontextualised language), for which there is scope to achieve alignment if educators are sufficiently resourced to deliver supporting activities.
- The apps incorporate all the elements of app design identified in the literature which are consistent with best practice.

3 Trial implementation

This chapter provides an overview of the available evidence on the *effectiveness* of the ELLA trial's implementation.

The **key evaluation questions** this chapter seeks to answer are:

- Was the trial able to be implemented effectively?
 - What was the implementation process at the trial sites?
 - Were there any impediments to a smooth trial implementation process?
 - Was the level and nature of support provided to the trial sites sufficient to facilitate a smooth implementation process?
 - Was the initial availability of apps and subsequent app updates timely and accessible for the trial sites?
 - How could the trial implementation process be improved in the future?

The evidence supporting the evaluation of this element of the ELLA trial has been drawn from the survey responses, site visit findings and help-desk data.

General findings on the implementation of the ELLA trial

- Implementation was generally smooth despite the limited timeframes, although there were significant network issues at a few state and territory government operated centres which caused delays in trial implementation.
 - The underlying drivers of these delays, particularly navigation of government school firewalls, will require attention prior to any broader roll-out of the ELLA trial.
- While the majority of services, as evidenced by survey responses, experienced some form of implementation issue for which they required assistance to resolve (most commonly a technical issue), these issues were usually minor and able to be addressed within a relatively short timeframe.
- ESA introduced a range of support materials for the implementation of the ELLA trial. Educators felt the support mechanisms available to sites throughout the trial were accessible and useful. In particular, the introductory training workshop, website and communication with ESA were stated to be helpful tools.
- Educators found that while restrictions on iPad use by children and waiting lists were necessary at the beginning of the trial, as the year progressed and children learnt to self-moderate their use, rules surrounding iPad use became less rigid and the devices became a normal fixture in the room.
- There are several ways in which the ELLA trial implementation process could have been improved, including reducing the administration time for enrolling children and supporting educators in delivering the ELLA trial around non-participating children.

3.1 The implementation process

The objective of the ELLA trial is to expose children to a language other than English using a series of seven apps, delivered on digital learning devices. In introducing the trial, the Department supplied all 41 trial sites with their own set of iPads. Overall, 336 iPads were delivered to sites – 280 iPads for children, and 56 iPads for educators. The sites were selected by the Department following an application process in which sites nominated their preferred language and provided supporting rationale.

Prior to the commencement of the trial, one to two educators or directors from each site took part in an introductory training workshop. The main purpose of the workshop was to introduce each trial site to the ELLA programme, including familiarising educators with the trial objectives and providing an opportunity for educators to share ideas on how the trial could be introduced in each service. The workshop also detailed the technical information educators required in order to be able to download each app, create different groups, and how to set up a new user.

A suite of introductory materials were given to the trial sites at the workshop. These included:

- literature on the benefits of tablets and language learning in early childhood education;
- an ELLA 'how to' guide, with detailed instructions on how to set up and use the iPads, download the apps, create a new group, add a new user, and other general iPad maintenance issues;
- contact details for the ESA helpdesk, in case any technical issues were encountered;
- an outline of the activities in App 1;
- a pronunciation and translation guide for App 1; and
- a cultural guide for each language.

The workshop was followed by a visit to each site from an ESA liaison officer, whose role was to support the sites in implementing the trial and methods which had been discussed during the workshop. The ESA visits were made throughout the year, with not all visits occurring within what would have been considered the implementation period.

Before children could participate in the trial, a parent/guardian of each child was required to complete a consent form. Consent forms were distributed by each site to parents and guardians of eligible children.⁴ Forms were returned to the service and then sent to ESA so the child could be included as a trial participant.

Once ESA received and processed a child's consent form, the educator could set up their profile. To set up the profile each child selected an avatar, allowing them to easily log in as the correct user. At most sites, a child's avatar was a photo of themselves that had been uploaded to the app – parents and guardians were also asked to consent to a child's photo to act as the child's avatar. A minority of parents/guardians did not consent, so in these instances, children chose an image unique to them (such as a favourite toy), which would act as their avatar.⁵

⁴ Children eligible for the ELLA trial are those eligible to attend their first year of primary school in 2016.

⁵ In accordance with the research approval granted by the South Australian Government, photos of children were not permitted to be used for avatars in Government sites in South Australia.

The apps were released progressively throughout the year with supporting materials. The use of the apps within services was therefore dependent on sites being able to access wifi which allows them to download each new app as it is released. Once downloaded, wifi is not necessary to use the apps, although wifi is needed to collect the usage data.

3.2 Level of support received

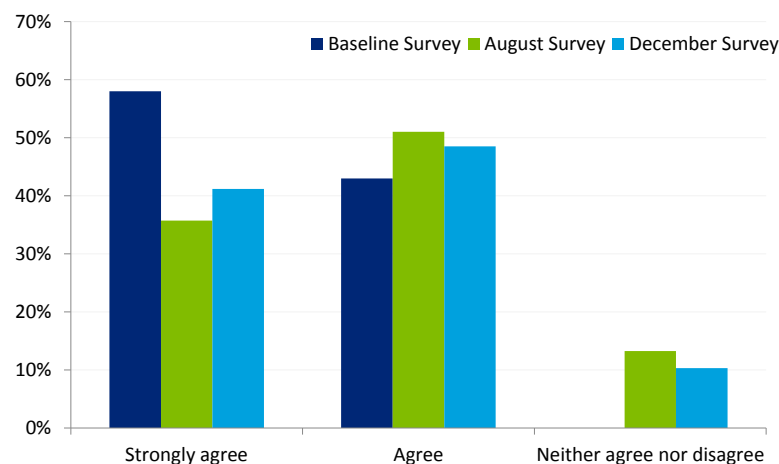
Given the uniqueness of the ELLA trial, it was anticipated there would be a number of issues in implementing the programme at the trial sites. ESA was contracted by the Department to support the sites through mechanisms including a help desk (details on help desk usage are provided in Box 3), an introductory training workshop, webinars, a website and a liaison officer.

3.2.1 Support during trial implementation

It was found that there was a very high level of understanding among educators about the forms of support available throughout the ELLA trial. In the Baseline and August educator surveys, 100% and 87% of educators respectively, either agreed or strongly agreed that their service understood the support available through the ELLA trial. This suggests that the means employed to educate the participants on how the trial would operate, including the initial workshop, liaison site visits and the provision of supporting resources⁶, were effective.

The higher proportion of educators who ‘strongly agreed’ with the proposition that they understood the support available in the Baseline Educator Survey is potentially influenced by the fact that this survey was only completed by one educator per service, which would most likely have been the ELLA lead within that service. The August and November educator surveys, in contrast, reached a wider breadth of educators and as such the average levels of understanding were lower. However, the overall level of understanding increased over the course of the year (Chart 3.1 below).

Chart 3.1: Educator agreement to the statement ‘Our service understands the support available through the ELLA trial’

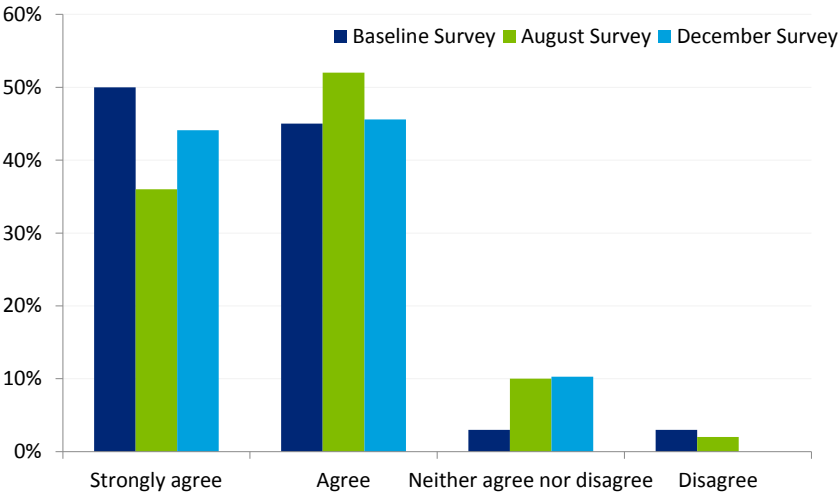


⁶ General programme support resources included the Programme Implementation Guide, the Parent information brochure and the Quick Start Guide. For each app an overview of the app, the song lyrics, the song soundtrack and artwork of each character was provided.

Source: Educator Surveys – Baseline (39 responses), August (98 responses), December (68 responses).

In regards to using the support mechanisms available, services overwhelmingly stated that help was available when required. This was reiterated throughout the site visits, in which educators often commented on the high level of support that had been available to help navigate any difficulties encountered.

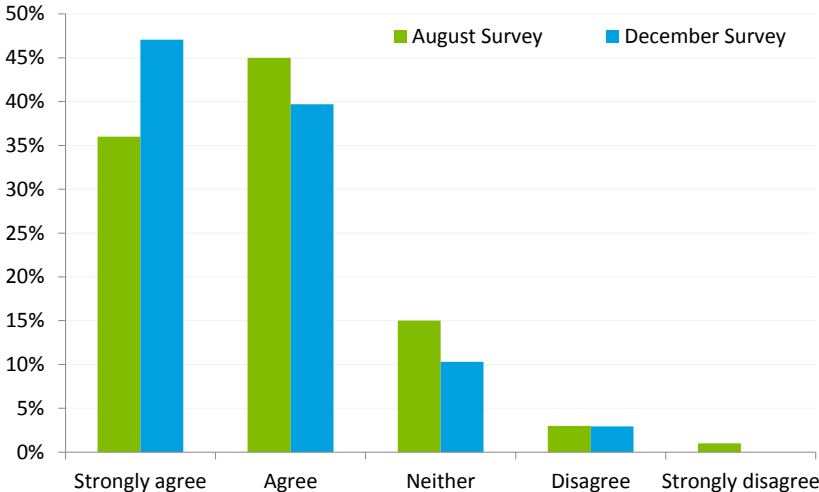
Chart 3.2: Educator agreement to the statement ‘Our service is able to obtain the support we need’



Source: Educator Surveys – Baseline (40 responses), August (98 responses), December (68 responses).

Following trial implementation, the positive commentary around the level of support provided to trial sites did not diminish. The vast majority of educators (81% in August and 87% in December) who responded to the educator surveys agreed or strongly agreed that they had received adequate ongoing information from ESA throughout the ELLA trial (Chart 3.3 below).

Chart 3.3: Extent to which educators agreed with the statement ‘I have received adequate ongoing information from ESA throughout the ELLA trial’



Source: Educator Surveys - August (98 responses) and December (68 responses)

However, 66% of educators who responded to the August Educator Survey stated that they would like to participate in further training about the apps, should it be made available. The desired forms of additional training, as stated by educators in free text responses, were centred on how to:

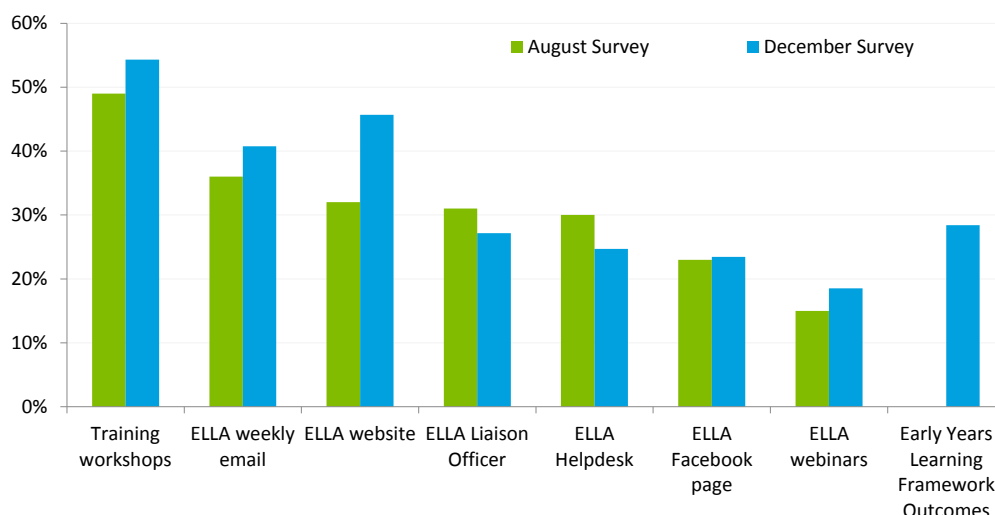
- Encourage all children who have parental/guardian consent to use the apps (86% of educators)
- Engage further with parents/guardians about the trial (76% of educators)
- Introduce other language-based learning activities, to support what children are learning about through the ELLA apps (74% of educators)
- Introduce other cultural-based learning activities, to support what children are learning about through the ELLA apps (73% of educators)
- Introduce other learning activities not related to learning or culture, to support what children are learning about through the ELLA apps (67% of educators)

3.2.2 Most helpful forms of support

The resources provided to sites over the course of the ELLA trial were generally considered appropriate. The majority of respondents to the educator surveys stated that they found the support materials ‘very helpful’ (53% in August and 68% in December), with the remainder typically finding the materials ‘somewhat helpful’. Approximately 16% of respondents in August, and 7% in December, found the materials ‘not very helpful’ or indicated that they had not used them.

Chart 3.4 displays the support mechanisms which were found to be the most useful for educators throughout the ELLA trial. Other useful means of support were mentioned as being the overview provided with each app and the reminders from ESA (phone calls/emails) at key stages throughout the trial.

Chart 3.4: Useful support tools (% of educators who nominated a mechanism as ‘useful’)



Source: Educator Surveys - August (98 responses) and December (81 responses). Note, the Early Years Learning Framework Outcomes were not included as an option in the August Survey.

Educators who attended the introductory training workshop⁸ felt this was an effective introduction to the trial, and contained important information on the objectives of the trial and how to introduce the apps within sites. It was noted in site visits that the trial was implemented more successfully when educators had a strong understanding of the intended benefits of the ELLA trial and the workshop helped to engage educators, generating enthusiasm and ideas.

Educators also reiterated through the August and December survey responses, and site visits that:

- sharing ideas between sites was highly useful, and it would have been beneficial if the Facebook page (or a similar mechanism) was used more actively and by a greater number of educators;
- it was useful having a point of contact (ESA) through which to seek help with initial implementation issues; and
- the ESA Helpdesk was highly responsive and helpful.

3.3 Implementation issues

While implementation was generally smooth, a few technical and administrative issues were encountered by services during the implementation of the ELLA trial. A discussion on the nature and prevalence of these issues, and how this impacted the timeliness of implementation, is provided below.

3.3.1 Technical issues

Feedback gathered from services during site visits suggested that the implementation of the ELLA trial into services had been relatively smooth. Despite this, approximately half of the services indicated in the Baseline Educator Survey that there had been technical difficulties encountered during the implementation of the ELLA trial. This figure was even higher in educator responses to the August and December surveys, at approximately 70% of services stating that they had experienced technical difficulties. The contrast between these conflicting forms of feedback (a smooth implementation process but a relatively high proportion of sites with some form of technical issue) suggests that while technical issues were prevalent across trial sites, they were typically minor, and managed in a manner which did not significantly impede implementation of the trial, leaving educators at most sites positive about the implementation experience. In a minor number of sites, however, there were significant technical difficulties early on which sometimes persisted and created major delays to these sites effectively implementing the ELLA trial (see below).

The technical difficulties encountered by services, as described in the August and December educator surveys, included:

- **Difficulties with the internet (33% of responses):** including trouble connecting at the start of the trial due to government protected internet connections (particularly in Western Australia, South Australia and the ACT), download limits, server problems and wifi issues. Generally these services reported that the internet issues were resolved at the beginning of the year, in some cases requiring additional investment. A minority of services (five) reported persistent connection issues due to wifi variability, resulting in apps being slow to download.

⁸ The introductory training workshop was followed by a second workshop later in the year, which was focused on ongoing programme delivery rather than programme implementation. Survey responses presented in Chart 3.4 refer to both training workshops collectively.

- **Difficulties with the iPads (30% of responses):** including iPads freezing, children accessing the password settings and locking the iPads, issues with the microphones and the iPads running out of battery quickly. Three services reported iPads which stopped functioning completely. There were also several reports of damage to the iPad, including screens cracking or the iPad being left in the rain.
- **Difficulties with the apps (18% of responses):** the most commonly reported issue with the apps was difficulty downloading new apps onto the iPads. A number of services reported that sometimes the apps would download onto only some of the iPads. Other reported issues included syncing and accessing the app data and ensuring the children's avatars were in the correct user group.

The implementation process was more difficult for government services in South Australia and Western Australia, which experienced problems with the firewalls. In these cases, the problem took many weeks to resolve and required a significant time investment from staff members. South Australian sites indicated that the final solution which enabled them to participate in the trial was only a temporary fix and a more permanent solution will need to be developed if the trial is to be rolled out more broadly.

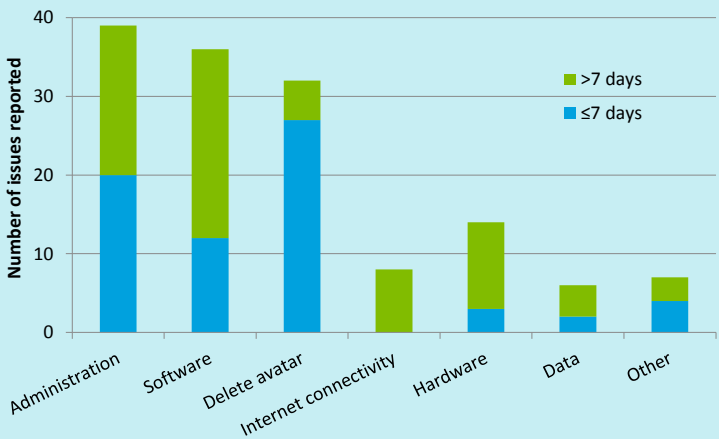
ESA Helpdesk Data, as provided in Box 3 on the following page, provides an overview of the type and number of implementation issues encountered by trial sites.

Box 3: Helpdesk data

The ESA helpdesk was set up to support educators encountering difficulties of a technical nature. Requests for support were logged by ESA, and classified by severity (either major or minor), and by problem type (administration, software, deleted avatar, internet, hardware, data and other).

Over the trial period, 142 requests for assistance were made to the ESA helpdesk, of which 44 were classified major and 98 minor. Unsurprisingly, the number of requests by most problem types decreased over time. (Only requests for avatar deletion increased towards the end of the year, as children left the service.). Administrative issues, software issues and data deletion were the main causes of a helpdesk call, making up a 75% of all issues reported between them (Chart 3.5).

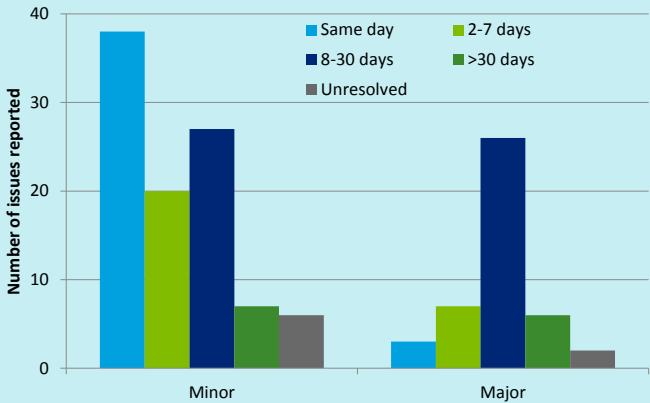
Chart 3.5: Issue type by resolution length



Source: ESA Helpdesk

The length of time between when an issue was created and when it was resolved varied significantly. Minor issues were predominately resolved on the same day, whilst major issues were typically resolved between eight and 30 days (Chart 3.6). 48% of all issues were resolved within seven days. 8 issues remained unresolved at the conclusion of the trial period.

Chart 3.6: Issue resolution times by priority



Source: ESA Helpdesk

3.3.2 Administrative issues

While technical issues were the most commonly reported problem faced by trial sites, it was also noted in consultations with trial sites that the process of ensuring consent forms were appropriately filled out, returning them to ESA and then the time lag before children were added to the system caused issues for some sites. Several sites stated that parents were displeased at the length of time it took to register the child after consent had been given, reflecting on the difficulties of explaining to children and parents that the child couldn't use the iPads until the process had been completed.

In this vein, a theme emerging from the site visits was the difficulties associated with providing the ELLA trial to participating children in a manner which did not exclude non-participating children. The current format of the ELLA trial requires that only children in the year before formal schooling, and with parental consent, could use the apps. Educators stated that non-participating children (such as three year olds who were too young for the trial or those who hadn't received parental consent) would express a desire to use the apps and would watch the children who were eligible to use them. Sites would have preferred to not exclude non-participating children from use.

3.3.3 The timeliness of implementation

The implementation issues explored above had an impact on the timeliness in which the ELLA trial was successfully integrated into each site. As such, one way to measure the magnitude of implementation issues across different service types is by observing the number of weeks it took each preschool to begin using the iPads.

Table 3.1 indicates the length (in weeks) for different types of preschools to commence using their iPads.⁹ Consistent with the findings discussed above, government services took, on average, significantly longer to commence using the iPads than independent services and LDC centres. Government services in South Australia, Western Australia and New South Wales all experienced delays in commencing the trial. This was driven primarily by the difficulties in accessing the ELLA apps through government protected internet connections.

⁹ For the purpose of this exercise, it was assumed the ELLA trial commenced at Week 10 of the school year, as this was two weeks after the initial educator workshop. This allows sufficient time for services to receive their iPads and other programme resources.

Table 3.1: Implementation length by provider characteristics (in weeks)

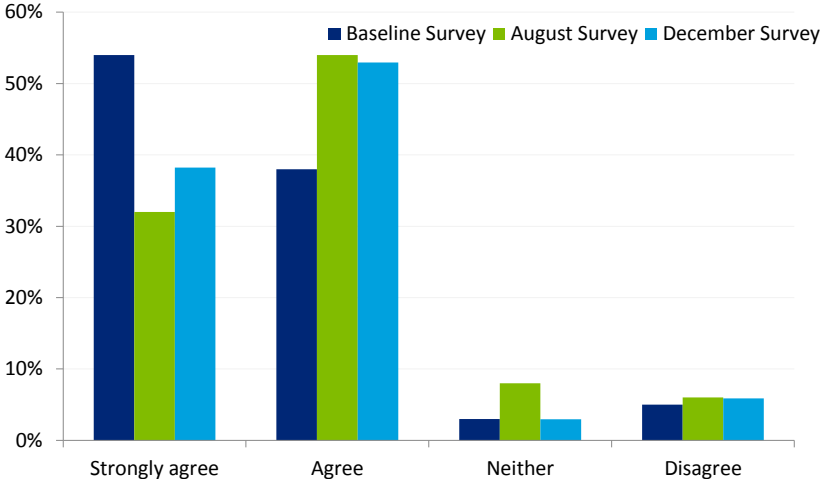
Provider type	
Attached-to-school (Government)	3.5
Attached-to-school (Independent)	1.0
Long day care	0.6
Stand-alone (Government)	3.8
Stand-alone (Independent)	0.1
Socioeconomic status of area in which service is located	
High	0.2
Medium	1.3
Low	1.8
Service location	
Metropolitan	1.7
Regional	1.2
Remote	0.5

Source: ELLA trial iPad data

Prior to the commencement of the ELLA trial, it was hypothesised that remote sites may experience greater wifi connectivity issues, and would have trouble implementing the trial. However, it appears remote sites had little trouble connecting to the internet and accessing the apps, with the average delay in commencing use only 0.5 weeks. This finding is supported by consultation with jurisdictional educational authorities, in which it was often stated that the infrastructure established to support distance education was generally of a high quality and would in most cases enable provision of the ELLA trial in remote areas. It should be acknowledged however, that there are only two remote sites in the sample.

Aside from implementation issues, feedback from the August and December educator surveys and consultations found that the timeliness of the app releases was generally considered to be appropriate, although some educators felt that App Four was released too quickly after App Three – there were only four weeks between the two apps. Chart 3.7 shows that at least 85% of respondents agreed or strongly agreed that app release was timely across the Baseline, August and December educator surveys. It is noted that there is a general shift from ‘strongly agree’ to ‘agree’ between the Baseline and later surveys, potentially indicating that while release of the first app was considered timely, this was less emphatically so the case for the remainder of the apps.

Chart 3.7: Level of educator agreement to statement ‘the release of new apps has been timely’



Source: Educator Surveys – Baseline (39 responses), August (98 responses) and December (68 responses).
Note: Responses to the August and December surveys were for the statement ‘release of new apps has been timely’ while responses to the Baseline Educator Survey were to the statement ‘release of the first app was timely’.

In summary, the evidence indicates that while there were several technical and administrative issues identified throughout the implementation process, the level of support underpinning the delivery of the ELLA trial in the trial sites mitigated the impact of these difficulties. However, the more significant issues, such as navigating protected internet connections within government school services and how the delivery of the ELLA trial effects non-participating children, will need to be considered in any future expansion of the trial.

4 Trial delivery

This chapter provides an overview of the available evidence on the *appropriateness* and *effectiveness* of the delivery of the ELLA trial across sites.

The **key evaluation questions** this chapter seeks to answer are:

- How do services deliver the trial?
 - How was the trial introduced in the participating sites?
 - What methods do educators use to engage children with the apps?
 - What complementary activities are delivered to support the ELLA trial within services?
- How are parents/guardians involved in the trial?
 - Was the involvement of parents/guardians throughout the trial appropriate?

The evidence supporting the evaluation of this element of the ELLA trial has been drawn from the survey responses, ELLA trial data and the site visit findings.

General findings on the delivery of the ELLA trial

- There was variation in how educators introduced the ELLA trial into their sites. This reflected the flexibility afforded to sites by the trial, which was intended to allow each service to find an approach which best suited their circumstances. However, some educators stated they would have appreciated more guidance as alluded to previously.
- Following this, there was also a high degree of variation in (1) the way the ELLA trial was delivered within sites; (2) the use of complementary activities to support the ELLA apps; and (3) the level of parent and guardian interaction. There were other less pronounced inconsistencies, such as the use of headphones in some sites.
- The ELLA app data has not been widely used by educators to inform trial delivery and as such, the format of the data provision to educators may need revisiting.
- While a range of complementary activities have been implemented across the trial sites, in general there was an inconsistent and ad hoc approach to supporting the ELLA apps through broader integration with the learning programme. However, this did improve as the trial went on.
- Specifically, the level and consistent use of complementary activities increased following the second workshop, where educators were given opportunity to share ideas and reiterate the importance of engaging children in language use outside the app. As such, additional resources for educators or further avenues to share ideas across sites may increase the number of activities undertaken.
- Parents and guardians have generally had relatively high levels of understanding and positive perceptions of the ELLA trial. Further, 99% of all parents/guardians whose children were invited to participate in the ELLA trial gave consent for their child to participate in the trial, indicating a strong willingness to allow their children to be involved.
- However, a number of parents/guardians expressed a desire for more information, including further resources to support their child’s learning at home, child level progress updates, and more frequent and detailed information updates about the ELLA trial.

4.1 Introducing the trial

There were several components to be considered in the introduction of the ELLA trial into the site, including: (1) introducing children to the trial; and (2) integrating iPads into the site.

4.1.1 Introducing children to the trial

Generally, educators stated that they held an initial group discussion with their class to introduce the ELLA trial. In this session they showed how the iPads and apps worked, explained about different languages and cultures and described how the children would be learning about a particular language and culture over the course of the year.

The demo function of the app was used to demonstrate in more detail how the apps could be explored by the children. Sites with interactive screens or projectors stated this was an advantage for using the ELLA apps in group settings. The introductory song was also used as a group activity to help familiarise the children with the ELLA trial.

This initial group session was also used to establish any ground rules about how the iPads and apps would be used within the site. This included explanations of any roster or waiting list instructions, how to find each child's individual avatar (and that this should be done each time the iPads were used), care of use guidelines and how the iPads would be set up.

While the 'group introductory session' approach was the most common, several sites stated they placed the iPads into the room without a formal introduction. This allowed children to 'find' the iPads, introducing the ELLA trial organically. Prior to the introduction of the iPads, a few services populated their play space with words and cultural symbols from the target language.

Several sites stated that they introduced the ELLA trial within a broader unit on cultural awareness, diversity and different 'ways of being'. Introducing the concept of different languages and cultures through examples of foreign language songs or videos was popular, as were examples of different languages from bilingual children or parents. A number of sites also stated that they used a globe or map to show the children the country or countries where their ELLA trial language was spoken and discussed how far this was from Australia.

4.1.2 Integrating the iPads in the site

The way in which services physically integrated the iPads into the site varied. Educators typically introduced the iPads in a manner which suited the circumstances of each service, often trying a variety of options until settling on an approach that suited best. The Baseline Educator Survey found that there were three predominant ways of positioning the iPads within the site:

- Creating an ELLA corner or space in which the iPads could be accessed at any time.
 - It was noted that such areas were designated with consideration to the noise the iPads could make and how this may impact the rest of the site.
 - Some services established 'cultural corners' which also included cultural play items (such as costumes, pictures, books or food).
- iPads were placed on tables for use at designated times.

Set up modifications over time

The educator surveys found that the majority of educators (approximately 60% of responses to both the August and December surveys) had changed the way that the iPads were set up in the site since the beginning of the trial. Reasoning for this change (noting different and sometimes opposite approaches were undertaken in each site) included:

- Offering children a variety of different ways and contexts through which to engage with the iPads – maximising opportunities to play in a less structured format and 'keep things fresh'.
 - Providing cushions, bean bags and mats to allow children to lie down while using the apps. This was also suggested to encourage use of iPads in small groups rather than individual use.
 - Broadening the area in which the iPads could be used to more evenly distribute noise, providing space for children to use the iPads on their own or in a quiet place.
 - Broadening the times in which children could use the iPads in efforts to either (1) increase use or (2) spread the use of the iPads more evenly over the course of the day.
- Placing additional restrictions on iPad use in order to increase supervision and limit disruption to the classroom.

- Restricting the area in which the iPads could be used to increase supervision, concentrate the noise and/or limit opportunity for inappropriate use or damage of the iPads.
- Restricting the number of iPads available at any one time to increase supervision capabilities and limit opportunities for too much 'chaos'.
- Modifying the set-up of the room to make it easy to separate the engagement of children eligible for the ELLA trial and those who are not.
- Addition/removal of timers, rosters or waiting lists to ensure equitable use.

The site visits conducted in the concluding weeks of the trial found that as the year progressed, many sites loosened their usage restrictions on the iPads. Educators stated that as the novelty associated with the iPads lessened, the digital tools became a normal fixture in the room. Educators were able to maintain adequate supervision of the apps through looser structures, resulting in less set 'iPad times', less formal monitoring of session times (i.e. with timers) and less set 'iPad spaces'. Children drifted to the iPads when they wanted to use them, and engaged in the iPads in whatever format they liked (sometimes solo, sometimes in groups, sometimes with headphones). One educator noted that this approach was more consistent with the EYLF and allowing children the freedom to follow their interests.

Controlling noise

A logistical issue that emerged when iPads were introduced to some preschool was noise. It was found that when in use, the iPads had the potential to create considerable noise and disrupt other activities, although the extent that this was a significant issue varied based on room layout. This problem was stated to be compounded by the fact that the iPad cases supplied made it difficult to adjust the volume of the iPads.

There were several methods employed by sites in order to minimise the impact of this issue, including:

- restricting the number of iPads in the room at any one time (i.e. a number of services allowed a maximum of two iPads to be in use);
- allowing iPads to be taken into different areas – which allowed children to find a quiet space (even outside) in which they could hear the iPad more clearly;
- creating a separate area for iPad use; and/or
- purchasing and encouraging the use of headphones.

Of the services which made the decision to use headphones with the apps, there were mixed reviews on this approach. A number of services stated that the use of headphones had influenced the ELLA trial positively, resulting in the children being able to achieve a higher level of engagement with the apps as they could hear more clearly while having minimal impact on social interactions. These sites stated that the children still worked interactively with the apps, pointing out areas of interest and helping each other. Conversely, a number of sites stated that they purchased headphones. Some sites continued to use the apps only with headphones, while others did not persist with headphone use. At least one site expressed a concern among educators that headphones reduced peer interaction and also reduced interaction with educators.

4.2 Methods of trial delivery

The methods of trial delivery employed across sites were also diverse. This section discusses the variety of ways in which educators engaged children with the ELLA apps.

4.2.1 Methods of engaging children

In order to allow educators flexibility in determination of the most appropriate way to implement the trial in their site, minimal prescriptive guidance was given as to how the ELLA trial should be delivered. As a result, educators engaged the children with the apps in a variety of ways. Aspects which varied across sites included:

- **Exposure to the iPads:** Some services made the iPads available only at prescribed time periods in the day (such as before lunch, or after rest time) for an hour or two at a time. Other services kept the iPads out at all times. Some services did not ever make the iPads available for general use but instead accommodated children's requests for use when asked. Similarly, some services made the iPads available each day, while others would only introduce the iPads once or twice a week.

As stated in Chapter 4.1, there was a general trend of increasing children's exposure to the iPads over time as the devices became a normal fixture of the room.

- **Time limits on app use:** While time limits were often used, there were varying approaches to this. In some sites, time limits appeared largely notional, while in others usage time was closely monitored and limits enforced. The time limits referred to were usually between 5-20 minutes per child per session. Educators reported that in most instances children were happy to share the iPad with another child when their time was up. In services where no time limit was imposed, educators reported encouraging other activities if they noticed a child had been using the iPad for an extended period of time.

Educators were generally of a consensus that in the absence of a time limit or supervision, there was a small sample of children that would continuously play with the iPad if allowed, reducing their exposure to the rest of the preschool programme.

Again, strict time limits and supervision appeared to lessen over the course of the year once the iPads became normalised in the preschool environment. Educators stated that over time children matured in their use of the iPads and required less formal use arrangements.

- **Nature of integration with learning programme:** A number of educators noted through consultation that the flexibility afforded to educators in the nature and extent of activities they were expected to deliver suited the preschool environment. In busy times, educators could limit the ELLA trial to children using the iPads, and when they found time to facilitate a supporting activity it was considered a bonus. However, this flexibility also resulted in a high level of variation across sites as to the extent of engagement with the ELLA apps.

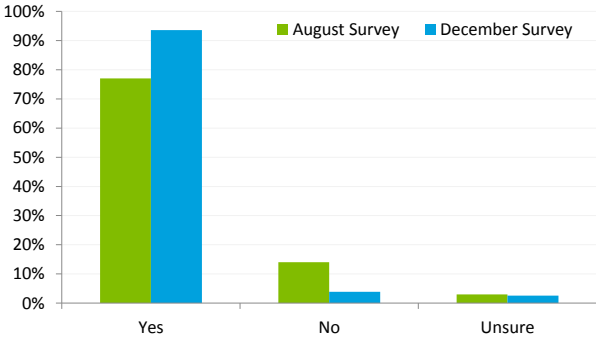
4.2.2 Educator guidance of app use

The majority of educators played an active role in supporting the trial's use. 77% of responses to the August Educator Survey stated that the educator interacted with the children while they were using the ELLA apps (Chart 4.1 below). This proportion increased to 94% by the time of the December Educator Survey, which may be attributed to the influence of messaging from the second educator workshop and liaison site visits that educator guidance was important for supporting trial outcomes. Consultation evidence supports this observation, with a number of educators stating during site visits

that they increased their level of interaction with children while they were using the apps following advice received during the second workshop or a liaison visit and found this had a positive influence on child engagement.

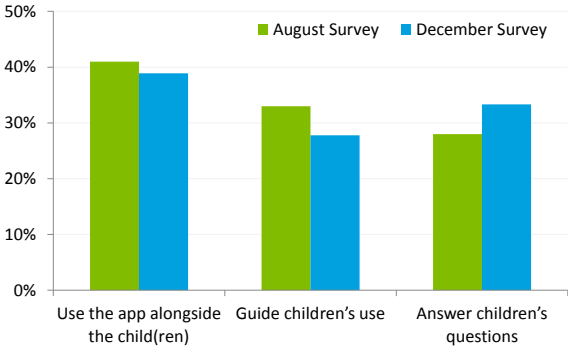
As shown in Chart 4.2, methods of interaction were typically stated to be (in order of popularity at the time of the August Educator Survey) (1) using the app alongside the child; (2) guiding children’s use and (3) answering the child’s questions – or a combination of these actions. Interestingly, in the December Educator Survey educators responded that answering questions was a more regular occurrence than guiding use. This suggests that the nature of interaction between educators and children matured over the course of the year from a more instructional model at the beginning of the trial, to responsive interactions in the later months. Additionally, a number of educators stated that they would ask the children to repeat things they’d heard or to explain what they are doing or what they understand, reinforcing the learning through questioning.

Chart 4.1: Do educators interact with the children when they are using the apps?



Source: Educator Surveys – August (105 responses) and December (78 responses)

Chart 4.2: How do educators interact with children when they are using the apps?

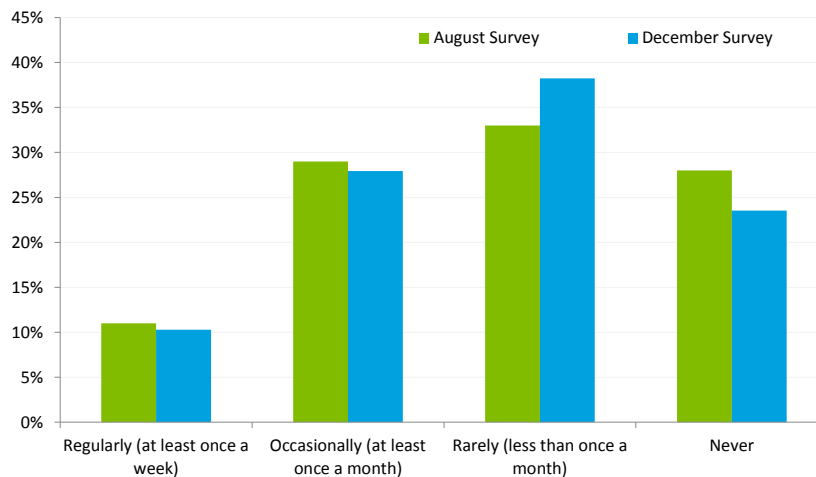


Source: Educator Surveys – August (105 responses) and December (78 responses)

Educator use of app data

While it was initially envisioned that the ELLA trial usage data may be drawn upon by educators to help inform their method of trial delivery, this was not found to be occurring on a widespread basis. In both the August and December Educator Surveys it was found that over 50% of educators used the ELLA trial data less than once a month, or not at all. Indeed, the usage of the data appeared to decrease slightly over the course of the year (Chart 4.3 below). These results were reinforced in site visits.

Chart 4.3: Educator use of ELLA trial usage data



Source: Educator Surveys – August (98 responses) and December (68 responses)

Of those educators that had accessed the app usage data, just over half of the respondents stated that they had found the data helpful – primarily using it to inform child reports for parents and to monitor usage. A number of educators stated that the data helped them to further understand learning patterns of certain children (i.e. noting if children like spending times on mazes) and allowing educators to adjust the learning programme to cater for this.

However, 47% of respondents stated that they had not found the data helpful. It was commonly noted that the time commitment required by other preschool activities made it difficult for the data to be accessed and analysed on a regular basis. It was suggested that as the data only showed use and not ‘how well’ the child was progressing with the apps, it was not overly useful.

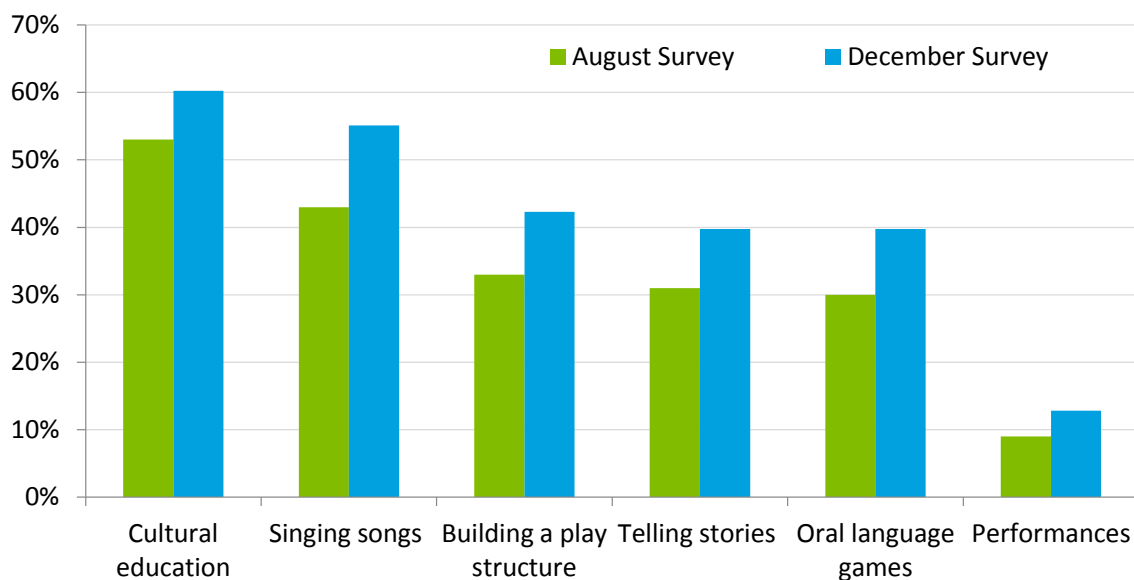
4.3 The use of complementary activities

There was a high degree of variability in the nature and extent of complementary activities delivered by educators to support the ELLA trial. At the most intensive end, one site developed a book detailing each child’s journey with the ELLA trial throughout the year, including photos of the child dressing in traditional attire, cooking traditional cuisine, playing with the apps and recording words that were learnt. This book was then distributed to parents so they could more fully understand how the ELLA trial was influencing their child’s learning. In contrast, a number of sites were found to not have facilitated any complementary activities over the year.

While site visits found that complementary activities were most often facilitated in an ad-hoc manner, and sometimes not at all, the majority of educators (79% of respondents to the August Educator Survey and 82% to the December) indicated that they had introduced at least one related activity to complement children’s experiences of the apps. It was found that in most sites the number of complementary activities fluctuated in accordance with other activities occurring in the site, as the activities were generally conceptualised as ‘extras’ rather than a regular component of the learning programme. For instance, in the final consultation with sites, many services noted that they had not engaged in complementary activities in the later stages of Term Four as they had been too busy.

As seen in Chart 4.4 below, the most popular complementary activities were centred on cultural education, followed by singing songs in the target language and building play structures which replicated activities in the ELLA apps. Site visits found that complementary activities which were natural extensions of the existing learning programme (such as counting first in English, then the target language, or repeating the colours in the target language during painting time) were more likely to be implemented, while activities which were new to the site (such as building a rocket ship, or cooking) were less frequently introduced.

Chart 4.4: Types of complementary activities which are being facilitated by educators



Source: Educator Surveys - August (98 responses) and December (71 responses) Other includes: Creation of games to reinforce language learning; Art projects which reinforce cultural and language learning; Decorating the room with language or cultural symbols; Cooking; Incorporating greetings (and less commonly other words) into everyday use; Using target language when teaching related activities (such as numbers and colours); Integrating app games into play time, i.e. making a real cake for an educator’s birthday or playing in the sandpit using the target language words; Creating simulated play spaces such as a Japanese shop or restaurant; Reading books in the target language or about the target culture; Exposing children to native speakers of the target language (parents/school language teachers/other educators); Building a cultural garden; Playing sports associated with the target language; Skyping children in a similar centre overseas; Watching videos in the target language or set in the relevant cultural setting.

It is also noted that a few of the trial sites complemented the ELLA trial with language instruction from a qualified language teacher. In these sites, the sessions delivered by the language teacher were typically distinct from the ELLA trial (i.e. did not incorporate use of the apps or the activities within the apps into the lesson) but did provide opportunity for increased language exposure in a different format.

Generally, it was found that the networking opportunities provided through the ELLA trial were helpful for the participating educators in terms of stimulating ideas for complementary activities. Some educators stated that they looked at the Facebook page for new ideas, though it was noted that a higher level of activity on the page would have been appreciated. It was also found during consultation that a number of sites had increased their undertaking of complementary activities following the second workshop, after feeling inspired by stories emerging from other trial sites. This is supported by the educator survey data, which shows an increase in the provision of complementary activities across all types of activities from August to December (Chart 4.4).

Educators who responded to the August and December educator surveys consistently stated that they predominately orchestrated complementary activities on an ad hoc basis, in response to children’s requests and interests or in response to a natural juncture into the existing learning programme, as opposed to imposing a fixed activity schedule. However, a number of services did state that they imposed a baseline target for a minimum amount of complementary activities – such as at least three activities a term, or once a week.

For educators who stated that they did not engage in complementary activities (less than 15% of responses), the cited reasons were:

- the opportunity hasn’t arisen naturally in the curriculum;
- there is not enough time for additional activities;
- the educators do not feel confident enough in the language to help the children, and have no access to native language speakers or ways in which to teach themselves; and
- the educator doesn’t have as much knowledge of the ELLA trial than other educator(s) in the service (i.e. those who attended the workshop) and as such doesn’t feel adequately qualified to deliver complementary activities.

During site visits, some services stated they did not want to place too much emphasis on one language or culture, as this could be insensitive, or not consistent with an ethos about appreciating all cultures.

It was also noted in site visits that if more support was provided, in the form of additional resources or more effective ways of communicating across sites to share ideas, educators would be more likely to engage in supporting activities. Some examples of additional resources that would be helpful were given as:

- an educator app, to teach educators the language while they familiarise themselves with the apps;
- transcripts for the educators, so they can translate and pronounce the words;
- learning materials (such as flash cards with the words on them);
- suggested resources and websites educators could use to improve the learning experience for children; and
- better infrastructure to improve networking with other preschools (educators noted the Facebook page existed, but commented it was not widely used).

4.4 Parent and guardian involvement

The nature of parent and guardian involvement with the ELLA trial varied across sites, but was generally found to be of a relatively low level – with minimal interaction other than providing consent for participation, varied levels of interest in the trial’s operation, requests for supporting activities to use at home, and isolated incidents of parents helping to deliver complementary activities.

4.4.1 Initial parent and guardian interactions with the ELLA trial

Parents and guardians were informed about the ELLA trial at the beginning of the year, and were required to provide written consent if their child was to participate. The vast majority of respondents to the August and December parent/guardian surveys reported that they were informed about the

ELLA trial through their preschool (90%), with the remainder stating they heard about the trial through media (5%) or through their child (2%).

Educators reported that they were generally able to convey the expected benefits of the ELLA trial to parents relatively easily. As noted above in Box 2, while a small portion of parents initially had concerns with the ELLA trial – in most cases these concerns were dispelled over time.

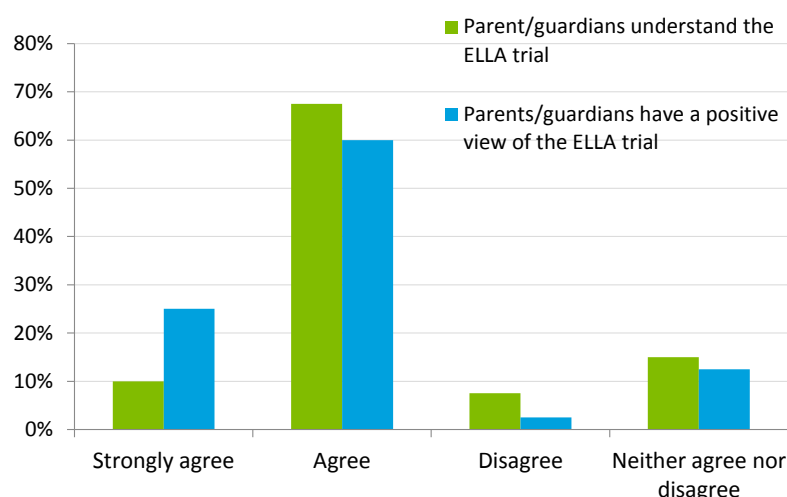
However, some educators did state they would have appreciated additional ELLA material to help them illustrate the benefits of digital technology and language learning in early childhood education. It was also mentioned in site visits that the initial phases of the ELLA trial were implemented quite quickly and the rushed nature of this made it difficult to engage with parents more meaningfully on participation, trial design or the choice of language at each site.

Several services noted that they felt parent/guardian engagement would be an important consideration for the future roll out of the ELLA programme – and could be supported with a higher level of resources than what was provided in this trial. These services noted that they felt parents were still not entirely clear on the primary objective of the trial and were confused about the distinction between language exposure and language learning, which caused difficulties for managing expectations.

4.4.2 Parent and guardian understanding and perceptions of the ELLA trial

There was a general consensus among ELLA trial sites that parents both understood and were broadly positive about the ELLA trial. In the Baseline Educator Survey, educators were asked about the initial understandings and perceptions of the ELLA trial with parents and guardians. As seen in Chart 4.5 below, the feedback was quite positive, with over three-quarters of educators stating that parents both understood and had positive views of the ELLA trial.

Chart 4.5: Educator perceptions parent/guardian understanding and view of the ELLA trial

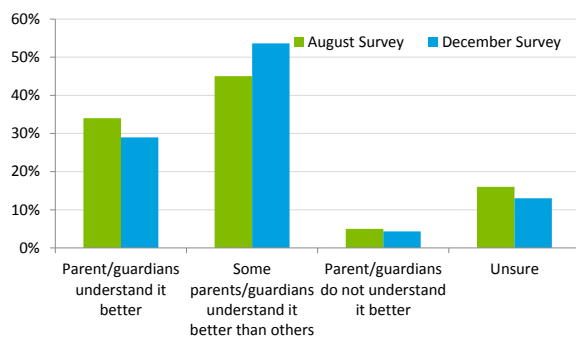


Source: Educator Baseline Survey, 40 responses

Following this, the August and December educator surveys asked educators to reflect on whether parent understanding or positive views of the ELLA trial had increased over time. Chart 4.6 and Chart 4.7 show that most educators felt at least some parents had increased their understanding of the

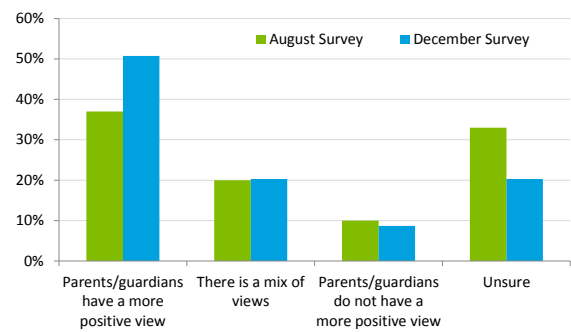
ELLA trial since the trial had begun, and that views of the trial had become increasingly positive over time.

Chart 4.6: Educator views on changes in parent understanding of ELLA over time



Source: Educator Surveys - August (98 responses) and December (69 responses)

Chart 4.7: Educator views on changes in parent attitude towards ELLA over time



Source: Educator Surveys - August (98 responses) and December (69 responses)

Parent/guardian understanding of the ELLA trial was also tested in the August and December parent/guardian surveys which asked respondents to nominate what they thought the ELLA trial involved (% respondents) and which were the most important aspects. The list below includes the proportion of respondents who ranked each item as important, and which elements of the ELLA trial were ranked as most important, according to parents.

3. Learning about another language (99% respondents) – *Most important*
4. Learning about another culture (95% respondents)
5. Using an iPad (84% respondents)
6. Using apps (80% respondents)
7. Playing games (80% respondents) – *Least important.*

It is noted that the responses to these questions were almost identical between the August and December parent/guardian surveys, indicating that understandings of the nature of ELLA trial did not change over the course of the year.

Service engagement with parents and guardians

Reflecting the diversity in approaches to the ELLA trial across services, survey responses and site visits indicated that there was also a high level of variation in the approach to parent/guardian interaction adopted across the trial sites. Some services held information nights and encouraged parents to sit with their children and use the apps. Other services used the ELLA trial as a mechanism through which to increase engagement with multiculturalism within their area and invited bilingual parents to share their skills or held cultural days. Conversely, some services did not report any engagement with parents/guardians.

Two services consulted with during site visits reported that parents and guardians who spoke the language being trialled were interested in being involved in the learning process. They occasionally came into class and helped the children with their pronunciation, and attempted to teach them some

new words. The educators at these services felt this support was unquestionably beneficial for the children and their language outcomes. It was noted by a number of services during the final round of consultation that parent interest in the ELLA trial grew over the course of the year as they began to observe their children using words from the target language at home.

Educators also commonly reported that a number of parents requested extra material to help the child continue their language learning in the home. In response to this, a number of educators developed word lists or flash cards that parents could use at home. Some parents even reported finding language classes for their child so they could continue their learning following the completion of the ELLA trial, demonstrating that the ELLA trial has the potential to raise community engagement in language learning.

Approximately three-quarters of educator respondents to the August Educator Survey stated that they were anticipating further engagement with parents/guardians about the ELLA trial over the remainder of the year. However, less than 50% of respondents to the December Educator Survey stated that they had indeed engaged further with parents/guardians. This was supported by consultation findings, which found limited engagement with parents/guardians across most sites.

General comments from educators who responded to the educator surveys relating to parent/guardian engagement included:

- It was often noted that allowing the parents to trial the app in demo mode or sit down with their child and watch them using the app was an effective means of engaging parents/guardians and increasing their understanding as to what the ELLA trial involved.
- A number of centres reported a lack of interest from parents and guardians about the ELLA trial, stating that they offered interaction opportunities but these were not taken up.
 - Preschool programs operating within a LDC service noted particular difficulty with engaging parents/guardians as their contact with parents was often limited due to early drop off and later pick up times.
 - It was noted that parent interest in the ELLA trial generally correlated with parent interest in their child's preschool experience overall – with engaged parents asking more questions about the ELLA trial.
- Some parents expressed high expectations regarding the ELLA trial and actively sought opportunities through which they could support their child's language development. There was some reporting of confusion regarding the nature of the ELLA trial – with these parents expecting the language learning to be a more structured learning programme.
 - Many parents/guardians asked to access the app at home.
- It was noted by several services that parent/guardian engagement and interest with the ELLA trial heightened as the children started to speak the app language at home. As the language skills increased and the potential benefits of the trial become clearer, parents become increasingly interested in the trial.
- Several services also stated that parent management committees were interested in the trial, and the implications of delivering the ELLA trial in the service.
- Two educators responding to the December Educator Survey stated that their service was culturally diverse and they were wary of appearing they were promoting one culture over another, so did not actively strive to engage parents in the ELLA trial – focussing instead on engaging parents/guardians in other areas, such as literacy and numeracy.

It was also noted in consultations that the discussions on multiculturalism and inclusion stimulated by the ELLA trial helped to promote a more welcoming environment for multicultural families attending the service.

4.4.3 Ongoing parent and guardian involvement with the trial

Approximately half the services consulted with during the site visits stated that they kept their parents/guardians regularly updated with the trial, either through newsletters or various forms of digital media, such as Kinderloo. The other half of services did not attempt to keep families informed (often stating this was because families did not demonstrate a high level of interest when the trial was introduced).

Parents and guardians were also kept informed about the ELLA trial through their children, with 74% of respondents to the August and December parent/guardian surveys stating that their children had spoken about the ELLA apps at home. It was reported that children talked about the games they were playing, the words they were using and expressing interest in other languages, cultures and visiting other places. It was also reported that children informed their parents when new apps were available and expressed wishes to download the apps on home devices. Only several parents commented on the level of discussion of the apps over time and these noted that their child had mentioned the ELLA apps more frequently in the latter half of the year.

Additionally, 79% of respondents to the August and December parent/guardian surveys stated that their children had spoken to them about using iPads at their preschool. These discussions were usually based on the excitement and enjoyment associated with being able to use the iPads, limits on iPad use, the content of new apps and learning with others. In the December Parent/Guardian Survey, a number of parents noted that their children's confidence using iPads, and willingness to talk about the iPad use, increased over the course of the year.

Reflecting on a combination of both these factors, 68% of respondents to the August Parent/Guardian Survey, and 79% to the December Parent/Guardian Survey, stated that they had received enough information about the ELLA trial to date. 19% in the August Parent/Guardian Survey, and 13% in the December Parent/Guardian Survey, stated that they had not received sufficient information. Those who would like further information expressed a desire for:

- Notifications when new apps are released and what theme they are based on.
- Further resources (or access to the apps if possible) so they could support the learning at home;
 - Requests included further information on the content of the apps and what the children are learning, such as word lists and cultural topics covered.
 - Methods and strategies for the optimal parent involvement at home to support language learning.
- More progress updates on their child's learning, including outcome targets and milestones.
- More about the ELLA trial generally, including:
 - More information on the aims, structure and evaluation methods underpinning the trial;
 - How much time children are spending on the ELLA trial each day; and
 - What the ELLA trial will mean for their child's language learning after the preschool year is complete, including whether the trial will be available in later years.
- An ability to try the apps before the child.

4.4.4 Development of an app for families

One of the most commonly reported requests from parents, as evidenced by consultations with educators and responses from the parent/guardian surveys, was an ability to use the apps at home. There were various contended benefits associated with this, including:

- An ability for parents to increase their understanding of the ELLA trial and the quality of the apps, reducing the likelihood for any parent opposition to the trial stemming from misunderstanding;
- An ability for parents to engage with their children's language learning journey;
 - It is noted that while preschool educators will only be engaged with an individual child over a one year period, cultivating parent engagement with their child's language learning will have more significant impacts over time. As such, greater parent involvement with the ELLA trial may further enhance the benefits of the trial through encouraging continued parent appreciation of, and investment in, language learning.
 - Additionally, several services noted that the ability for children to use the ELLA trial with their parents in the home may be an effective way of promoting parent interest in their children's learning more generally. It was noted that the play-based nature of the apps may be in some cases more accessible for families than traditional learning modes, such as reading story books, and provide an avenue for shared learning experiences that may not otherwise take place.
- Increased exposure to the ELLA trial for children, particularly children who attend the service less frequently than other children. It would also allow the apps to be used after the completion of preschool, to some extent lessening the issues with continuity of language exposure inherent in the current ELLA trial format.

However, despite these noted benefits, there was still a level of reservation in a number of educators (approximately one quarter of sites consulted with) about allowing the ELLA apps to be downloaded at home. These services noted that educators are skilled in encouraging children to engage with the apps in a manner which supports positive learning, and that misuse or overuse of the apps in the home may reduce the educational value of the apps.

5 Trial engagement

This chapter provides an overview of the available evidence on the *appropriateness* and *effectiveness* of children's engagement with the ELLA trial.

The **key evaluation questions** this chapter seeks to answer are:

- Do children use the programme?
 - To what extent are children engaged with the apps?
 - What are the patterns of usage?
 - What factors contribute to children using the apps more or less frequently?

The evidence supporting the evaluation of this element of the ELLA trial has been drawn from the ELLA trial data, the survey responses and site visit findings.

Although children have not been directly consulted during the evaluation, the detailed app data reveals significant evidence on children's usage of the apps. Information from surveys and site visits also provides qualitative evidence from educators, directors and parents/guardians on the level of child engagement with the trial.

General findings on ELLA trial engagement

- 72% of children use the apps at least once a week. Nearly all children spend between five and ten minutes with the apps in once session.
- App usage (as measured by minutes per session) remained consistent throughout the trial.
- The number of sessions per child *declined* in the final term of the year. However, this is most likely due to children having less access to iPads (as term four is typically busy with other activities), rather than a drop-off in interest.
- Not all children engaged equally with the apps. There are some children that spent a relatively short period of time with the apps, while others use it more regularly, and for longer periods. 10% of users account for 33% of total app use.
- 75% educators report children use the iPads in groups of two or more.
- Each app was most popular when it was first released. Usage would increase sharply after app release, before plateauing gradually over time.
- While all apps received significant attention when they were first released, App 3 appears to have been the most popular among the children throughout the trial.
- *Cake* (from App 3) and *Lift operator* and *Pizza café* (from app 7) appear to have been the most popular activities.
- App 2 and App 7 were the most successful at exposing children to the target language, with over 30% of time spent with these apps spent listening to the target language.
- The main factor driving differences in use among children was service type – generally, children attending long day care centres used the apps more regularly. This was to be expected, as children attending long day care centres are typically there for more days a week than children attending other types of preschool services.

5.1 Children’s overall usage and participation

The extent to which children use the ELLA apps and participate in the trial more broadly are key indicators of their engagement with the trial.

5.1.1 Children’s usage of the ELLA apps

Information on children’s use of the ELLA apps was primarily sourced from the app data. The analysis presented in this report relates to all seven apps, with data included up to the week starting 28 December 2015. The release schedule for these apps is included in Table 5.1. In total, 41 weeks of app data has been analysed.

For the purpose of the evaluation, the trial was assumed to commence on 8 March 2015. While usage actually commenced two weeks earlier, very few children had begun using the apps at that time. As almost 50% of children were active by 8 March 2015, this was used as the starting point for analysis and is referred to as week 1 throughout the report.

Table 5.1: Release cycle for ELLA apps

App	Release cycle
App 1 – Polyglots in the Playroom	Released 22 February 2015
App 2 – Polyglots at the Beach	Released 13 April 2015 - week 6 for purpose of the evaluation (week 15 of the calendar year)
App 3 – Polyglots at the Birthday Party	Released 9 June 2015 - week 14 for purpose of the evaluation (week 23 of the calendar year)
App 4 – Polyglots at the Zoo	Released 6 July - week 18 for purpose of the evaluation (week 27 of the calendar year)
App 5 – Polyglots at the Circus	Released 10 August – week 23 for the purpose of the evaluation (week 32 of the calendar year)
App 6 – Polyglots in the Park	Released 28 September – week 30 for the purpose of the evaluation (week 39 of the calendar year)
App 7 – Polyglots in the Town	Released 2 November – week 35 for the purpose of the evaluation (week 44 of the calendar year)

There were 1,771 children that completed the ELLA trial – that is, of the 1,868 children involved in the trial, 1,771 children were still eligible to use the apps as at week 41. Only these children that completed the trial have been included in the ELLA app data analysis presented throughout this chapter.

Over the trial, there have been around 235,000 sessions, an average of five sessions per child per week (after controlling for school holidays) – see Table 5.2 below. A session is defined as commencing when a user (child) logs into an app, and continues until another user logs in, or the iPad is idle for at least one minute.¹⁰ It is important to note that each time a user switches between apps, this was recorded in the app data as separate sessions. This means a child may have used the iPad for a longer amount of time than indicated by the session time (i.e. they may have used several apps consecutively in the one ‘iPad session’).

During these sessions, there was an accumulated 27,661 hours of app usage, which equates to an average of nearly 28.5 minutes per child every week. On average, each child spent 7.1 minutes using an app every time they logged on.

¹⁰ Sessions lasting less than 30 seconds were excluded from reporting, as it was assumed these short sessions were occurring only when a child selected the wrong user.

Table 5.2: Overall usage statistics, by child

	As at week 41
Total users	1,771
Number of sessions	234,956
Sessions per child per week	4.0
Total hours	27,661
Average minutes per child per week	28.5
Minutes per session (average session length)	7.1
Number of users above average minutes	418 (24%)
Sessions lasting at least 5 minutes	116,491 (50%)
Sessions lasting at least 10 minutes	55,945 (24%)

Source: Deloitte Access Economics analysis of ELLA app data

Note: Total users was not used as the denominator in the per child analysis. A weighted average of eligible users per week was used, as this better captured when children were late in joining the trial, or if a service had no usage due to school holidays. This is explained further in Box 4.

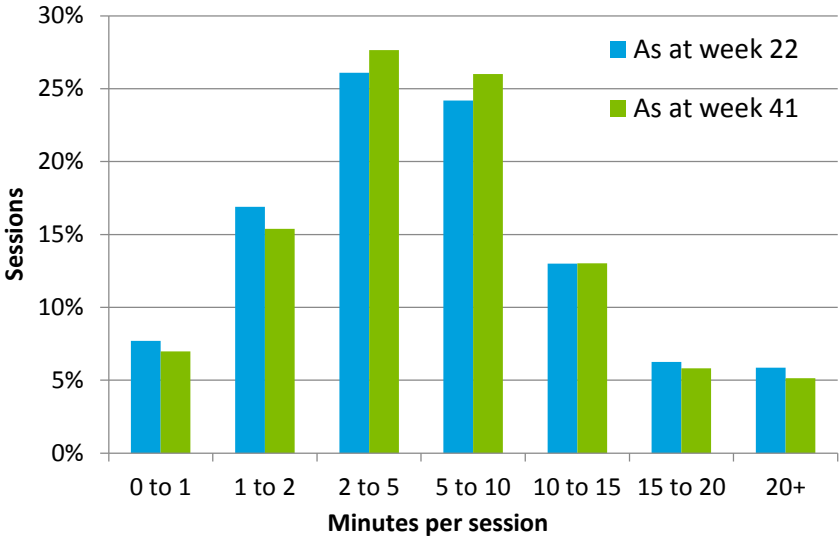
Several other assumptions underlie this data analysis, as outlined in Box 4.

Box 4: Major assumptions underpinning the app data analysis

- **Active user** – An active user was defined as a user who had completed their consent form (and was therefore eligible to participate in the trial), and their service was not on school holidays or encountering technical difficulties preventing use of the iPad.
- **Sessions or minutes per user** – where practical, this analysis presents figures on a per active user (or child) basis. This per active user measurement controls for preschools that may have experienced delays in implementing the trial, and controls for school holidays. For example, total usage appears to decrease by almost 40% between weeks 16 and 17 of the trial. However, this can be explained by nearly half the children involved in the trial going on school holidays. If only the children who attended preschool in week 17 are considered to be active users in this week, the total minutes **per user** were unchanged, and is more reflective of child use of the apps in that week.
- **Children not selecting their avatar** – while educators encouraged children to log in and out using their own avatar, it was reported that children did not always remember to do so. If children use the iPad without logging the previous user out, this will overstate the length of each session, but understate the number of sessions. This issue cannot be controlled for in the analysis.
- **Children joining the preschool midtrial** – it is assumed that a child only became eligible to join the trial the week they first used the iPad. For example, if a child first used the apps in week 10, it was assumed they only gained permission to participate in the trial in week 10, and they were assumed to be ‘inactive’ in weeks one to nine. There is a risk this will understate the number of children eligible to use the iPad, as a child may have been eligible but never logged in; however, reports from consultations suggest educators encouraged all eligible children to use the iPads at least once.
- **Children leaving the preschool midtrial** – throughout the trial, 97 children were removed from the trial, and these children’s usage statistics have been removed from the sample. The analysis therefore only pertains to children who completed the trial.

Most sessions (54%) were between two and ten minutes long, as shown in Chart 5.1.¹¹ There were a relatively small proportion of sessions lasting over 15 minutes (11%). During the second round of consultations, educators often suggested they had relaxed enforcement of ‘time limits’ yet the app data revealed slightly *fewer* sessions that last longer than 15 minutes, compared to the mid-way point of the trial.¹² Therefore, educator observations that children’s ability to self-regulate their use of the iPads increased over the course of the year is supported by trial data.

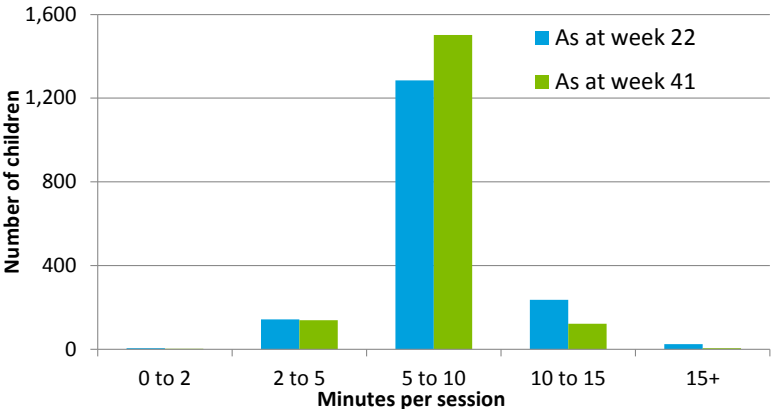
Chart 5.1: App usage – average minutes per session, proportion of total sessions



Source: Deloitte Access Economics analysis of ELLA app data

Analysis of session length conducted on a per child basis shows that the majority of children (1,502, or 85%) spent, on average, between five and ten minutes per session with an app (Chart 5.2).

Chart 5.2: App usage – average minutes per session, by child



Source: Deloitte Access Economics analysis of ELLA app data

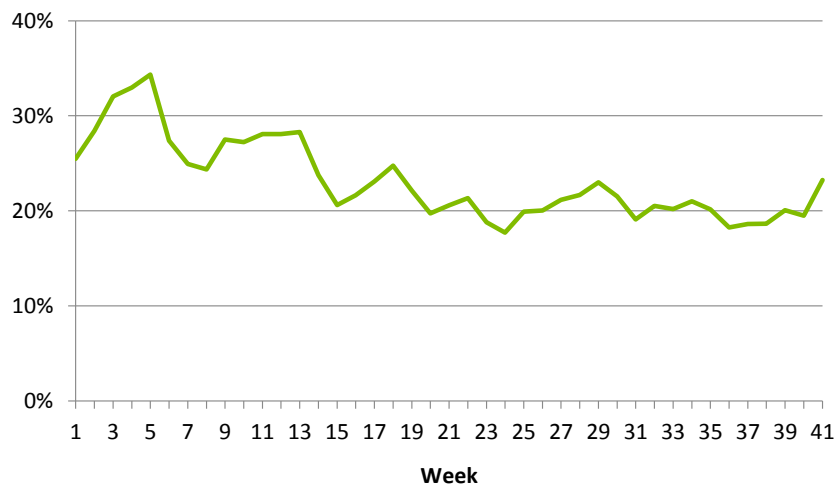
¹¹ The national physical activity guidelines for screen time suggest children under the age of five should spend no more than one hour per day with electronic media. For a link to the guidelines, see [here](#).

¹² It should also be noted that the time limit imposed by educators may affect the interpretation of app data results, in terms of usage providing an accurate reflection of the extent to which children want to use the apps and therefore their level of engagement.

5.1.2 Child engagement over time

Educators noted that engagement had generally been consistent over the duration of the trial, with interest levels peaking with the release of each new app. Educators also commented that children’s use of the iPads became calmer as the trial progressed. They reported that the novelty factor associated with iPad use had lessened, so most children were no longer rushing to play with the iPads each morning. Educators felt this was overall a positive for the children, as interest levels were still high and users were able to calmly interact with the apps without pressure from other children. The ELLA app data supports this viewpoint, as the proportion of ‘short’ sessions (sessions lasting less than two minutes), have declined as the trial has progressed (Chart 5.3). This suggests children are less likely to rush through the activities, and more likely to spend time with the apps, potentially increasing their exposure to the target language.

Chart 5.3: App usage – proportion of sessions lasting less than two minutes

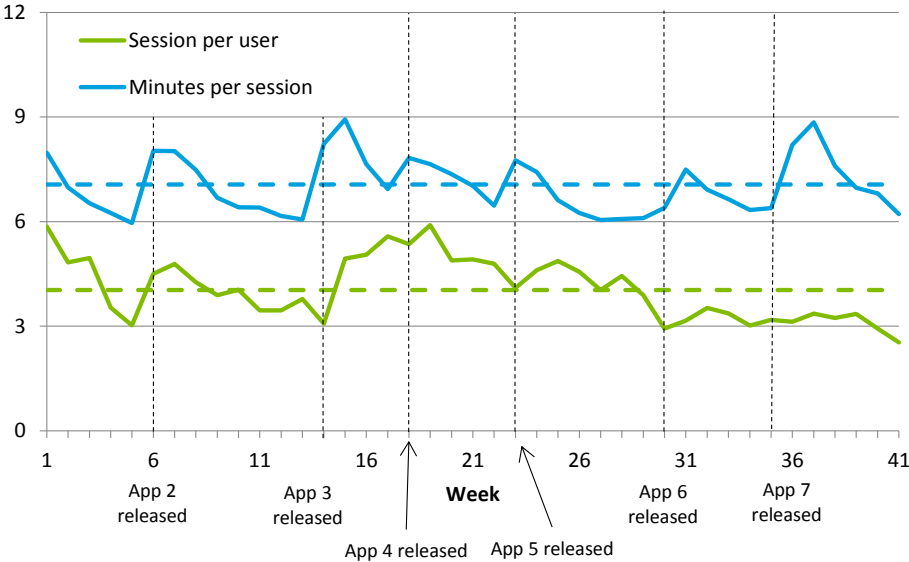


Source: Deloitte Access Economics analysis of ELLA app data

Educator views on child engagement are largely supported though the app data, which reveals child usage patterns were largely consistent throughout the trial – usage would increase with the release of a new app, and then slowly decline. Chart 5.4 demonstrates that session length increased with the release of a new app, and slowly diminished over time. While this pattern is also true of the number of sessions, there was a decline in the number of sessions per user towards the end of the trial.

The reduced number of sessions towards the end of the trial may be due to Term Four being particularly busy with other activities (as reported during the second consultation), rather than an indication of reduced interest.

Chart 5.4: App usage over time

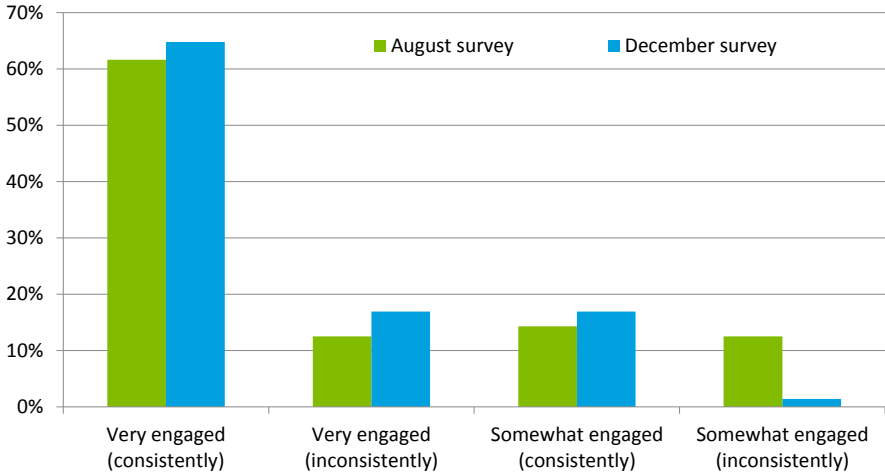


Source: Deloitte Access Economics analysis of ELLA app data
 The dotted lines represent averages across the trial.

The patterns of usage following release suggest that interest in the apps was maintained quite consistently throughout the year, and the process of incremental release contributed to this.

Further evidence of the continued high levels of child engagement can be elicited from the educator survey responses, with 82% of educators reported children were ‘very engaged’ with the apps by the conclusion of the trial, a marginal increase from the previous survey (Chart 5.5). 86% of educators reported that child engagement had either increased or remained unchanged.

Chart 5.5: Educator perspectives on child engagement with the ELLA apps



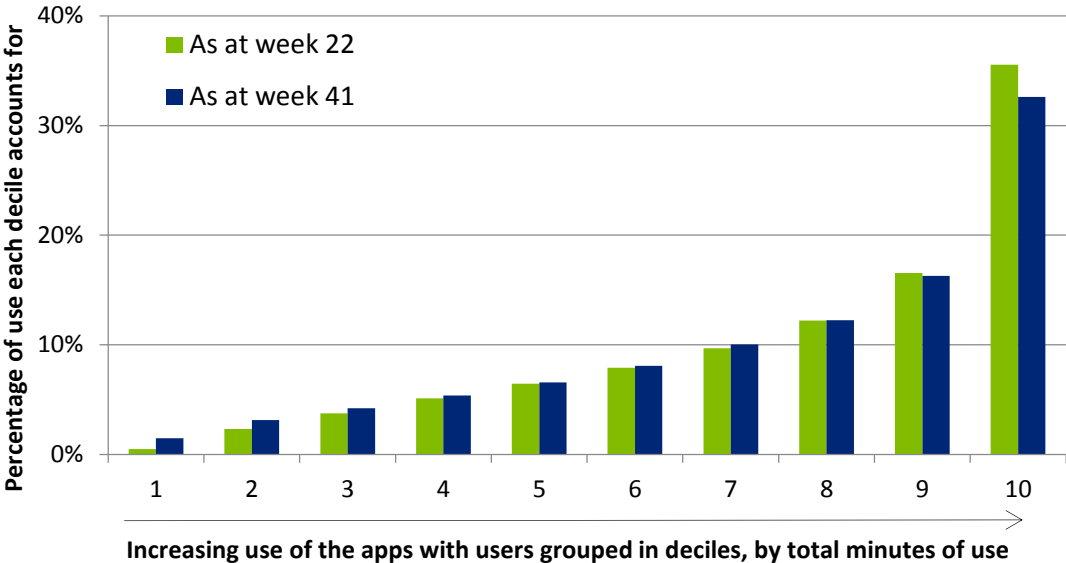
Source: Educator Surveys – August (101 responses) and December (81 responses)

5.1.3 Variation in usage between children

During site visits, it was commonly stated that the children enjoyed using the ELLA apps. There was however, a range of usage among children. Most children were reported to have used the iPads regularly throughout the trial, although a minority were reported to rarely use the iPads. Additionally, educators noted a spectrum of interest among those who used the apps regularly, with some children preferring to play one game before moving on and others who prefer to use the iPad for extended periods of time.

This usage distribution is captured through the app data, where it is clear a disproportionate share of total usage can be attributed to the most regular users of the apps. Chart 5.6 shows that if all children are ranked by their total usage (in minutes), the top 10% of users were significantly overrepresented in the total usage statistics, accounting for 33% of total time with the apps. By way of contrast, the lowest 50% of users account for only 21% of total time with the apps highlighting a possible risk that this inequality of use will result in different language outcomes across children. Chapter 6 includes a more detailed discussion on the link between iPad use and possible language outcomes.

Chart 5.6: Distribution of child app usage by decile

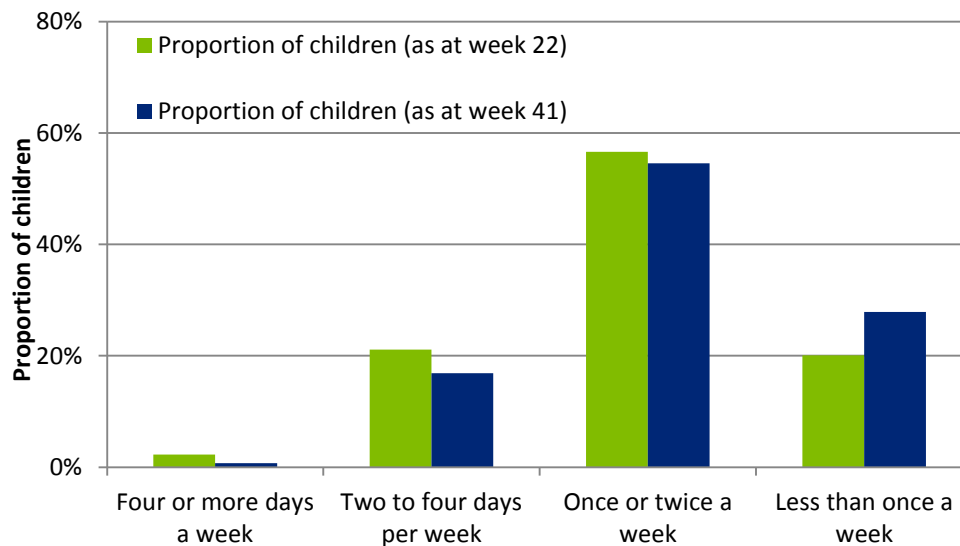


Source: Deloitte Access Economics analysis of ELLA app data

Despite the unevenness of use, it is still the case that the majority of children (72%) logged on at least once a week (Chart 5.7). The proportion of children that logged on less than once a week increased to 28% at the end of the year (up from 20% in mid-year). Educators reported managing the trial in a less structured manner as the trial progressed, allowing children to self-regulate their use, which may explain this slight increase in children logging on less frequently. Over the trial, very few children

logged in more than four days a week, but as the number of days each child involved in the trial attends preschool is not known, it is difficult to gauge the significance of this result.¹³

Chart 5.7: Frequency of app usage



Source: Deloitte Access Economics analysis of ELLA app data

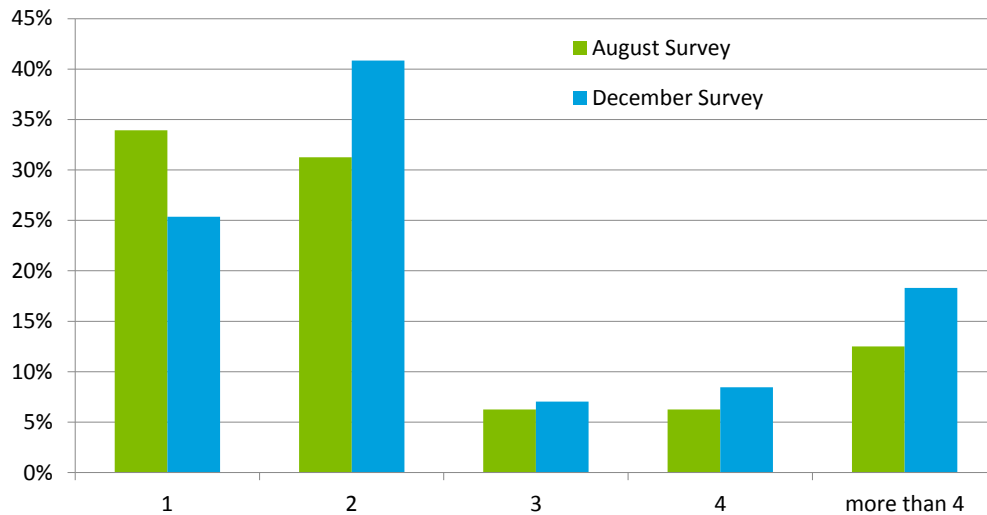
5.1.4 Group usage of the apps

During site visits, educators noted that some children enjoyed using the apps by themselves, whereas other children enjoy using the apps while interacting with other users around them. During these interactions, children were observed to compare activities and exchange ideas on how to perform the task on their screen. Some children were reported to prefer sharing the same iPad among two or more children, but in these instances, it was reported that children mostly wanted to be the ‘driver’ controlling the iPad.

This variation in the number of children using one iPad was confirmed by the educator survey responses, as shown in Chart 5.8 with children reported by educators as using the iPads individually, in pairs and in small groups. Educator survey responses suggest there was a slight move away from using the iPads individually, as children became more likely to use the iPads in pairs.

¹³ For example, it is likely children attending long day care centres attend for more days a week, compared to children attending stand-alone preschools, increasing the frequency with which they would access the iPads and use the apps. Further investigation is undertaken later in this chapter.

Chart 5.8: Average number of children using each iPad



Source: Educator Surveys – August (101 responses) and December (71 responses)

It is important to note that **due to group usage of the iPads, the app data understates the level of child engagement with and exposure to the apps**. This is because only one child can be logged into an iPad at a time, but there may be one or more other children alongside the ‘driver’ who were gaining exposure to the language.

Group usage of the apps, compared to individual usage, also has implications for the number of iPads that may be required by a service, outlined in Box 5 below.

Box 5: Number of iPads

In both the Baseline Educator Survey of trial sites and the August Educator Survey, just over half of the respondents (68% and 57% respectively) indicated that the service had enough iPads to sufficiently cater for the ELLA trial. This proportion had increased to 70% by the December Educator Survey. Some reasons as to why services wanted more iPads are cited below:

- Children typically want to be in control of the iPad, and are not satisfied when they can only participate as an observer
- Children generally want to play on the iPads at the same time, rather than spread out equally over the course of the day.

Most educators noted that in limiting the number of iPads available, children were required to gain a range of valuable skills, including collaborative learning, patience and turn taking.

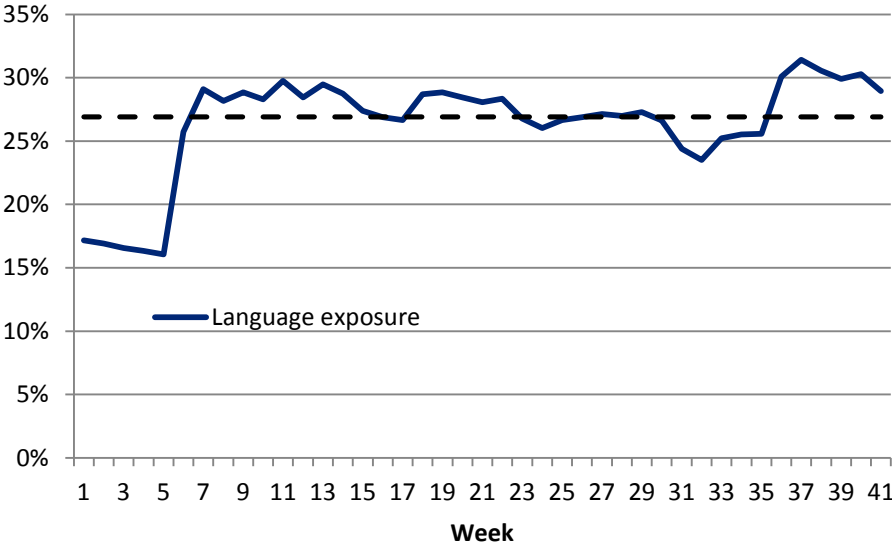
5.1.5 Language exposure

Each app comprises between four and six activities, and within each activity, children are exposed to different words in the target language. The ratio of time spent listening to language, relative to total time spent with an app, is an important measure, as it outlines the degree to which children were exposed to the target language.

Over the duration of the trial, approximately 27% of all time spent with the apps had been spent listening to the target language. The proportion of language exposure was inconsistent over time,

making it difficult to validate or repudiate educators’ observations that children’s engagement with the listening activities in the apps increased towards the end of the year (Chart 5.9). This issue is further explored in Chapter 5.2, as the language exposure for each app may vary.

Chart 5.9: Language exposure over time



Source: Deloitte Access Economics analysis of ELLA app data
Note: the black dotted line represents the average throughout the entire trial

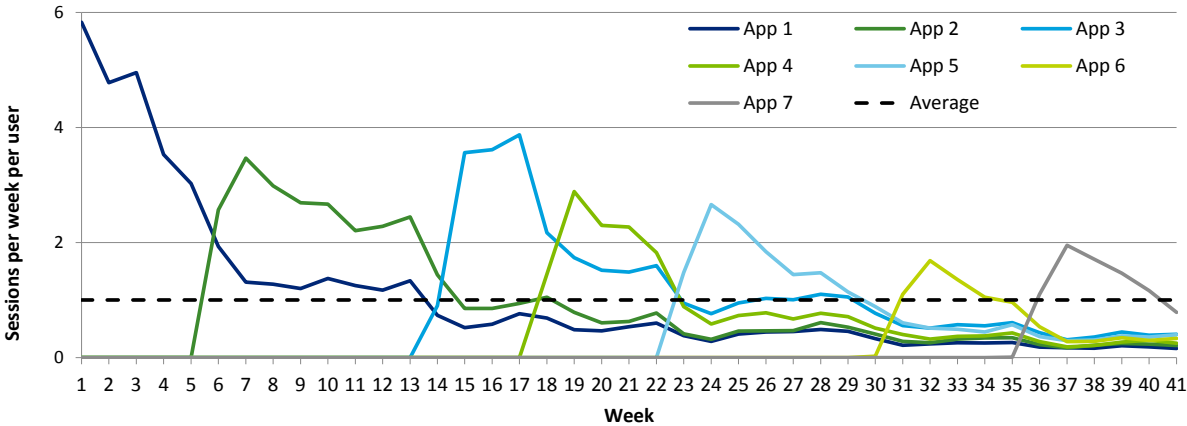
5.2 Children’s usage of individual apps

Further insight on children’s engagement can be gathered from analysis of patterns of usage on an individual app basis.

5.2.1 App use over time

It was mentioned in site visits that app popularity varies over time – with apps being most popular in the period immediately following their release, and interest diminishing over time. Educators consulted during the site visits also stated that while children are likely to use the most recent app, they will occasionally return to older apps. Both these observations are affirmed by Chart 5.10, which demonstrates that the app children log into the most, as measured by the average number of sessions per user, was always the most recently released app.

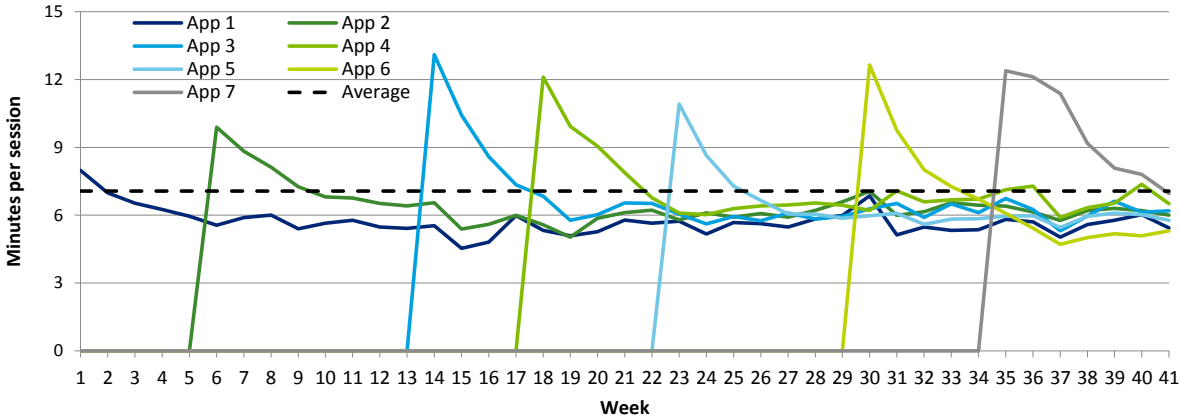
Chart 5.10: Average sessions per user over time, by app



Source: Deloitte Access Economics analysis of ELLA app data

Each app kept children engaged for longest when it was first released, suggesting there is an initial burst of enthusiasm associated with the release of a new app (Chart 5.11). Following this initial spike in usage, the length of each session across each app was fairly consistent throughout the remainder of the trial.

Chart 5.11: Average minutes per session over time, by app



Source: Deloitte Access Economics analysis of ELLA app data

5.2.2 App popularity

Throughout the site visits, no single app emerged as the most universally popular. Each app was nominated at least once as the children’s favourite app at different trial sites.¹⁴ However, the app data can be analysed to understand whether some apps are in fact more popular than others.

When comparing apps, it is important to recognise that each app has been available for a different length of time and, as shown above, the longer an app has been released, the less it is used by children. Comparing each app by usage over the duration of the trial will either:

¹⁴ Note that, during the period when some of the second site visits occurred, app 7 was yet to be released.

- overstate the popularity of older apps if **total time** is used, as these apps have been available to use over a longer time span; or
- understate the popularity of the older apps if **average time** is used, as popularity naturally diminishes with time.

It is therefore important to compare between apps across a comparable timeframe. Analysis has been undertaken using two complementary time periods:

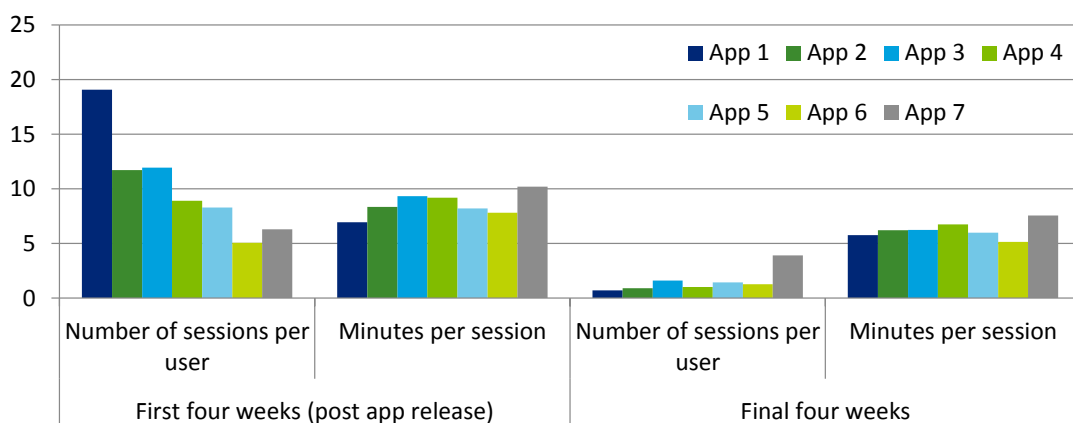
- the first four weeks after each app was released, indicating initial popularity levels; and
- the final four weeks of the trial to date, to determine the popularity after each app has settled into a consistent pattern of use.

Finally, app popularity is measured using two methods:

- **Number of sessions** – this reflects the attraction of an app, as a large volume of sessions suggests children enjoyed the app sufficiently to return to it next time they logged in.
- **Minutes per session** – this reflects the level of attention a child gives an app after logging in. A long session suggests the app holds children’s attention for a longer period of time, implying children are engaged while using the app.

Examining the first four weeks of each app, App 1 appears to have been the most popular app based on the average number of sessions per user per week (Chart 5.12). However, taking into account the average length of each session, it becomes apparent App 1 was used for the least amount of time per session. This result is most likely attributable to the initial unfamiliarity of the ELLA trial to children (discussed above), potentially resulting in children frequently logging in and out as they familiarised themselves with using the app. This may explain the elevated average number of sessions and the relatively lower average session length over the first four weeks after the release of App 1.

Chart 5.12: Summary of app popularity



Source: Source: Deloitte Access Economics analysis of ELLA app data

NOTE: App7 only became widely in use during week 36 of the trial (out of 41 weeks). For the analysis of the most recent four weeks, rather than include data from weeks 38-41 (as this would include data from the initial spike in use), only data from weeks 40 and 41 is included.

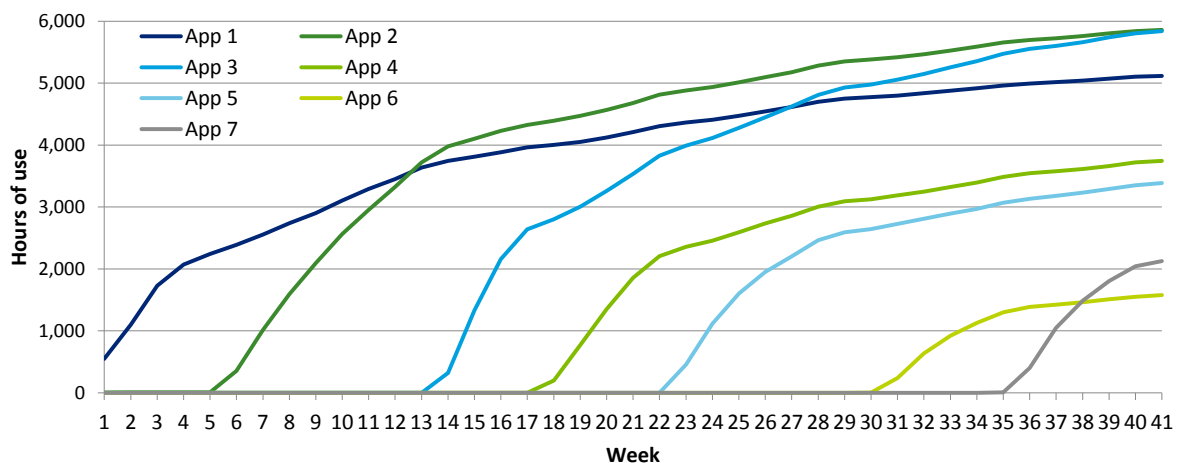
Discounting App 1, App 3 appears to be (marginally) the app most children logged into when it was first released (12 sessions per user); it also kept children engaged, with just less than 10 minutes per session over the initial four week post-release. App 7 could potentially also be considered the most popular app, with users averaging 10.2 minutes for every session. The sessions per user measure

suggests it has been unpopular, but this could be attributable to general reduced activity with the iPads in Term Four (as mentioned above), rather than a reflection of App 7’s popularity.

Turning attention to the final four weeks, only App 7 was used with any regularity, presumably as it was the most recently released app, while App 3 still receives slightly more attention than other apps. The length of each session across most of the other apps seems fairly consistent as well, indicating there is not a clearly preferred app. Two notable exceptions are App 7, (which is likely to be experiencing additional attention as it is still the most recently released app), and App 6, which appears to be marginally less popular and engaging than the other apps.

To reinforce the relative popularity of each app, Chart 5.13 shows the cumulative hours of use, by app. This confirms the popularity of App 3, as it is the most used app despite being available for 13 weeks less than Apps 1 and 2.

Chart 5.13: Cumulative app use, by app



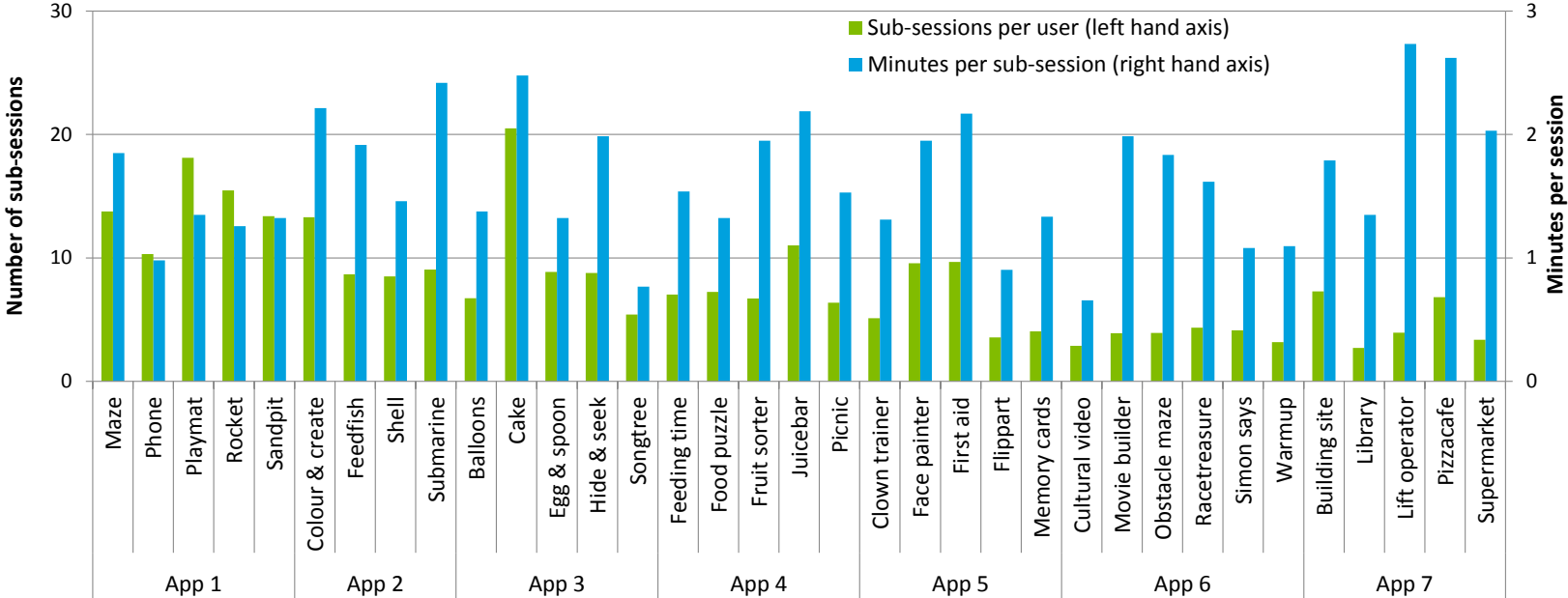
Source: Deloitte Access Economics analysis of ELLA app data

5.2.3 Most popular activities within the apps

During the second round of site visits, educators reiterated that the interactive activities (those encouraging movement or voice responses) were generally stated to be among the children’s favourite activities in the apps. During previous consultations, several educators noted children preferred the apps with a specific task to complete (such as *Cake*), rather than the apps which have no conclusion (such as colouring-in activities, or *Sandpit*).

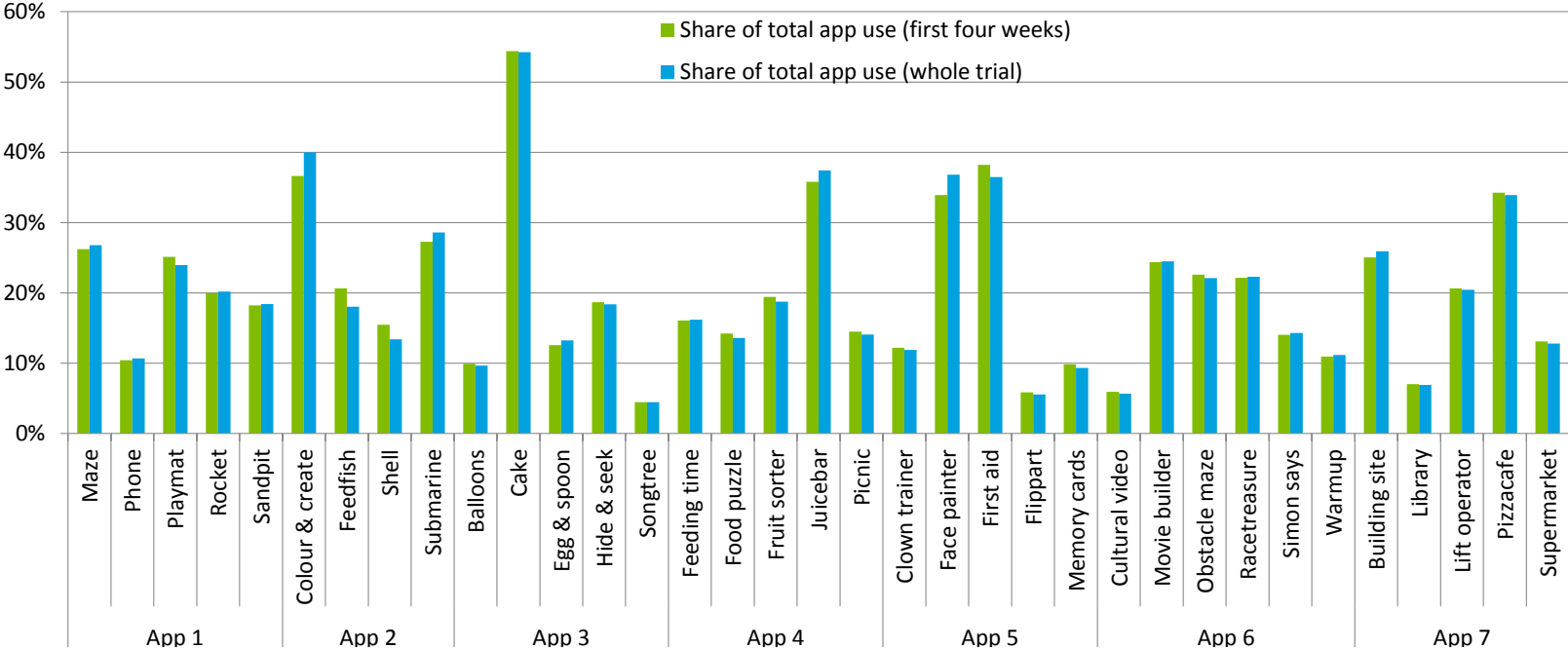
Examining app usage data for the first four weeks post release of each app reveals the relative popularity of different activities – see Chart 5.14. Note that for the purpose of this analysis, a **sub-session** refers to the number of times a user selects to enter each activity. Within a single session, a user often changes between activities, so there are multiple sub-sessions within each session.

Chart 5.14: Activity use by app, during first four weeks



Source: Deloitte Access Economics analysis of ELLA app data

Chart 5.15: Activity popularity (by app), over time



Source: Deloitte Access Economics analysis of ELLA app data

As can be seen in Chart 5.14, the most popular activity by a significant margin, (as measured by the number of sub-sessions per user) was *Cake* (from App 3), while *Lift Operator* and *Pizza Cafe* (from App 7) have the longest lasting sessions (2.7 and 2.6 minutes per session respectively).

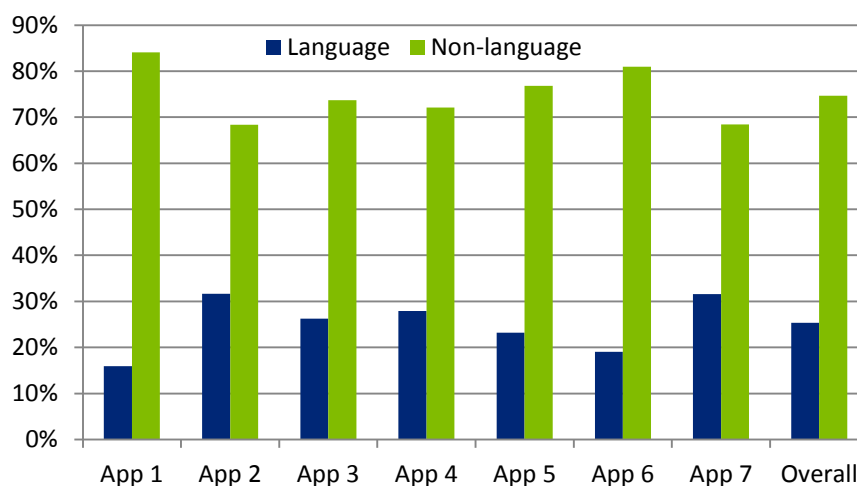
The relative popularity of each activity, within each app, was broadly unchanged over time (Chart 5.15). The song, which accompanies each app, was the least popular activity across all the apps. At the initial release of App 1, it appeared as if there was some interest in listening to the song, with usage across the first week representing almost 5% of total use of App 1. However, over the duration of the trial, and across all the apps, usage of the song had decreased to negligible levels, suggesting children were skipping the song when they logged into the apps.

An interesting lesson to emerge from Chart 5.14 is that, on average, there were noticeably fewer sub-sessions per user in the later apps, but the length of each session increased. This finding lends additional weight to the hypothesis that children became more familiar with the apps as the trial progressed, and therefore became more sophisticated in their usage. For example, rather than jumping haphazardly between activities, they appeared to choose their preferred activity, and use it for an extended period of time.

5.2.4 Language exposure by app

Language exposure varied more significantly by app, rather than over time. Apps 2 and 7 were the most successful at exposing children to the target language, with children spending 32% of time listening to the target language (Chart 5.16). By comparison, only 16% of time on App 1 was spent listening to the target language.

Chart 5.16: Proportion of language exposure, by app

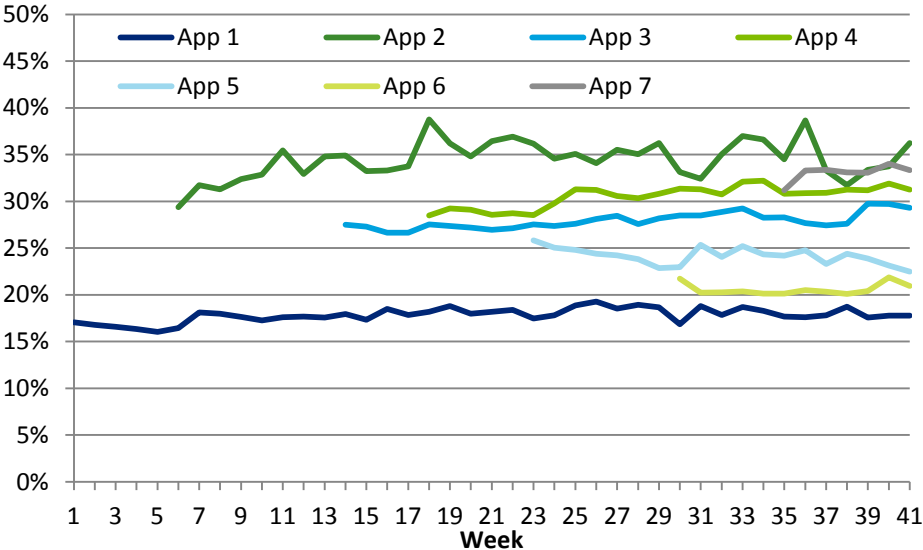


Source: Deloitte Access Economics analysis of ELLA app data

Examining usage over time by app (Chart 5.17), there is little evidence to support some educators’ observations that children are ‘playing games’ without listening to the target language, or that children spent more time listening to the target language as they became more familiar with the apps. Language exposure by app appeared to be largely consistent throughout the trial. It should be noted this does not preclude educators’ observations that children increased concentration levels

while using the app – it may be that children used the apps in a similar manner throughout the trial (therefore meaning usage data remained unchanged), but began paying more attention to the target language when it was spoken.

Chart 5.17 : Proportion of language exposure over time, by app

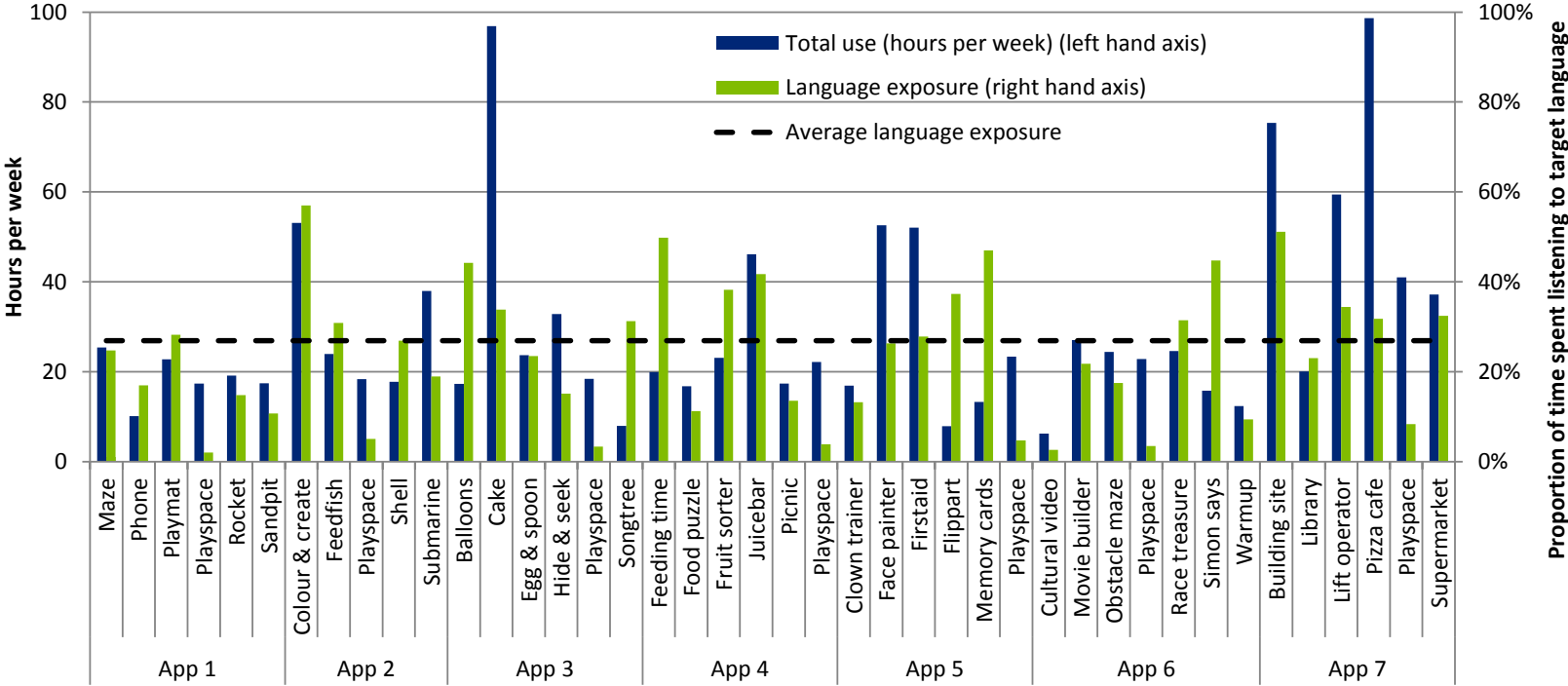


Source: Deloitte Access Economics analysis of ELLA app data

5.2.5 Language exposure by activities

Examining app data by activity, *Colour & Create, Shell*, (from App 2), *Feeding Time* (from App 4) and *Building Site* (from App 7), were the most effective in exposing children to the target language, in that the largest proportion of time with these activities was spent listening to the target language (Chart 5.18). In the case of *Colour & Create* and *Building Site* these apps are also highly popular, suggesting these activities were more likely to expose children to the target language. On the other hand, *Feeding Time*, was a relatively less popular activity, and therefore less likely than other, more popular activities, at successfully exposing children to the target language.

Chart 5.18: Total use (hours) and language exposure (as a proportion of total use), by activity



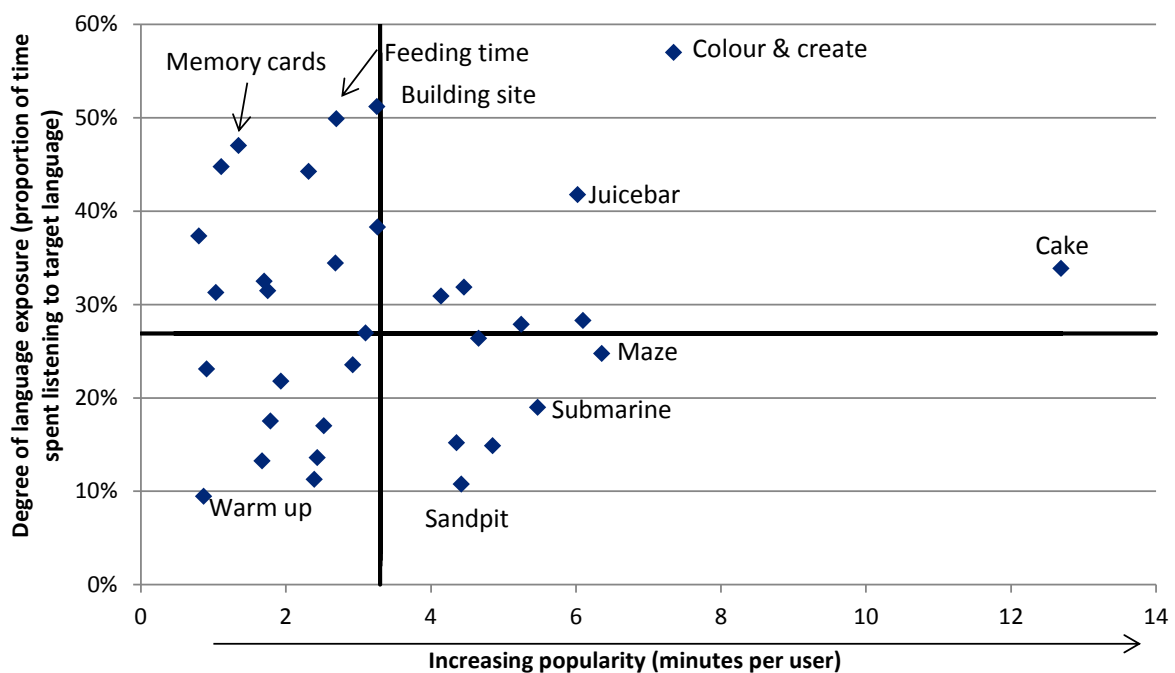
Source: Deloitte Access Economics analysis of ELLA app data

Presenting this information in a different format, Chart 5.19 demonstrates the effectiveness of each activity at exposing children to the target language by considering their:

- popularity (measured in average minutes per user); and
- degree of language exposure (measured as the proportion of time spent listening to the target language, as opposed to playing games).

Activities located in the top right quadrant can be considered both popular and effective at delivering the target language. Notably, relatively popular activities (such as *Cake* and *Colour & Create*) also demonstrated above average effectiveness at language exposure (these are located in the top-right quadrant of Chart 5.19). Other activities, such as *Memory Cards* and *Feeding Time* (in the top left quadrant), were relatively unpopular, despite their effectiveness at exposing children to the target language. There were also a large amount of activities in the bottom-left quadrant, which are both unpopular, and did not expose children to language as effectively.

Chart 5.19: Most effective activities for language exposure



Source: Deloitte Access Economics analysis of ELLA app data

Note: An activity in App 6 – *Cultural Video* was designed to focus on cultural, rather than language, exposure and has therefore been excluded from this analysis.

5.3 Factors contributing to children using the apps

To shed further light on factors driving the patterns of usage outlined in this chapter, it is useful to consider other evaluation evidence sources.

There are a range of factors that may be influencing how regularly children use the apps. During site visits, educators were generally reluctant to make any definitive statements concerning factors

driving differentiation in app usage, with most putting difference in use down to ‘personal preference’.

There are several other factors which could potentially be driving app usage:

- **language** – different languages may resonate differently with children;
- **socioeconomic status**¹⁵ – children of different socioeconomic backgrounds may have different home environments, including level of parental engagement in their education, and therefore may respond differently to the trial;
- **location** – location may affect services’ ability to access the internet, especially for regional and remote services;
- **provider type** – different providers may employ different methods in engaging children, including the opportunity to use the apps more frequently (e.g. children generally attend LDC services more days a week than other provider types);
- **did children have previous language experience at the centre?** – this examines whether or not child familiarity with languages other than English changes their behaviour with the apps; and
- **educator comfort with iPads as an educational tool** – an educator’s comfort with the tool is expected to influence how it is integrated into the classroom, and therefore will influence usage patterns.

A cross-tabulation method was used to attempt to identify the key factors driving use (for this exercise, use was estimated by the average number of sessions per user per week). It was identified that children who attended LDC centres were higher weekly users than other children. This was to be expected however, as children enrolled in LDC centres typically attend for longer hours and more days in a week, and therefore have more opportunities to access the iPads. In light of this finding, all other potential factors were considered after separating out long day care providers, and all other providers. Results are shown in Table 5.3 below:

Table 5.3: Sessions per user per week, by various explanatory factors

	Long day care	Non-long day care	Overall
Language			
Arabic	3.15	2.72	2.88
French	3.65	2.85	3.08
Indonesian	6.17	2.69	3.91
Japanese	6.50	2.69	3.88
Mandarin	6.04	3.13	3.97
Site SES status			
High	5.64	2.22	3.07
Medium	5.09	3.29	4.00
Low	4.75	2.89	3.44

¹⁵ The socioeconomic status of each child is unknown. Rather, the socioeconomic status of the suburb the preschool is located in has been applied to all children attending the same preschool.

	Long day care	Non-long day care	Overall
Location			
Metropolitan	5.13	2.81	3.41
Other ²	5.16	2.82	3.57
Educator comfort with iPads			
Very comfortable	5.32	2.94	3.95
Somewhat comfortable	4.32	2.68	2.95
Previous language experience			
Yes	5.76	2.68	4.20
No	4.45	2.88	3.26

Source: DAE analysis of ELLA app usage data

² Given the small number of remote services, these were combined with regional services.

As seen in Table 5.3 above, users in the left hand column (children from LDC centres) are always more regular users than their counterparts in non-LDC centres, aligning with the cross-tabulation outlined above.

Preschools which reported to have **educators who are ‘very comfortable’ with iPads as an educational tool appears to be the only factor which possibly explains differences in usage among children**. Both within LDC and non LDC centres, children attending preschools where educators were ‘very comfortable’ with iPads as an educational tool demonstrated more frequent usage. This is possibly a reflection that educators who were more comfortable allowed children increased access to the iPads. It may also be the case these children enjoyed using the apps to a greater level as educators were able to provide a highly engaging experience.

Focussing on different languages, there is little evidence to suggest one language resonates more with children than any other. However, the most popular languages within LDC centres (Indonesian and Japanese) are the least popular within non-LDC centres. This suggests there are other factors driving high language usage, rather than the popularity of any language. It should also be noted that as each preschool was only given one language, there may be some other, unobservable differences between preschools driving this result. To thoroughly test different levels of popularity between languages, each child would need access to each language.

There appears to be little variation in usage by socioeconomic status – this is likely due to the fact that nearly all children quickly learnt how to use the iPads and apps at their preschool. This means that the possible effect of a lack of exposure to digital technology among lower SES children was likely made redundant by the speed with which all children could use the iPads effectively.

Services in different locations exhibited, on average, similar usage habits, although the limited number of remote services made it difficult to test whether or not rurality influences usage.

Finally, it was not universally found that children who had previous language experience used the iPads more frequently. While this was the case within LDC centres, it was not true within other preschools.

It should be noted the findings articulated above are not definitive, as it could be the case that there are unobserved, underlying factors which influenced the results. For example, different usage patterns between preschools may be driven by different rules relating to iPad use. Further, much of

the data is analysed at the preschool level, however it may be the case the children within the same preschool have different experiences during the trial. There are often different groups within preschools, and several different educators within each group (each of which may employ different trial delivery methods). The analysis should be interpreted in light of these caveats.

6 Trial impact and efficiency

This chapter provides an overview of the available evidence on the *impact* of the ELLA trial on child, educator and service outcomes across trial sites. The *efficiency* of the ELLA trial, that is the relationship between the impact of the trial and the benefits invested in it, is also evaluated.

The **key evaluation questions** this chapter seeks to answer are:

- Does the ELLA trial make a difference to children's outcomes?
 - What outcomes for children have been observed to date?
- What impact has the ELLA trial had on educators and services involved?
- Has the ELLA trial been cost-efficient?
 - Are there any ways in which the ELLA programme could increase its efficiency?

The evidence supporting the evaluation of this element of the ELLA trial has been drawn from the survey responses, ELLA trial data and the site visit findings.

General findings on the impact of the ELLA trial

- Educators and parents/guardians commonly reported that at least some children were producing words and phrases from the ELLA language and using them in context – though this varied significantly by child.
- It was found that over time, children used a higher number of words and became more comfortable speaking in the target language. It was generally understood by educators that comprehension levels were higher than speaking – that is, a larger number of children understood words from the language even if they were not observed to be using the words.
- There were some reports of the ELLA trial inspiring increased interest in the culture associated with the ELLA apps, or multiculturalism more broadly, but this was not consistent across sites.
- The ELLA trial was associated with the development of a range of skills for participating children, including: caring for property, sharing, digital literacy, collaborative learning and social skills.
- There were also several casual links observed by educators between the ELLA trial and improved English skills for children, and general development for autistic children. It is expected that targeted research would need to be undertaken to further explore this link.
- Educators, parents and guardians were largely positive about the trial, and most expressed a desire for the trial to continue in the future.
- Educators, on average, felt more confident about using technology or integrating language learning in their learning programme as a result of the ELLA trial.
- Despite the positivity, there are some lingering concerns about the impact of the ELLA trial, including a lack of continuity of language learning for the children once they leave preschool and variations in the level of educator support for the ELLA trial.
- Because some children use the apps considerably more than others, not all children are receiving the same level of exposure to the apps or the language(s).
- Given that a significant proportion of the cost associated with the ELLA trial has been invested in the development stages, and the marginal cost of distributing the programme to additional participants is low, the ELLA programme will become increasingly cost-efficient as participation grows.

6.1 Child outcomes

The outcomes arising from children participating in the ELLA trial can be grouped into three broad categories:

- language outcomes (the amount of language exposure and production being observed in children participating in the trial);
- cultural awareness (children’s understanding of the culture associated with the target language of their app); and
- any other skills associated with the trial.

This section discusses these outcomes as observed by analysis of app data, observations from educators and observations from parents and guardians.

The focus of the ELLA trial was on benefits associated with language exposure, rather than language learning. However, in the broader context of the ELLA programme objectives, including increased participation in language learning among secondary school students, and the realisation of benefits associated with language learning, it is pertinent to look at the impact of the ELLA programme on language production to the extent that this was observed. The relationship between the ELLA trial and the realisation of benefits, and the ability of the evaluation to assess this, is described in more detail in Box 6.

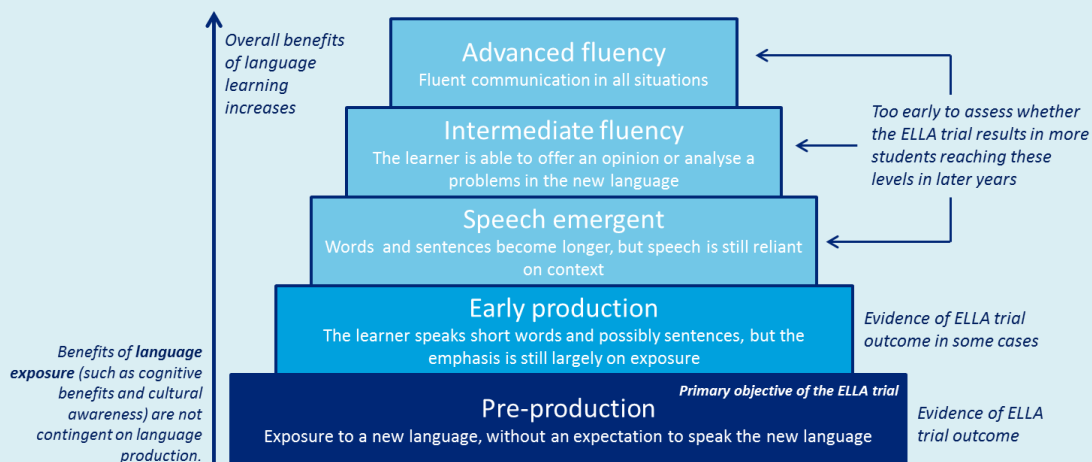
Box 6: The link between language exposure, language learning and benefits

Within the spectrum of language learning, there is a hierarchy of outcomes – beginning with exposure and leading towards fluent communications. Even if language production does not occur, there are benefits associated with language exposure exclusively.

The benefits to language exposure at an early age include an increased propensity to successfully produce language later in life, increased awareness of other languages and cultures and more advanced cognitive capabilities. These benefits are described in greater detail in the literature review presented in Appendix C.

To the extent that a number of these outcomes are immediately observable in children, the evaluation has been able to make an assessment as to the ELLA trial’s effectiveness. However, many of the benefits associated with language exposure will only become apparent over a longer time frame.

While there is a theoretic link between language exposure in early years and increased language learning later in life, there are a range of factors that may impact on the achievement of this ultimate outcome, including a scarcity of language programmes for children immediately after preschool and the inconsistency of connected language pathways between preschools, primary schools and secondary schools.



Deloitte Access Economics, based on Krashen and Terrell (1983)

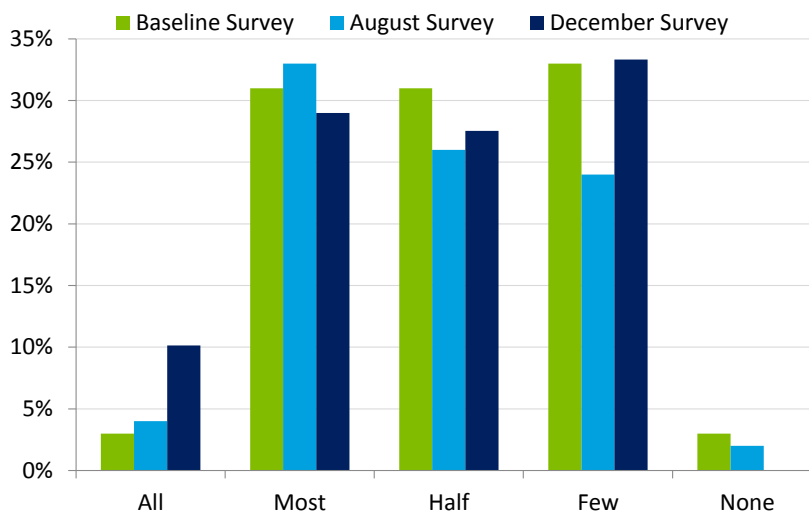
In light of the above, the assessment of the ELLA trial’s effectiveness within this evaluation has been primarily focused on the programme’s ability to expose children to languages and to look at early signs of effective exposure, including educator observations of language production. This approach is appropriate given the overarching objective of the ELLA trial is to increase the number of Australian children studying languages later in life.

6.1.1 Educator observations

6.1.1.1 Educator observations on language outcomes

Educator observations, as collected through the three educator surveys, display a wide range of variety in estimates of the proportion of children who are using the app language. Less than 10% of educators observed ‘all’ children speaking the language (though this increased over time), with responses fairly evenly split between ‘Most’, ‘Half’ and ‘Few’ (averaging 31%, 28% and 30% across the three educator surveys respectively). By the time of the December survey, no educators stated that there had been no children observed to be using the language.

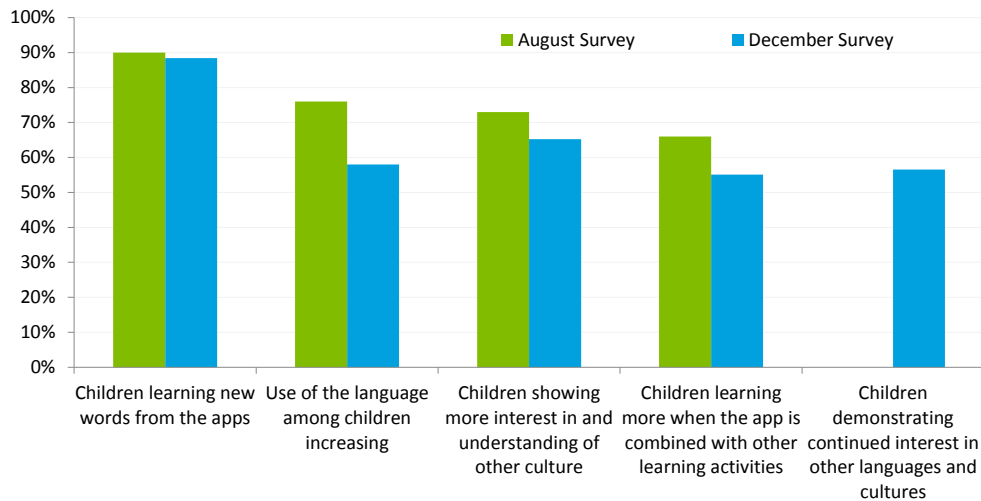
Chart 6.1: Educator perspective on the number of children using the app language, as observed by themselves or parents



Source: Educator Surveys - Baseline (39 responses), August (109 responses), December (69 responses)

Similarly, the survey findings relating to the proportion of educators that felt the impacts of the ELLA trial increased over the course of the trial were also mixed (Chart 6.2). Aside from an acknowledgement that children were learning more words from the apps as the year progressed, there was less evidence that the use of language, and the level of language production, among children was also increasing over time. Similarly, just over half of educators responding to the surveys noted an increase in interest in children’s understanding of culture or demonstration of a continued interest in other languages and cultures over the course of the year.

Chart 6.2: Educator views on how ELLA trial impacts changed over time



Source: Educator Surveys - August (98 responses), December (69 responses). Note, the category ‘children demonstrating continued interest in other languages and culture’ was only included in the December survey.

Site visits supported the finding that there was a range of reported outcomes associated with language exposure and production. A number of educators were highly positive about the language production they had observed over the course of the year, stating that some children were using words and phrases from the apps in real life contexts, unprompted. The most commonly stated uses of the languages, as observed by educators or parents, included singing the app songs, counting, using greetings or naming colours and foods. At the other end of the spectrum, there were a small number of educators who believed participating children were not speaking the target language at all, indicating that some children, while receiving language exposure, were not yet at the language production stage.

The most common observation was that children were using and understanding the language while engaging with the apps, but did not tend to use language outside of the apps unless prompted by educators. In the final round of consultations, approximately one quarter of sites stated that they doubted the participating children would use the words from the apps in context unless prompted. This further emphasises that language outcomes related to emergent speech and fluency are not direct outcomes of the ELLA trial and would be reliant on future language learning.

There was, however, evidence to suggest that over time children increased both their knowledge of language and the ability to use the language they had learned in context. The mid-year consultation and surveying period found that educators and parents were observing children using words from the ELLA apps, particularly singing the songs and using the greetings. For instance, the following statements were typical of those made by educators in the August Educator Survey:

- *‘They use the words incidentally during the day. When we were focusing on colour they would use the Indonesian words when selecting crayons. They sometimes count in Indonesian.... Recently they have been telling us that they are hungry in Indonesian.’*
- *‘Out of the two groups of 20 children in our room I have not heard any of them using words from the app outside of the context of actually playing the app. I’ve heard my colleagues reporting that a few of their children use some words occasionally. I hear children repeating ‘sounds’ from the app (in the context of playing the app), but I don’t believe they have a*

thorough understanding of the fact that those sounds are actually words that translate to a corresponding word in English, therefore they are not able to meaningfully use them in any other context.'

- *'They love saying hello and goodbye in the language. We have heard most children using it'*

In contrast, the consultation and survey period conducted at the conclusion of the trial found more constant observations of children using the language unprompted, and/or in the correct context. Educators noted in consultations that children's use of language increased as the year progressed and they became more comfortable using the language. Accordingly, survey commentary surrounding language observation in the December Educator Survey included:

- *'We regularly hear children singing songs from the apps such as the heads-shoulders song, colours, the greetings – they say the fruit names and when using the apps you can hear them repeating the names. Parents say they hear them at home using the language.'*
- *'There is a wide variation on the language used, with a few children using a lot and most of them using a little. Most of their usage revolved around colours and numbers, although there are some children who also use other words that they have particularly become familiar with.'*
- *'Almost daily we will hear someone using some Japanese, away from iPad use. Single words such as colours and numbers are mixed with English sentences. Short phrases are used in play – answering the telephone, and at meal times, "I like".'*
- *'I have not noticed the children using the language in their own play, but when questioned or encouraged they can repeat the phrases/words they have learned.'*
- *'We use the language daily but only at times that are meaningful, e.g. greetings and farewells; colours; numbers and counting; foods (mostly ones that the children are familiar with eating themselves).'*

It was also stated by most educators that comprehension levels were felt to be quite high, even for children who were not observed speaking words in the target language. For instance, some educators would use activities to gauge understanding levels, such as asking everyone wearing a red top (with 'red' spoken in the target language) to stand up and noted that no members of the class needed further instruction.

6.1.1.2 Factors influencing language learning

The second round of site visits were used to explore in greater depth, factors which educators felt might influence the rate or extent to which participating children were learning the target language – noting that it was universally reported that there were differing levels of language ability across the classroom. This question garnered mixed responses from services, with no definitive factors emerging as influential. Common responses included:

- **Usage:** while usage was typically noted as having some impact on the rate of language learning, educators most often felt that usage was not the dominant factor.
 - Consistency of use (rather than quantum of use) was forwarded by one centre as being influential. As an LDC service, it had noted that children who came every day of the week, and were therefore more highly exposed to the apps, picked up more words in the target language than children who attended the service only one or two days a week.
 - In consultation with a formal language teacher at one of the trial sites, the teacher noted that the ability for children to engage with the language on a daily basis (as

opposed to their interaction with them once a week) had reinforced basic words to a greater extent than what they had observed in years prior to the ELLA trial.

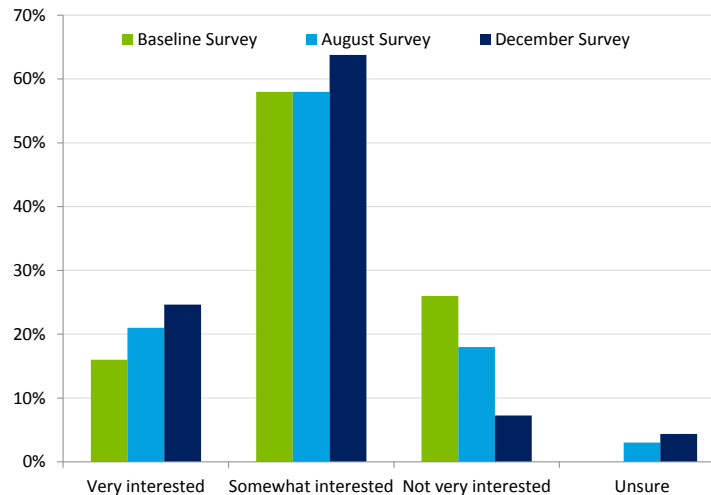
- However, it was also stated that children who were not high users (or even users of the apps at all) had also been observed singing the songs from the apps and using words. This suggests that constant exposure to the ELLA trial over time, including interactions with children who were engaged with the apps, had allowed them to learn elements of the language without being directly involved.
- **Confidence:** it was contended that more confident children (in terms of communication most particularly) were observed using the language more often as they were comfortable experimenting and using new words.
- **Technology lovers:** educators also noted that children learn in a variety of different ways and for some children, iPads and use of digital technology were found to be a highly effective medium. These children, who were confident and naturally curious about the apps, tended to learn language at a faster rate than those who were less digitally literate.
- **Bilingual:** interestingly, while services were explicitly asked if bilingual children engaged with the apps any differently than monolingual children in the first round of site visits and it was determined there was no material difference – in the second round of site visits, several services noted that children who already spoke another language were picking up the ELLA language more quickly than other children.
- **Educator engagement:** It was also noted that the extent of educator engagement was an influential factor in the rate of language learning. Educators noted that when they (1) sat with children and asked questions about the app while they were using it; and/or (2) incorporated words from the apps in everyday use in the room; this had the effect of increasing language learning. An example of this, as found in a response to the August Educator Survey, is provided below:

‘The children in my room were not using the language at all by approximately half way through the year. It wasn’t until explicit teaching took place and the educators began really teaching the language to the children that they actually began responding. We used the fruit names for morning tea. And incorporated other French words and sayings into our transitional routines.’

6.1.1.3 Educator observations on cultural awareness

As with language knowledge, the level of observed cultural awareness and the degree to which the ELLA trial facilitated an increased focus on cultural discussions, varied across sites. The majority of educators in both the Baseline Educator Survey and the August Educator Survey (74% and 79% respectively) stated that children were at least ‘somewhat interested’ in the culture associated with the language of the app being trialled at their preschool, as shown in Chart 6.3. This proportion increased to 88% in the December Educator Survey, potentially reflecting an increased focus on cultural awareness that may have been encouraged during the second training workshop or through service liaison visits.

Chart 6.3: Educator observations on children’s level of interest in the culture associated with the language of the app being trialled



Source: Educator Surveys – Baseline (38 responses), August (96 responses), December (38 responses)

Site visits determined that it was common for services to incorporate the cultural aspects of the ELLA trial into a broader discussion on multiculturalism which often existed prior to ELLA. This made it difficult to attribute cultural learnings directly to the influence of the ELLA trial. It was also found that there was sensitivity around placing a singular focus on the culture portrayed in the app, at the expense of other cultures prevalent in the preschool.

However, a number of observations recorded in the educator surveys pointed to the fact that children’s cultural awareness had increased due to activities associated with the ELLA trial. These outcomes relate to both an increased knowledge of the places from which the target language originates, and an acceptance of cultural diversity more broadly. For instance, this included:

- *‘The increase in general knowledge about Indonesia. I love it when they show me a picture of something they have seen in an app and then in a book. Of course we have spent time talking about it, e.g. the Garuda Pancasila and completing art and craft activities, but I think it is so wonderful that they remember.’*
- *‘Cultural confidence. Our students are aware of their cultures and are proud to share stories or words from their language or ask about another child’s culture. We feel this year that there are more mixed social groupings.’*
- *‘They seem to be more aware of other children’s differing cultural backgrounds and the children who speak another language were regarded as ‘special’ as they could already do what the others were just learning to.’*

Of the sites that had incorporated a focus on the specific culture attached to the apps, it was reported in site visits that the children had generally responded positively. Children displayed an interest in the country of origin, and some cultural elements that differ from what they are familiar with. Parent observations relating to children’s increased interest in different cultural aspects are discussed in detail below.

6.1.1.4 Other learning outcomes associated with the ELLA trial

In addition to language and cultural outcomes, a host of other outcomes attributable to the ELLA trial have been identified. Educators contended (through both site visits and educator survey responses) that the ELLA trial encouraged development of a range of cognitive and social skills to varying degrees in the participating children, such as:

- caring for property;
- understanding of other cultures in general (rather than just the culture exposed to through app use);
- understanding of language (including English) as a form of communication;
- understanding of different languages and where they are on maps;
- digital literacy;
- developing areas targeted in the apps (such as counting or colours);
- persistence and focus to complete activities;
- sharing and collaborative learning;
- turn-taking;
- increasing confidence and pride for multicultural and/or bilingual children;
- understandings of time and rostering (through use of a time minute limit and/or waitlist);
- social skills – particularly for developmentally delayed or autistic children;
- self-regulation and self-autonomy;
- improving understanding of English;
- technology skills (particularly for those who don't have access at home); and
- concentration and maturity.

It was noted by educators in educator survey responses that these skills were continually developed over the course of the trial, improving with time. Educators did contend, however, that while the listed benefits are attributable to the trial, it is likely that many of these skills would have been developed through other means in the absence of the ELLA trial.

There were also some trial outcomes that educators were more confident attributing directly to the ELLA trial than others. For instance, the positive impacts on self-regulation, sharing and collaborative learning and care for property were consistently reported confidently across services. The impacts on understandings of English, and the positive social development for autistic children¹⁶, however, were reported with a higher level of uncertainty as to whether the ELLA trial had been the driving factor in this changed behaviour. For instance, numerous educators noted that 'the level of literacy has been higher in the room this year' or 'the children using the apps more often have displayed large increases in their English skills', but then caveated this with an observation that this outcome may have been a coincidence and not explicitly linked to participation in the ELLA trial.

¹⁶ A brief overview of the current evidence supporting increased learning outcomes for autistic children through the use of digital technology is provided in the literature review in Appendix C.

6.1.2 Data analysis

This section draws on the ELLA trial data, specifically the progress through apps, to make an assessment of child outcomes.

6.1.2.1 Using levelling data as a proxy for language outcomes

There are several activities within the ELLA apps containing logic which change the difficulty of the activity in response to the user's performance. Such activities are said to contain 'levelling' information – and a user's progression through these levels indicates their ability to accurately complete the tasks within each activity.

Within Apps 6 and 7, three activities have been designed so progression through the levels can possibly be interpreted as a demonstration of language learning. In theory, the successful completion of tasks is contingent on a user understanding the meaning of particular words in the target language (although in practise players may be able to advance between levels due to their persistence, rather than knowledge). These three activities are:

- Race treasure
- Pizza café
- Supermarket.

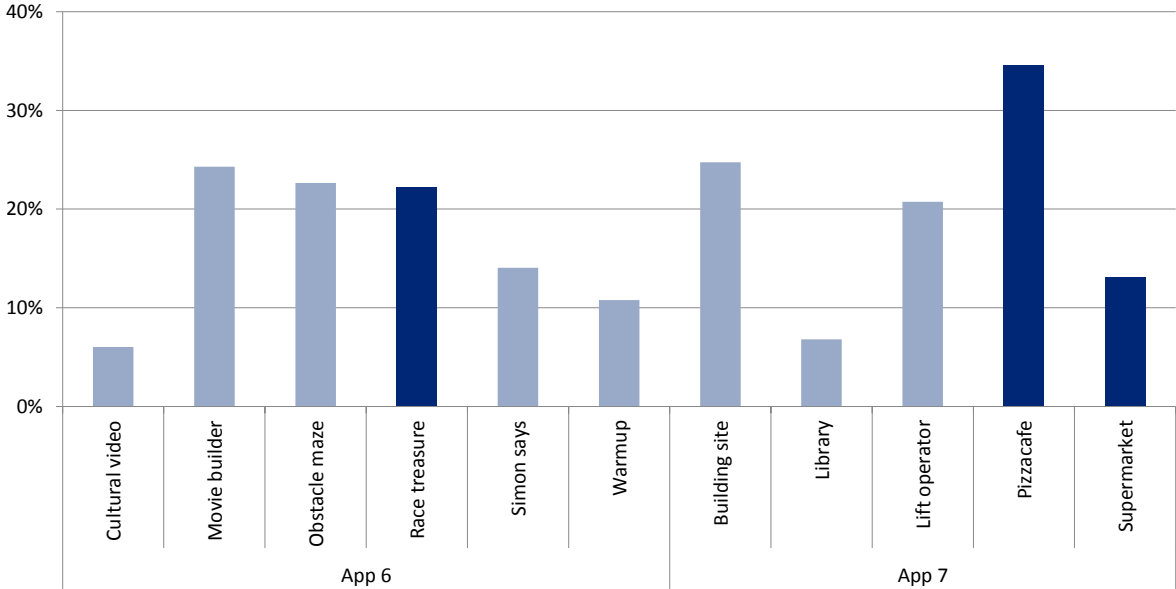
It therefore may be possible to infer language outcomes, or language ability, based on performance throughout these 'levelling' activities. While this is not an exact measure for ability as other factors likely feed into a child's ability to advance to further levels, for the remainder of this analysis, it is assumed that, broadly, users who progress to higher levels have demonstrated a stronger comprehension of the target language.

6.1.2.2 Performance of children based on levelling activities

It is firstly worth noting these activities had varying levels of popularity within their respective apps. *Race treasure* is close to the most popular activity in App 6, *Pizza café* is the most popular in App 7¹⁷, while *Supermarket* is one of the least popular activities. Notwithstanding the small sample size, it does not appear children's behaviour changed when faced with levelling activities – that is, the levelling aspect of an activity did not appear to influence whether or not children played an activity, as shown in Chart 6.4.

¹⁷ It should be acknowledged that *Pizza café* also has a 'free play' section, so it is possible its popularity is driven by this, rather than the fact children enjoy the 'levelling' element of the activity.

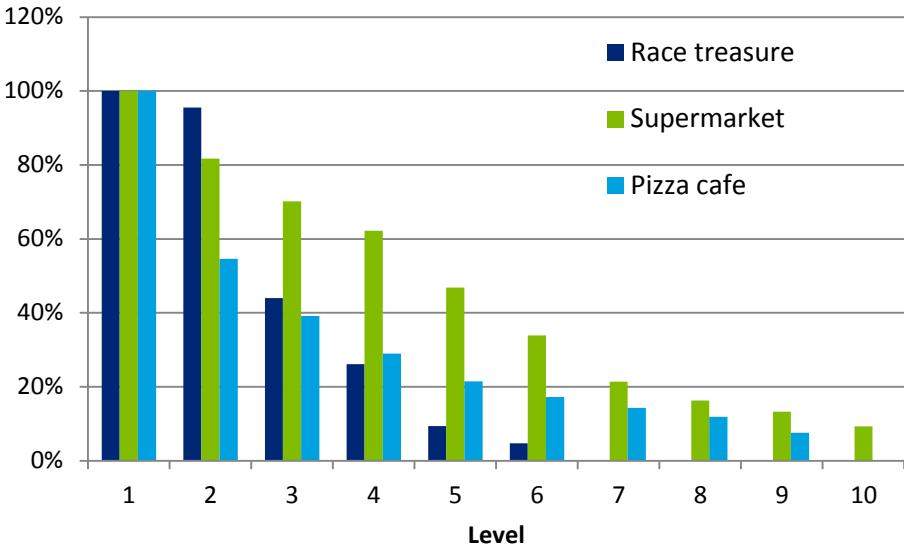
Chart 6.4: Proportion of time spent on each activity, within Apps 6 and 7



Source: ELLA app data

The progress children were able to make within each levelling activity is demonstrated in Chart 6.5 below. Only a small fraction of children were able to progress to the final level of each activity. Less than 40% of children successfully completed level 2 of *Race treasure*, suggesting this was the most difficult of the levelling activities. The number of users advancing through each level on *Pizza café* slowly declined as the levels got harder, although, once past level 4, 35% of users managed to reach the final level. This pattern is largely true for *Supermarket* as well – there are fewer and fewer users able to advance to each level, although 44% who reach level 7 are able to reach level 10.

Chart 6.5: Proportion of children reaching each level, by activity



Source: Deloitte Access Economics analysis of ELLA app data

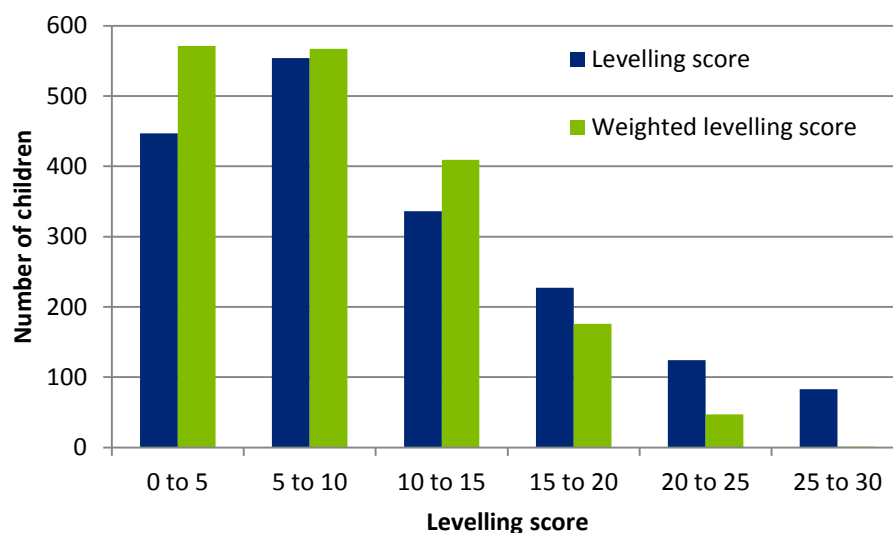
Note: the highest level for *Race treasure* was level 6, the highest level for *Supermarket* was level 10, and the highest level for *Pizza café* was level 9.

Overall, a total of 229 children reached the highest level in *at least* one of the levelling activities, and 22 managed to reach the highest level across all three activities.

In order to summarise their performance using the levelling activities, each child was assigned a ‘levelling score’. A child’s levelling score was the sum of the highest level reached across the three activities (with scores from *Pizza café* and *Race treasure* scaled up to a maximum of 10). The maximum score was therefore 30. The distribution of scores is shown in Chart 6.6.

However, it was considered that simply summing up the highest level each user reached is unlikely to best represent demonstrated knowledge, as it fails to consider how many attempts each child took to progress. For example, it is more likely that a child who progresses between levels on their first attempt has a better understanding of the language, as opposed to a child who takes 10 attempts. Therefore, an additional weighting was added to the ‘levelling score,’ reducing the score of users who required many attempts to advance between each level. The greater the number of attempts, the larger the reduction that was applied. This is henceforth referred to as the ‘weighted levelling score’.

Chart 6.6: Distribution of levelling scores



Source: ELLA app data

Using either measure, a majority of children had scores between 0 and 10 – in other words, they were able to reach (on average) level 3 in each activity. Given the number of potential levels, this indicates that children were generally unable to progress far through the levelling activities. Despite what most educators reported, the data appears to suggest that only a minority of children were able to fully absorb the language and demonstrate this learning by progressing through the various levels of those activities.

Several attempts were made to determine what factors influenced a child’s levelling score. However, it was found that the most dominant factor (by a significant margin) was the number of attempts at each activity – in other words, the higher the amount of times a child attempted each activity, the more likely they were to progress further. This could be interpreted that children who were most engaged with the trial learnt the most, and were therefore most keen to participate in the levelling

activities; alternatively it could be the case that these activities reward persistence rather than knowledge, and children were only able to progress after making multiple attempts, not because they were able to understand the language. The analysis was unable to reveal which of these alternatives was more likely.

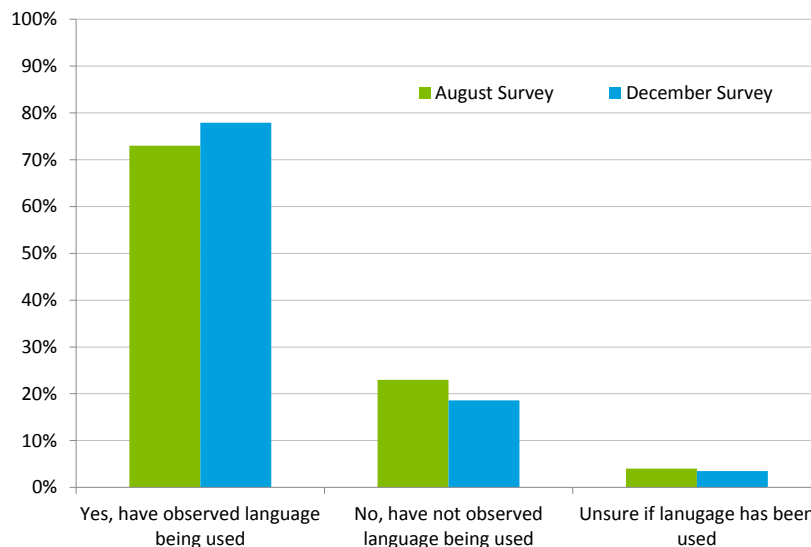
6.1.3 Parent/guardian observations on ELLA trial outcomes

6.1.3.1 Parent/guardian observations on the impacts of the ELLA trial

There were many reports, received through both the site visits and parent/guardian surveys, that parents and guardians had observed their children speaking the app language at home. Most typically these observations were related to the use of greetings, counting, colours or singing the introductory song. There were even several reports of some children knowing words in the app language (such as colours or numbers) but not in English.

This was reaffirmed in the parent/guardian surveys in which over 70% of respondents stated that they had observed their child using words from the language outside of preschool (Chart 6.7 below). The proportion of parents who observed their child using words from the language increased from 73% to 78% over the second half of the ELLA trial.

Chart 6.7: Parent/guardian observations of child use of words from the ELLA language at home



Source: August Parent Guardian Survey (252 responses), December Parent Guardian Survey (199 responses)

Specific observations relating to the language outcomes of children participating in the ELLA trial, as observed by parents and guardians, included:

- Children using the words learnt through the app in context. Many parents noted the pride that children felt when showcasing their language skills. The most commonly reported words used outside the home were numbers, colours and greetings.
 - *'We travelled overseas and my child was doing cannon-balls into the swimming pool counting in Japanese to 10 before jumping in the pool. The Japanese tourists were highly excited that he could do that at 4 years of age.'*

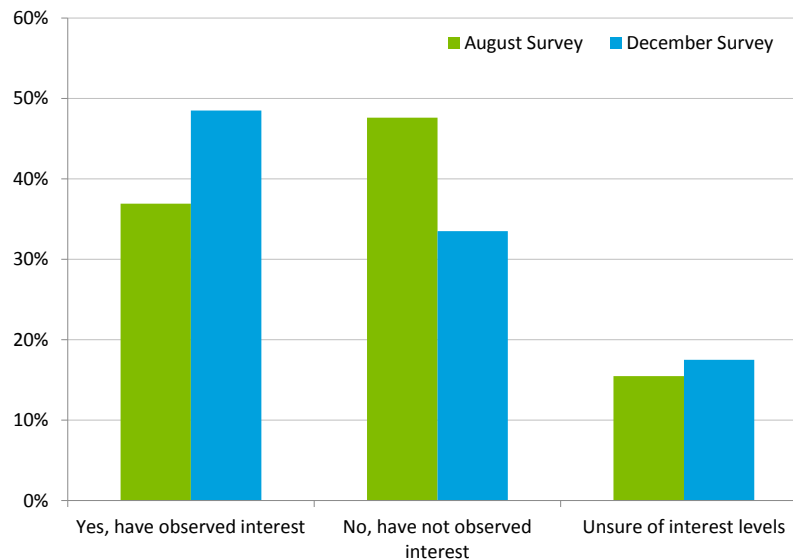
- *'I took him to a Lebanese restaurant, and he ordered his drink in Arabic (like the character does in the app, I think), and he used Thank you and Bye. And the waiter said his pronunciation was very good. Amazing.'*
- *'My daughter tells me the Arabic names for food I'm cooking with (eggs, milk, butter).'*
- *'Sometimes [she] will deliberately slot in a Japanese word when she is discussing a topic. She is always very proud to make the connection.'*
- Children teaching parents/guardians and siblings the words.
 - *'My child is speaking Japanese at home and teaching me words. My child is drawing pictures of things he knows in Japanese (eg. Numbers, colours, fruit) and writing the Japanese word next to them.'*
 - *'My child counts to 10 in Indonesian and so does his younger sister, and she doesn't even attend preschool'.*
 - *'He sings the songs frequently. Says hello and goodbye to people in Japanese. Uses words for like and dislike daily at the dinner table. Plays schools with his older sister and he plays the teacher instead of the student which has encouraged her to learn a few basic words also.'*
 - *'[My child] comes home keen to apply new words that he has learnt at school in the home context. He is even teaching his 2 year old sister to count in French. He often describes things in French'.*
- A small proportion of parent/guardians noted that their child's use of language had increased progressively over the course of the year.
 - *'She quite often comes out with a French word or song from the app, more so as the year has gone on'.*
 - *'In the beginning of the year we rarely heard him use any Indonesian words. He increasingly uses Indonesian. He will tell us the colours and body parts. He tried to teach me how to say hello and good morning but became frustrated with me because I wasn't pronouncing them properly.'*
- One parent/guardian who had prior knowledge of the language being learnt stated that their child's pronunciation had improved.
- Several parents/guardians noted that while they could observe their child speaking the language, they could not tell if the child was using the words in context or with the right pronunciation as the adult didn't speak the language themselves.

Those who stated that the children had not learnt any language generally stated they had not talked about the ELLA trial at all with their children or that the child enjoyed playing on the iPads but seemed to like the games more than the language learning.

6.1.3.2 Parent/guardian observations relating to cultural awareness outcomes

Reflecting the findings from educators, an interest in the culture associated with the language of the ELLA apps was observed less frequently by parents and guardians than the use of words from the language. However, a larger proportion of parents observed their children displaying interest in the culture associated with the ELLA apps at home in December (49%) than in August (37%). This suggests that children's interest levels in the culture associated with the apps may have increased over the course of the year as children became more familiar with the ELLA apps.

Chart 6.8: Parent/guardian observations of child showing interest in culture associated with the ELLA app at home



Source: August Parent Guardian Survey (252 responses), December Parent Guardian Survey (199 responses)

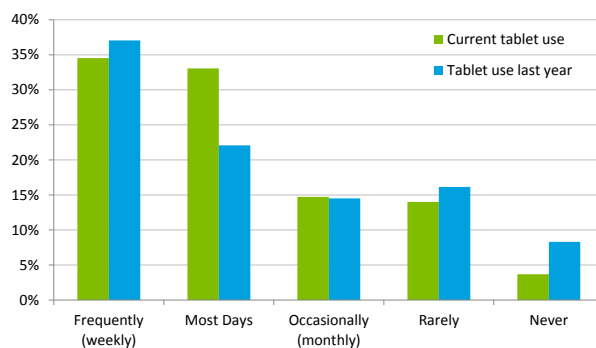
Specific observations in relation to cultural awareness outcomes of children participating in the ELLA trial, as observed by parents and guardians, included:

- An interest in places, food and other cultural objects associated with the language being explored in the ELLA app.
 - *'He gets all excited when he hears the word Japanese, anywhere!! If any of his brothers come across anything Japanese they go straight to [my child] and tell him, and always greatly appreciated by [my child], lots of smiling and nodding. We like to get books from the town library about Japan. We practice using chop sticks.'*
 - *'She notices when Indonesia is mentioned on TV or out in the world, and points things out to us that remind her of things relating to Indonesia which she has learned about at school'.*
 - *'She is keen to go to Japan and loves sushi and Japanese food, which we make at home sometimes, as well as chicken teriyaki. She has also asked me quite a lot about the war with Japan. As Darwin was bombed by the Japanese, we have had discussions about why our countries were enemies and how they are now friends and allies, for instance.'*
 - *'He wanted have long shirt (Arabic traditional costume) on Eid. He bought one and he was so happy.'*
- An awareness of different cultures and ways of being.
 - *'My son is always asking questions about people who he notices are different to him'.*
 - *'Talks about how far other countries are away from us and has his own globe in his bedroom now that he is always looking at'.*
 - *'He is now more observant of accents and the implication of accents, i.e. that the individual must speak another language'.*

6.1.3.3 Observations relating to other child outcomes

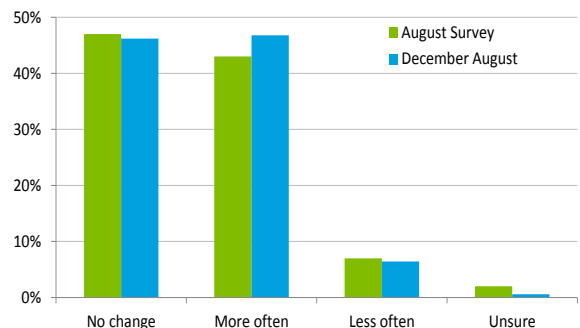
In addition to observed language use and cultural outcomes, digital literacy was the next most commonly discussed outcome of the ELLA trial by parents and guardians. The results of the parent/guardian surveys suggested that child use of tablets outside of preschool has increased over the course of the year, as shown in Chart 6.9 and Chart 6.10. Many parents/guardians stated that their children had become confident using iPads and touch screens, able to navigate through different apps with ease.

Chart 6.9: Child use of tablet technology within the home



Source: Weighted average of the Parent/Guardian Surveys - August (231 responses) & December (176 responses)

Chart 6.10: Child use of tablet technology this year as opposed to previous use



Source: Weighted average of the Parent/Guardian Surveys - August (231 responses) & December (176 responses)

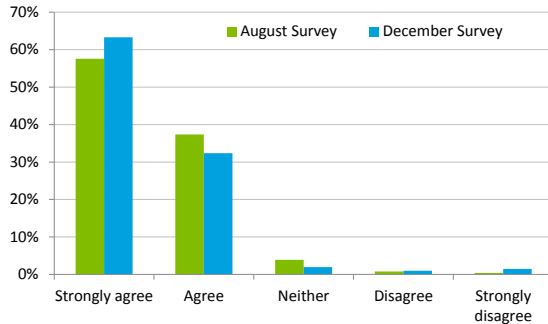
And finally, while social outcomes such as turn taking and care for property were not reflected in parent and guardian observations, a number of parents/guardians discussed the impact of the ELLA trial on their child’s confidence. It was remarked in several survey responses that the child’s ability to showcase their language skills or cultural knowledge, had increased their confidence in conversing with others. It was suggested that this was driven by holding a skill which others did not, or through the ability to evoke positive reactions in native speakers of the language.

It was also observed in several parent/guardian observations that children expressed heightened interest in other languages and cultures. This supports educator observations that bilingual children gained pride for their own language abilities over the course of the trial. For instance, one parent observed that *‘She likes to name things in Japanese when she knows them. She’s also more interested in other languages spoken fluently in our family (French and German) which previously we’ve struggled to pique her interest in’.*

6.1.3.4 Overall parent/guardian perception of ELLA trial

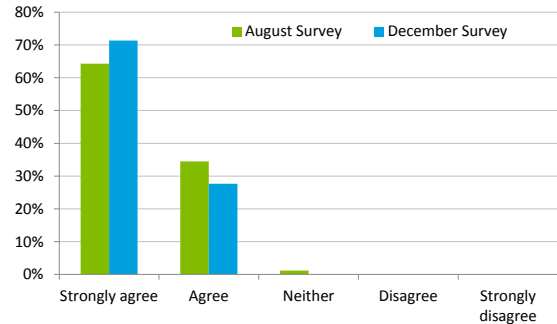
Generally, parents and guardians endorsed the ELLA trial, with some referring to the trial as ‘wonderful’ or ‘fabulous’. Typically, parent/guardian survey responses indicated that they felt the trial was beneficial for their child. As a whole, they appeared to be appreciative of the diverse potential outcomes associated with the ELLA apps, with more than 90% of parents/guardians agreeing or strongly agreeing with the propositions that it is beneficial for preschool children to learn about another language and another culture (Chart 1.1 and Chart 6.12).

Chart 6.11 Parent/guardian strength of agreement with ‘it is good for preschool children to learn another language’



Source: Parent /Guardian Surveys - August (257 responses) and December (207)

Chart 6.12: Parent/guardian strength of agreement with ‘it is good for preschool children to learn about another culture’



Source: Parent /Guardian Surveys - August (257 responses) and December (206)

Some of the perceived benefits associated with language learning, as stated by parents and guardians, included:

- it enables children to conceptualise living in a multicultural society;
- it increases opportunities for travel and work in the future;
- it encourages brain development and other cognitive skills;
- children learn languages more easily at a younger age;
- learning another language reinforces understanding of the primary language; and
- it improves children’s confidence.

Additionally, some of the perceived benefits associated with cultural learning, as stated by parents and guardians, included:

- encouraging children to think and understand concepts of difference and cultural awareness;
- important that children begin to be exposed to diversity at an early age, particularly given the multicultural nature of Australia and the increasingly globalised world; and
- encourage tolerance and respect for other people and other perspectives – potentially leading to a more harmonious and accepting society in the future.

6.2 Educator outcomes

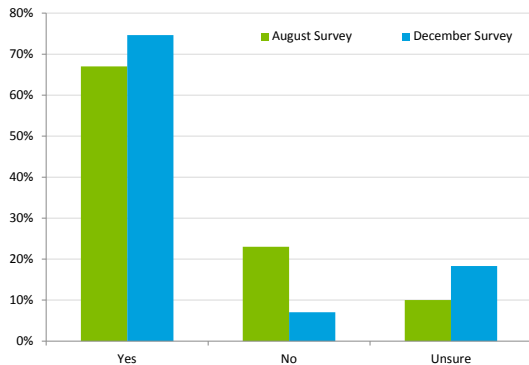
While child outcomes were the primary focus of the ELLA trial, educators also noted a number of positive outcomes which could be attributed to the trial. Most commonly this included: (1) an increased confidence in incorporating language and culture; and (2) increased confidence in using digital technology to support early childhood learning.

6.2.1 Increased educator confidence in incorporating language and culture

The educator surveys asked educators to indicate whether they felt more confident in their ability to incorporate language learning and culture as a result of the trial. The results, confirming a positive impact of the ELLA trial on educator confidence, are provided in Chart 6.13 and Chart 6.14 below, which show that over 70% of educators felt increase confidence in incorporating language learning. It

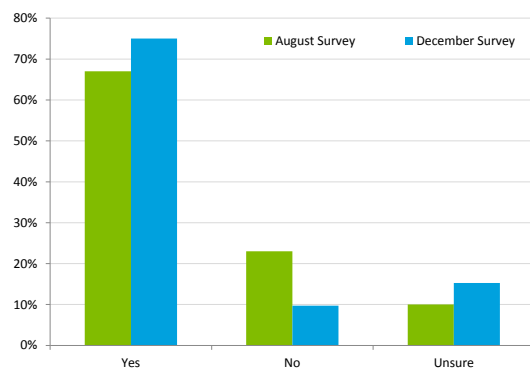
can be observed that the proportion of educators stating their confidence increased as a result of the ELLA trial grew as the year progressed.

Chart 6.13: Did educators feel increased confidence in their ability to incorporate language learning as a result of the ELLA trial?



Source: Educator Surveys - August (91 responses), December (71)

Chart 6.14: Did educators feel increased confidence in their ability to incorporate cultural awareness as a result of the ELLA trial?



Source: Educator Surveys - August (91 responses), December (72)

Affirmative comments as to why educator confidence in language and culture integration had increased included:

- The ELLA trial provided exposure to a wide number of methods through which to incorporate language learning into the educational programme – including through play and immersion rather than just structured language lessons.
 - *'The apps gave me so much [sic] ideas and strategies to teach language to young children, the interactive and fun based language learning will stimulate children's interest and desire, that's for sure!'*
- The format of the trial allowed children to engage with and learn the language at their own pace in a positive environment.
 - *'You learn as the children go. Because it is a new skill to both educators and children it was good to learn together. Learning a new language is daunting but breaking it down into categories made it easier and following the children's interest with their progression of the phrases was good.'*
- The trial provided exposure to the impact that teaching children to communicate in another language and understand another culture can have. This was driven by the observed high level of interest children had in the ELLA apps and how quickly they picked up words and phrases.
 - *'I have seen how easily the children learn a new language, and how they take to it. They have no fear about making mistakes and just enjoy themselves. They are happy to learn new things and absorb them quickly. So there is no need to think it would be hard to incorporate foreign languages.'*
 - *'I have more knowledge of Arabic than I previously did and the ELLA apps help with pronunciation and meaning. I am also more confident because I have seen how the children have embraced the learning and the confidence it has given them to know languages other than that of their families.'*

- The realisation that the educator did not need to speak the target language in order to facilitate the children engaging with and learning the language.
 - *'Most definitely are more confident teaching language, but with using the iPads. The work is done for you. If I had to teach the language without the iPad I would probably not do it...pronouncing those words for me is very difficult'*
 - *'When reinforcing the words I kept referring back to the iPads to get the words correct.'*
 - *'Realisation that it is OK for me to be learning this alongside the children – so I don't have to already know a second language for it to be valuable.'*
- The trial highlighted how the cultural experiences of children and families within the service could be used to raise awareness of multiculturalism and to increase connections across the service. While many services stated that the ELLA trial facilitated conversations around cultural awareness and openness, other services already employed an extensive cultural program within their service and the ELLA trial complemented existing approaches.
 - *'Creates entry points for family and community members to share their culture across the centre'.*
 - *'Having had this opportunity and being able to discuss it with other professionals has provided lots of information and ideas about how cultures can be integrated into early childhood programs'.*
 - *'The ELLA Trial has encouraged lots of parents to "open up" about their own culture and heritage'.*
 - *'The ELLA trial has made me think about the cultures that are currently represented within our centre and how little we know about them. Making resources, planning activities and singing songs based around the apps and the French language has made me think I could adapt them to other cultures'.*
 - *'We are more comfortable and have seen the effect it has on the confidence of the children from those cultures when they see their culture is acknowledged and valued'.*

It was noted in some responses that this increased confidence was linked to the ability to use the ELLA apps and resources, and without these educators would revert back to the informal and ad hoc approaches to language education they employed prior to the trial. Others stated they would use the learned techniques regardless of whether the trial was continued or not.

Comments as to why confidence had not increased included:

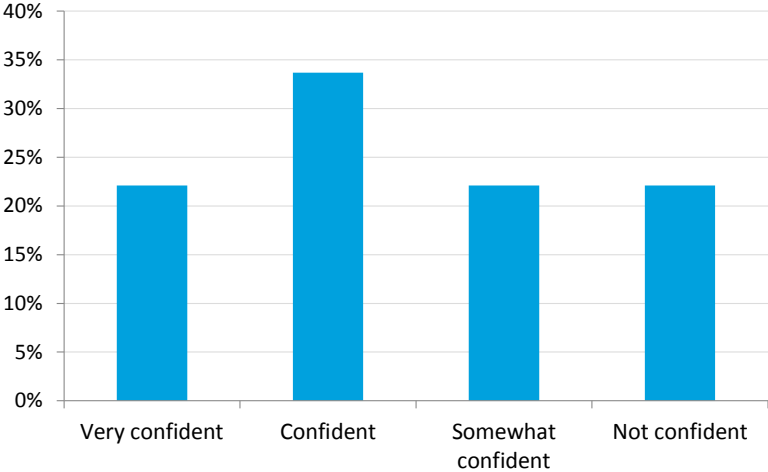
- Uncertainty that the trial had resulted in any actual language learning as it appears more focussed on language awareness.
- Educator unfamiliarity with the language and the correct pronunciation has limited potential confidence growth. It was noted that this may be improved with further training or guidance.
 - *'As an educator/teacher I like to really know and understand what I am teaching. I felt that I didn't have enough understanding of the language and to gain a strong understanding of this one area of my program would take a lot of time'.*
- Lack of time for the educator to properly familiarise themselves with the ELLA apps and resources, resulting in a lower level of engagement with the trial than would have been preferred.
- In some instances the service already had a strong emphasis on cultural awareness so the ELLA trial did not alter current practice.

6.2.2 Increased educator confidence in incorporating digital technology

Responses to the August Educator Survey found that at the beginning of the trial there was a fairly even spread of confidence levels relating to digital technology among participating educators, with a slight majority (56%) of respondents feeling confident or very confident about incorporating technology (Chart 6.15).

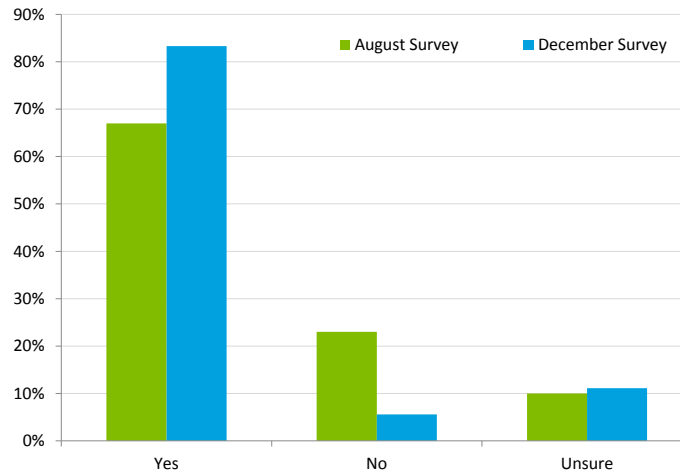
Following this, as shown in Chart 6.16, in August most educators (69% of responses) stated that their confidence in incorporating digital technology had increased as a result of the ELLA trial. This proportion grew to 83% of educator responses by the December Educator Survey, indicating that confidence continued to develop over the course of the year. Of those educators who stated that their confidence had not improved (6% of responses in December), it was commonly stated that the reason for this was because they were already confident using technology prior to the ELLA trial. Site visits suggested that those educators who felt more confident using technology were looking for other ways to integrate technology, outside of the ELLA trial.

Chart 6.15: Educator confidence levels about incorporating digital technology at trial outset



Source: August Educator Survey (95 responses)

Chart 6.16: Did educator confidence levels about incorporating digital technology increase as a result of the trial?



Source: Educator Surveys - August (95 responses) and December (72 responses) Educators cited numerous characteristics of the format of the ELLA trial which facilitated their growth in technology confidence:

- The ELLA trial highlighted the effectiveness of iPads and apps as a learning tool for preschool children. A key fixture in this effectiveness was noted as being the flexibility iPads afforded children to work at their own pace, in a non-competitive format. This characteristic was in some cases stated to be particularly beneficial for certain cohorts, such as quiet children or children with developmental delays.
 - *'I did not really use the iPads...however after seeing how well the children enjoy using the iPads and how they have learnt so much I would definitely use them in my class. I am quite amazed at how much children have learnt using the iPads. The apps have reinforced some basic Kindy concepts which has been really good, especially for the lower achievers.'*
 - *'It has been encouraging to see quiet/shy students interact with technology in a way they don't with educators. That face to face interaction which is intimidating for some is removed when they are using an iPad.'*
 - *'I have experienced how easy it is for children to use and the learning opportunities to suit all developmental levels.'*
 - *'The ELLA apps are well designed, non competitive and with a positive purpose, this fits in well with our philosophy. Not all apps are designed this way so we would have to be very careful which ones we put in the classroom.'*
- Being exposed to the iPads over the course of the year has made the devices a familiar tool and they are being increasingly used outside the ELLA trial. iPads were also found to easier to integrate into a preschool environment than desk-top computers.
 - *'More knowledgeable about what quality programs look like, can see how iPads can be integrated in the classroom if available all the time, knowledge of how children will interact with the iPads.'*
 - *'The iPads have opened so many possibilities with their portability.'*
 - *'More regular use and consistency of use of technology in the learning programme. Not just for "one-offs".'*
 - *'The iPads are so intuitive. The children picked up things much quicker than the staff. I have loved moving away from the notion of a computer station.'*

- Confidence in using the iPads has extended into other technological devices, such as Apple TV and interactive white boards.
- Concerns that use would be difficult to manage were generally found to be without merit, with rosters and timers helping children to self-regulate their time.
 - *'The children self-regulating their use was a surprise to the educators.'*
 - *'The children were quite capable of regulating their use of the iPads themselves and they were not "over-used".'*
 - *'Honestly, I am not a digital technology person and I had reservations about having them in the classroom. I thought the iPads would take over and the children would not want to do anything else. This year has changed my mind. Some of the children need to be prompted to move on from the iPads but generally they monitor themselves. Some days the children choose to just leave them in the basket and not even use them and other days there is a line up (for this we use a 10 minute sand-glass timer).'*
- Concerns that the iPads would be easily damaged were also discovered to be unfounded, with the cases providing good protection and children generally following established use guidelines.
 - *'We had never used iPads before and were nervous about how the children would manage e.g. breakages etc. but they have listened well and follow 'rules' really well.'*

However, there was still a level of reservation from a minority of educators about the use of digital education. Reservations included:

- A need to balance technology use against other experiences matched with a belief that exposure to iPads occurs enough in the child's home.
- A philosophy that young children learn best with concrete materials they can feel and manipulate.

6.2.3 Other outcomes for educators as a result of the ELLA trial

Site visits and surveys found numerous other impacts on educators which resulted from the introduction of the ELLA trial within their service. When educators were asked to reflect on the broader impacts of the ELLA trial, some common reflections were that the trial:

- Provided increased opportunities to network with other services and learn from others.
- Inspired educators to think more creatively about pedagogy and the way they deliver the educational programme – including more focus on play-based and technology based learning.
- The supporting material provided for the ELLA trial, including the impacts of language learning on brain development, was noted by several educators as being useful context for reinforcing the educational aspects of preschool for families.
- An opportunity to redesign their learning trial to incorporate a more immersive approach to multiculturalism, including increased interaction with families.
- An environment in which children can 'teach the teacher', encouraging collaborative learning and instilling confidence in participating children.

The following statements were made by educators responding to the December Educator Survey at the conclusion of the trial, and reflect the positive impressions of the trial.

- *'Amazing experience, so glad to have been a part of it'.*

- *'The apps are incredible! App 7 has been developed so accurately to suit their interests and to make language and culture as rich as possible. The apps make learning so, so fun.'*
- *'I feel very strongly that the intention of bringing interest back into learning other languages to children by introducing and engaging at a young age has been a resounding success and I would strongly encourage learning further languages in the new year...even filtering this learning to other rooms (we are a 0-5 year centre).'*
- *'It has been one of the best learning experiences of my 25 year teaching career. I am in awe daily of how quickly the children learn and have loved this learning.'*

Although uncommon, there were a small number of less positive reflections:

- The ELLA trial was time consuming and resulted in other components of the educational trial receiving less attention.
- The behaviour of children was more difficult when iPads were introduced – including children becoming impatient, constantly asking for the iPads and being disruptive until it was their turn.
- It was more difficult to engage children in active social play at times when iPads were being used in the classroom.

6.3 Funding and cost efficiency

The evaluation has considered the *cost efficiency* of the ELLA trial, which is a function of: the outcomes of the trial; the number of children participating in the trial; and the level of resources required for establishing and delivering the trial.

While the evaluation can make general observations regarding cost efficiency, it is not yet possible to undertake a definitive *cost effectiveness* analysis. This reflects that while the ELLA trial has clearly been well received and shown positive signs regarding the pre-production and early language production stages of language learning, the actual benefits will not become known for some time. The cost effectiveness analysis would also require a comparison group, so the value of these outcomes could be compared.

6.3.1 The cost of the ELLA trial

The cost of the ELLA trial during the development and the 2015 trial period was \$9.8 million. It reached 1,868 students, representing a cost per student of approximately \$5,246. Given the innovative nature of the ELLA trial, no direct comparisons through which to determine the cost efficiency of the trial on a per child basis have been identified.

If costs were considered at a 'per app' rate, rather than a 'per child' rate, the total cost of the ELLA programme came to \$280,000 per app (\$9.8 million divided by 35 apps¹⁸). However, given the \$9.8 million budget for the ELLA trial included training materials, support materials, project management, the introductory and mid-way workshops the cost of supplying the iPads, and a host of other cost items, the per app development cost is likely to be significantly less than the \$280,000 per app.

Nevertheless, this figure can be compared with the development of similar apps – in particular, the development of other enterprise apps (apps designed to satisfy the needs of a group of people, rather than an individual user) to provide a high level point of comparison. Surveys conducted by IT

¹⁸ This assumes the trial involved the development of 35 separate apps – a series of 7 apps across each of the 5 languages.

services firm Kinvey suggest that the costs associated with developing an enterprise app average to approximately US\$270,000, with a fifth of respondents spending between US\$500,000 and US\$1 million on their app development (Kinvey, 2014). Reporting slightly lower costs, similar research conducted by IT research firm Clutch places the median cost of an app between US\$38,000 and US \$171,000, with a maximum cost as high as \$727,000 (Clutch 2015).

6.3.2 Increasing cost efficiency over time

Reflecting that the evaluation has examined the ELLA programme during a trial phase, the most significant cost investments associated with it (i.e. the development of the ELLA apps and supporting resources) have been undertaken. As such, the per-unit cost associated with delivering the ELLA trial is expected to decrease as the number of participants increases, provided an appropriate model for managed growth and sustainable app maintenance and ongoing development is put in place.

Table 6.1 shows the per child unit costs of the ELLA trial in the initial year (2015). Assuming no additional apps were developed and the trial was made available to the same or an increased number of sites, the estimated per child costs for a further three years of the trial have been estimated under three illustrative scenarios (base case, medium growth and fast growth). In each scenario, the average cost per child decreases over the three year period after the initial year. The trial costs are assumed to be \$9.8 million for the pilot trial, with ongoing annual costs of \$8 million dollars over the next three years.

Table 6.1: ELLA trial cost per child illustration¹

	Trial year	Year 1	Year 2	Year 3	Year 4
Base case scenario²					
No. participating children	1868	1868	1868	1868	1868
Ave. cost per child	\$5,246	\$3,337	\$2,700	\$2,382	\$2,191
Medium growth scenario³					
No. participating children	1868	3,736	7,472	14,944	29,888
Ave. cost per child	\$5,246	\$2,225	\$1,157	\$635	\$353
High growth scenario⁴					
No. participating children	1868	7,472	29,888	119,552	335,357
Ave. cost per child	\$5,246	\$1,335	\$386	\$112	\$41

¹ Future cost of ELLA trial assumed to be \$8 million dollars over three years, spread equally over each year.

² Assumes no new sites receive the apps, and a new 1,868 children participate in the trial each year (i.e. the same number of trial participants per site as current levels).

³ Assumes the number of sites and the number of children that receive the apps doubles each year.

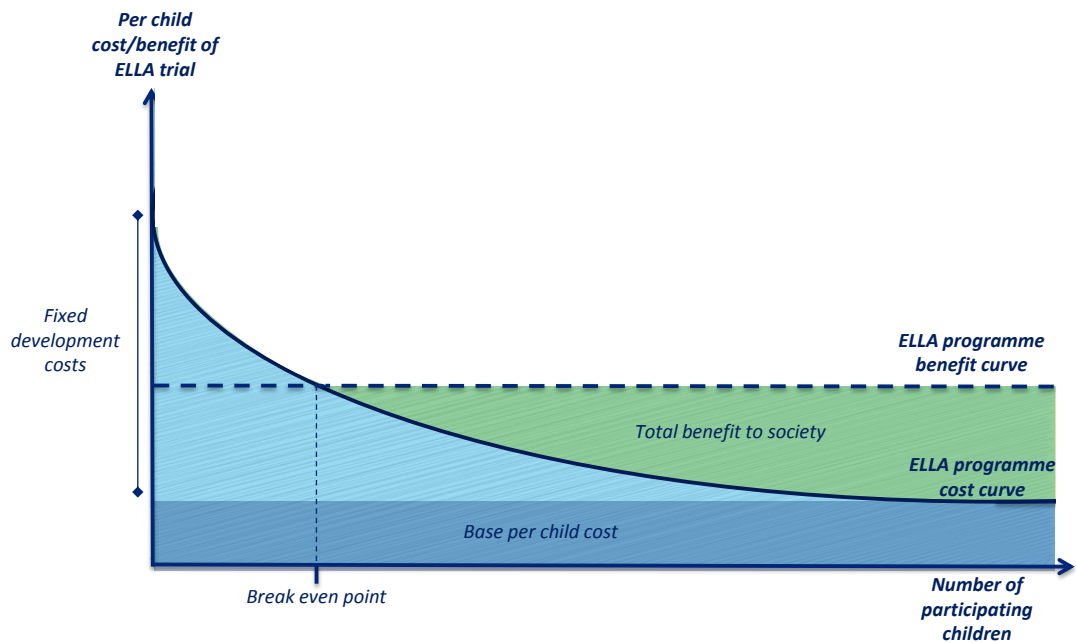
⁴ Assumes the number of sites and the number of children that receive the apps quadruples each year (until all children enrolled in preschools are reached in year 4⁽¹⁾).

Assuming that the trial quality remains constant (that is, that an increase in participants does not adversely impact trial quality and, therefore, trial outcomes), the cost efficiency of the ELLA trial is expected to increase as it expands.

⁽¹⁾ All children enrolled in preschools is sourced from ABS (2015), *Preschool education, Australia, 2014*, Table 1: Preschool education, Australia, 2014, catalogue number: 4240.0. There were 324,624 children enrolled in preschools nationwide in 2014.

As seen in Figure 6.1 below, there will always remain a base per child cost associated with the delivery of the ELLA trial. This is driven by variable costs such as administration and support for services which will increase as participation numbers increase. However, the fixed costs of the ELLA trial, those which do not vary with participation numbers (such as app development, data storage, advertising and provision of set resources) will decrease on a per unit basis as the trial grows. Therefore, as the number of participants grows, the ELLA trial cost per child decreases towards the level of the base per child cost.

Figure 6.1: ELLA trial cost curve (illustrative replication only)

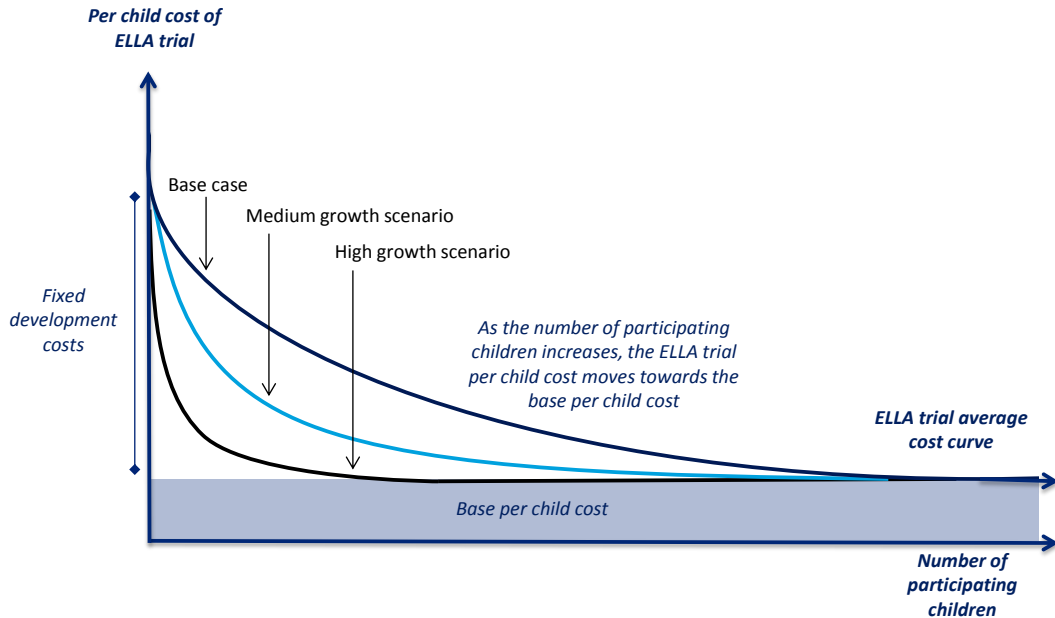


Source: Deloitte Access Economics

It can also be assumed that there is a minimum benefit per child as a result of participating in the trial. At this stage of the trial, it is difficult to determine the magnitude of this benefit. While there are positive signs that the benefits associated with early language exposure would be gained by participating children, many of the benefits associated with learning a language, and language exposure, will not become apparent until a later time period. Also, the nature of the benefits of the ELLA trial, including increased cultural awareness and acceptance, community cohesion and increased interest in language learning are in many cases intangible and difficult to quantify. It is also noted that engagement with the ELLA trial was highly variable on a per child basis, and as such, the benefits accruing to each child would vary significantly.

As the magnitude of the costs and benefits are at this stage unknown, Figure 6.2 below is purely illustrative. However, it demonstrates – at a theoretical level – how the aggregate benefit of the trial increases as the number of participants increases, leading to an increase in cost effectiveness. As long as the per child benefit of participating in the ELLA trial is larger than the per child base cost, the ELLA trial will have a higher probability of producing a net benefit for society as the number of children participating in the trial increases.

Figure 6.2: ELLA trial benefit-cost curve (illustrative replication only)



Source: Deloitte Access Economics

Ultimately, given (1) the significant investment associated with trial development, (2) the potential benefits of the ELLA trial and (3) the relatively low marginal cost of expansion, there is a case for facilitating the expansion of the trial to a greater number of services, provided this is done in a managed way.

6.3.3 The potential for partial cost recovery

While it is anticipated that the Australian Government will remain the primary funder of the ELLA trial going forward, there are two avenues through which a portion of the ELLA costs may be funded by an alternative source:

1. Charging a price for the ELLA trial and recouping a portion of the cost of delivery from services.
2. Co-funding the ongoing costs of the ELLA trial with state and territory governments.

6.3.3.1 A user-pays system

Given the positive reception of the ELLA trial by sites, and an overwhelming indication that services wish to continue delivering the trial, a potential opportunity exists to charge services for the apps. This is supported by the fact that several sites noted the apps were a powerful marketing tool for their services, as parents were eager to enrol their children at a site which offered language exposure and learning.

The potential to charge for ELLA apps was tested with sites and it was found that only 6% of educator responses to the December Educator Survey stated that they would be unwilling to pay for the ELLA apps. 34% indicated they would be willing to pay and 60% stated they were unsure. Educators noted that the following considerations were important:

- The high quality of the apps, and the positive experience of the trial would support a move to purchase the apps in the future.
 - *'This is something I cannot commit to without going to my finance committee. However, if this became available for us to buy I would encourage my school to do so as I think it has been a great experience for the children and has helped their growth and development.'*
 - *'We think it has been an excellent program and we are just coming to grips with it now, as are the children. To be able to continue on would be fantastic. We would even look at getting additional languages...'*
 - *'Depending on cost obviously, but we know it is a high quality program with high benefit in the classroom.'*
- A need to get sign off from councils or the broader community
 - *'We have a strong family committee who runs great fundraising events, we always look for good program or projects for the children...learning language will be a good program for the children, I'm sure the families would like to support this.'*
- The price of the programme
 - *'Hard to say what a reasonable amount would be. The price of the app would need to be reasonable to be competitive as schools may wish to install them on more than just the 5 iPads provided – i.e. 50 iPads across the school with 7 ELLA apps on each at \$1 per app is \$350 for one language...I guess we would be prepared to pay around \$300-\$500.'*
 - *'The major expense for us would be furnishing the iPads. It's a significant outlay to purchase 5 iPads...and then the additional expense of an ELLA subscription. I think the program is worth it, but I particularly value language learning...I don't know that I could convince my colleagues. I think a reasonable amount for a year's classroom subscription would be \$100-\$150.'*

Those who were reluctant to pay for the apps generally cited a lack of available finances, equity implications and/or competing priorities:

- *'As our service has a number of families on HCC and concession cards which reduce their Kindergarten Fees and already struggle to pay those reduced fees... children that have limited access and exposure to using iPads etc have really enjoyed having the exposure to ICT and exploring a new language...so being free has enabled those families to actively participate in the program.'*
- *'Preschool funding being minimal, this program would be an expense the preschool couldn't afford. A lot of other things more important and would be more beneficial to the children than paying for this program. Like paying for support workers'*
- *'As we are a community kindergarten it would need to be a cheap option as funds are limited for us. I would think that it would need to be government funded so that all children have equal access'*

It is noted that the equity implications of imposing any charge for the ELLA programme would need to be considered, to the extent that the imposition of an additional cost-barrier may preclude participation from any families or services. This is considered in greater detail in Chapter 7.

6.3.3.2 State and territory contributions

There is also a potential that states and territory governments increase their involvement in the ELLA programme, and may provide support through in-kind or financial assistance. The consultations held with education authorities found that generally, the states and territories were supportive of the concept of an expanded ELLA trial, and that the trial generally aligned well with local policies related to increased use of digital technology in early years education and heightened focus on language learning and cultural exposure.

As such, to the extent that there is scope for the Australian governments to increase collaboration in the delivery of the ELLA programme, and for the state and territory governments to progress towards language learning and digital education policy objectives through the ELLA programme, further cost efficiencies may be achieved. Additionally, if the ELLA programme was to be expanded into primary education at any point in time, it would be necessary for state and territory governments to increase their role in the delivery of the ELLA programme given their jurisdiction over the schooling system.

7 Future considerations

This chapter, informed by the Evaluation findings, provides an overview of considerations for the future of the ELLA trial. This includes both suggested refinements to the existing trial and an analysis of the options for future expansion.

7.1 Trial limitations and refinements

While educators and the wider community, including jurisdictional state and territory authorities, were broadly positive about the potential benefits of the trial, there were several concerns that were raised about the trial's efficacy.

At a high level, these concerns included:

- **Continuity in language learning:** the lack of a clear path for language learning for children on the completion of the ELLA trial raises questions as to the long-term effectiveness of the ELLA programme. It is noted that this issue relates specifically to the outcome of 'language learning' as opposed to 'language exposure'.
- **Ensuring adequate language exposure:** there was variation in the use of apps by children within and across sites. While this is appropriate in a pre-school environment, it does suggest that children could not be expected to have a minimum level of language understanding at the conclusion of the trial.
- **Level of educator engagement:** it was found that the level of trial integration (and potentially effectiveness) across sites was highly variable and dependent on the individual approach of each educator. As such, educator engagement is crucial for successful implementation of the ELLA trial and methods to ensure consistent and high levels of engagement should be considered in relation to any future broadening of the trial.
- **Educator confidence:** stemming from concerns with educator engagement, there were concerns among several educators (noting that this was a minority group, as discussed in Chapter 6.2) that they did not hold the required skills to adequately deliver the ELLA trial in their service. These concerns stemmed from a lack of confidence in teaching a foreign language, as well as how to integrate digital technology in the classroom (i.e. unsure of appropriate screen time limits for children).
- **Exclusivity of the ELLA trial:** it was difficult to exclude non-participating children (three year olds or those not provided with consent) from using the apps when they were so engaging for other children. Many educators noted that they could not see a logical reason why three year olds could not participate in the trial as they would easily be able to navigate the apps, and by starting a year earlier, would have the opportunity to increase their language exposure.

7.1.1 Suggested refinements

Building on the concerns articulated above, over the course of the trial – many educators and parent/guardians made suggestions as to how the ELLA trial could be improved, and the impact of the trial further enhanced. These are discussed below.

7.1.1.1 Additional guidance

There was a common theme that services would have benefited from increased guidance at both the implementation stage and throughout the trial. This included guidance on trial delivery, supporting activities and parent/guardian engagement. However, it is important to note the trial was purposely designed to allow educators the freedom to implement the trial in a way that suited them best. This was done to observe the effectiveness of different methods used to introduce iPads and language learning into a preschool environment.

The types of additional material, which sites indicated they would appreciate was predominately in the form of:

- A translation sheet or educator app which allowed educators to more confidently support children in their language acquisition – it is noted that an educator app is currently under development for inclusion in the ELLA trial from next year.
- A more clear delineation of the ELLA trial’s aims and objectives (i.e. is it language exposure or language acquisition) in order to manage expectations of educators and families accordingly. It was also stated that it would be helpful if such a document also clearly mapped linkages to the EYLF and provided guidance on how the ELLA trial could most effectively be implemented in the room, including advice on screen time.
- A resource bank which provided educators online access to a stockpile of relevant, high quality, appropriate materials to be used for complementary activities. However, it was noted that there may be difficulties associated with the Australian Government or ESA promoting external material.
- More explicit guidance as to appropriate amounts of screen time for children.

7.1.1.2 Broadening of the ELLA trial

It was suggested by numerous parents and educators that the trial could heighten its impact if broadened to allow for participation by children of broader age groups (potentially developing more later age apps and integrating with primary school). A desire for greater language choice within the trial was also expressed. Potentially, multiple languages could be explored within a single preschool, especially as a focus on one language and culture can be seen to contradict an ethos of multiculturalism.

7.1.1.3 Networking between educators

Educators regularly stated they felt they would have benefited from increased interaction with other sites to share ideas on how to best deliver the ELLA trial. While there was acknowledgement of the Facebook page, educators felt this was not being sufficiently utilised.

7.1.1.4 App design

While feedback on the software design was typically positive, several suggestions for further enhancements and improvements to the apps were made by both educators and parents/guardians throughout the trial. Suggestions included:

- a ‘back’ arrow to improve navigation between activities;
- parental controls on the iPads - allowing the settings to be locked and preventing children from changing them;
- increased opportunities for children to speak the target language;

- provision of a screen cover to prevent damage;
- a timer on the screen which begins when a child logs into the trial;
- using real life images, rather than cartoons, to further support children’s cultural awareness outcomes; and
- use of the child’s avatar within the app activities as a means to increase child engagement.

7.2 Options for expansion

This section works through the key decision points for the potential expansion options for the ELLA trial. A series of design principles and parameters were established to ensure that the options analysis was undertaken with consideration of the trial objectives and the anticipated direction of the next phase of the ELLA trial, based on Australian Government consideration of evaluation findings.

Design criteria

To evaluate the merits of the potential options for the expansion of the ELLA trial, three design criteria were established.

- **Accessibility:** the extent to which each option provides opportunity for increased participation in the ELLA trial. This criterion also includes consideration of equity.
- **Cost-efficiency:** the extent to which each option minimises the cost per child of delivering the ELLA trial (as discussed in Chapter 6.3).
- **Effectiveness:** the extent to which the trial achieves its desired objectives of increasing language exposure and learning in Australia. This includes consideration of the quality of the programme and how this may change over time.

Throughout this options assessment, the above design criteria are applied to each option. This illustrates the interactions and trade-offs between the considerations of accessibility, cost-efficiency and effectiveness.

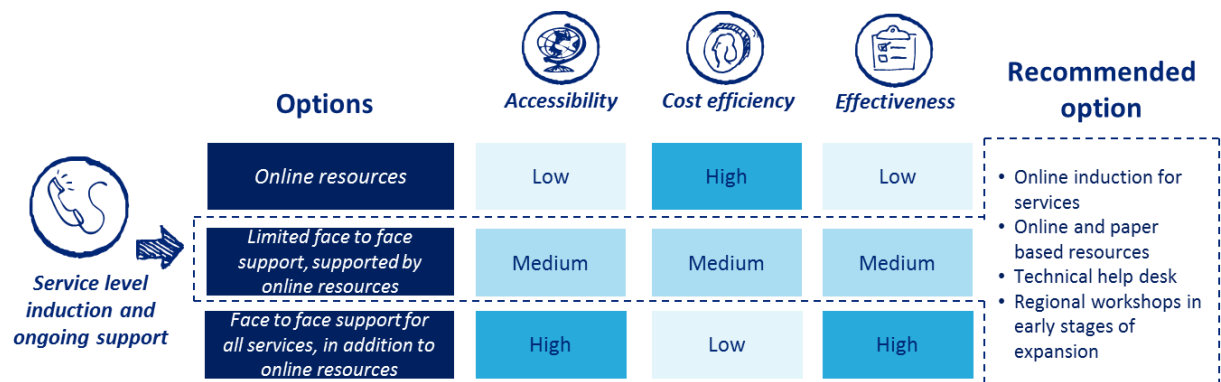
Parameters for consideration

While the below analysis of potential options is based on the independent findings of the evaluation, to ensure the analysis is able to provide practical guidance for decision making, several parameters have been set. These parameters relate to the Australian Government’s intended direction for the ELLA trial:

- An ELLA trial budget of approximately \$8 million over the next three years.
- The major priority of the ELLA trial in the immediate future (the next three years) is to boost participation among preschool aged children in use of the ELLA language apps.
- In the immediate future, the apps developed as a result of the ELLA trial will remain a government asset. As such, no analysis of divestment of the ELLA programme has been undertaken.

Four elements are discussed below – support for services, recruitment of additional sites financial assistance for services, and scope of the trial.

7.2.1 Support for services



Ongoing support for ELLA trial participants can be divided into two key components (1) responding to ad hoc questions and technical issues regarding trial delivery; and (2) providing opportunities for information sharing and educator development.

The various support mechanisms available are discussed below, drawing on evaluation findings outlined in Chapter 3.2, and are categorised as either **delivery** or **development** support.

- **Programme delivery support**
 - **Online and paper based resources:** These were found by educators to be useful support mechanisms. Additionally, as these resources have already been developed, the marginal cost of distribution to participating services will be minimal.
 - **Webinars:** While the webinars conducted throughout the trial were noted as being useful by some educators, this form of support was not as popular as either the website or networking opportunities – potentially due to the reduced flexibility of needing to logon to computers at a set time.
 - **Help desk:** As the help-desk has the potential to service a large number of participating sites with centralised resources, it presents a cost-effective way of ensuring smooth implementation and providing reasonably responsive technical support to services on an ongoing basis.
- **Programme development support**
 - **Workshops/networking opportunities:** The workshops were the most popular support service offered throughout the ELLA trial, reported by educators as inspiring increased engagement with the ELLA trial, and as such, potentially raising outcomes.
 - **Site visits:** The site visits were found to be a useful form of support by services. However, given that workshops are both more cost effective than individual site visits, and were more popular with educators, it is expected that workshops would be prioritised over site visits in any ongoing support for the ELLA trial.

A trade off exists between the cost-efficiency of online resources and the effectiveness of face-to-face support. During the second round of site visits, the importance of face-to-face demonstrations, as opposed to viable alternatives, was tested with services. Educators stated that they appreciated the value of the workshops, and the opportunity to network with other educators. Some educators felt a combination of introductory materials and online webinars or videos would be sufficient to enable sites to implement the ELLA trial effectively.

However, despite the increased costs, evaluation findings suggest that face-to-face demonstrations would be beneficial, particularly in the early phases of the ELLA trial:

- Educators participating in the ELLA trial stated that the workshops were highly valuable in providing direction on how to most effectively deliver the ELLA trial at their site, and for generating enthusiasm for the trial.
- Educators also suggested that face-to-face inductions increase the likelihood that the ELLA trial is delivered in a manner which maximises trial outcomes. Indeed the evaluation found that interactive sessions were more likely to encourage changes in practice, encourage innovative pedagogical approaches and ‘develop the educational model’ – all which would work to enhance the effectiveness of the ELLA trial
- Additionally, face-to-face demonstrations would act as a further marketing tool for the trial and potentially increase participation from services that would be unlikely to apply unless witnessing the apps first-hand, thereby also increasing the accessibility of the trial. Indeed, consultations with educators found that a number of educators and families were initially sceptical of the ELLA trial until they saw the high quality of the apps and the ease with which children engaged with them.

It is noted that investment in more intensive forms of support, such as workshops and a phone-based help desk, would be more effective if concentrated in the initial stages of trial expansion. As the ELLA programme becomes more established, and networks of educators develop increased capacity to provide support (through online forums, on a regional basis etc.), the need for more intensive support may reduce.

Educators involved in the ELLA trial indicated that they would be willing to act as advocates and provide guidance to new programme participants where practical, creating communities of practice that will, over time reduce dependence on formal networking opportunities and increase the sustainability of the ELLA programme. Specifically, it is expected that the need for organised networking opportunities will decrease (and correspondingly become less costly) as informal networks build in strength. The strength of these networks, and their ability to function sustainably over time, will be more likely if leaders are identified early, and supported to develop in their role.

Evaluation findings therefore suggest that although face-to-face induction is not a mandatory requirement to support effective implementation, the accessibility and effectiveness of the trial would likely be enhanced if some level of face-to-face interaction was facilitated. It's expected that informal networks (online and regional) will reduce the need for organised face-to-face interactions as they become more established over time.

Reflecting on the above, and seeking to balance the need for a responsive and comprehensive support service to facilitate effective programme delivery with a cost-efficient approach, it is anticipated that the ongoing support for the programme will include:

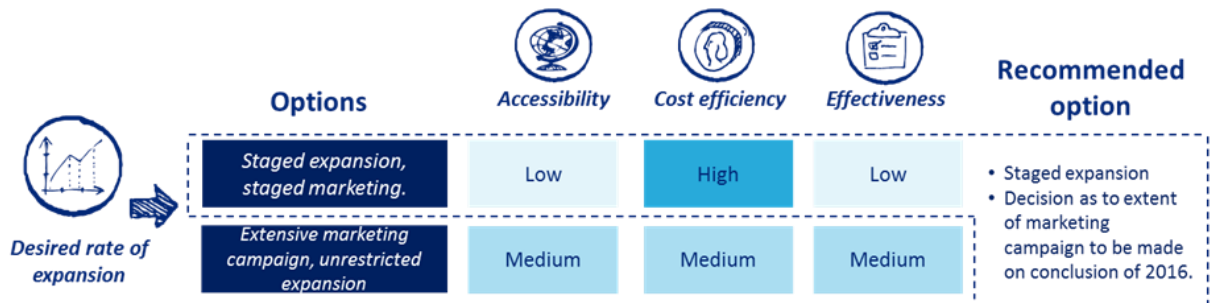
1. The provision of standard online and paper-based resources to support implementation and delivery.
2. A central help-desk to field technical and implementation issues. There is also the potential to shift this help-desk to an online service in the future if demand significantly reduces.
3. The facilitation of face-to-face workshops at a regional level, to encourage meaningful engagement with the ELLA programme and innovative approaches to delivery – particularly in the early stages of trial expansion.

4. Identification and support of regional leaders to help develop informal networks that will sustainably support the ELLA programme over time.

Summary of recommended option for service support

- Evaluation findings suggest that the most appropriate format for introducing the ELLA trial to services is through the development of high-quality online resources, which allow for flexibility in the number of services participating in the programme.
 - If additional funds are available, face-to-face awareness demonstrations would be beneficial in both encouraging participation, providing networking opportunities for educators and advising on best-practice implementation of the ELLA trial.
- Ongoing support for the ELLA programme should include online and paper based resources, a technical help desk, to be administered by ESA and some form of workshop/networking opportunity in the early stages of trial expansion.
- More intensive support measures should be weighted towards the early stages of expansion, to aid in building momentum and capacity at a regional level. Over time, networks of participants (online and regional) are expected to replace the need for organised face-to-face workshops.
- It is noted that cost efficiency is weighted more strongly than accessibility and effectiveness in the recommended option, as it is deemed that the programme will still be accessible and effective under the medium option.

7.2.2 Recruitment of additional sites



One option for the ELLA trial going forward is an expansion in the number of services participating in the programme. The extent of resources required to facilitate the recruitment of additional sites to the ELLA trial depends heavily on the desired rate of expansion.

There are several factors which need to be considered when determining what the optimal expansion pathway would look like:

- Currently, there is no clear picture of future demand for the ELLA programme. The response to the trial has been positive, however it is not yet known how a 'bring your own device' (BYOD) requirement, or reduced support levels, may impact on participation rates.
- An understanding of the level of resources required to encourage services to participate in the ELLA programme, and to support this participation, will be further developed over time as the trial expands. For instance, the effectiveness of word of mouth advertising will be more apparent after the opportunity to observe how many services apply for the ELLA trial in the absence of a deliberate marketing campaign in 2016.
- As the trial increases in size, the overall ongoing cost of administrating the trial also increases (assuming the project management responsibilities remain unchanged). Given this, measures

should be put in place to ensure that demand for the trial does not exceed a level in which the quality of support for participating services may be compromised. If the quality of support was threatened.

In the light of the above, a staged expansion in which additional services are added to the trial at a controlled rate, offers the opportunity to establish a more comprehensive understanding of demand for the program and the level of resources required to support the expansion – increasing the ability of the Australian Government to support the expansion of the ELLA program with adequate resources in a cost effective manner.

As discussed above, there is currently uncertainty regarding the level of demand for the ELLA trial, which will influence the nature and magnitude of the marketing and communications strategy required. Given the evaluation finding that the ELLA trial has been generally well received by sites, and confirmation that many educators involved in the trial would be comfortable advocating the merits of the ELLA trial at a regional level, there is solid evidence to suggest that a word-of-mouth campaign may be highly effective, potentially reducing the need to invest in paid advertising.

It is expected that the level of resources required to encourage participation from the desired number of sites will become clearer over the course of 2016 as the impact of word of mouth advertising will be able to be monitored through the number of services which apply to participate in the trial next year in the absence of any additional marketing activity.¹⁹ The other advantage of this approach is to allow a longer time period to examine app usage in an environment in which the release of new apps is less frequent. In other words, to what extent will children maintain interest in the apps over a longer time frame? The evaluation has considered this to the extent possible but a longer timeframe will enable more detailed analysis.

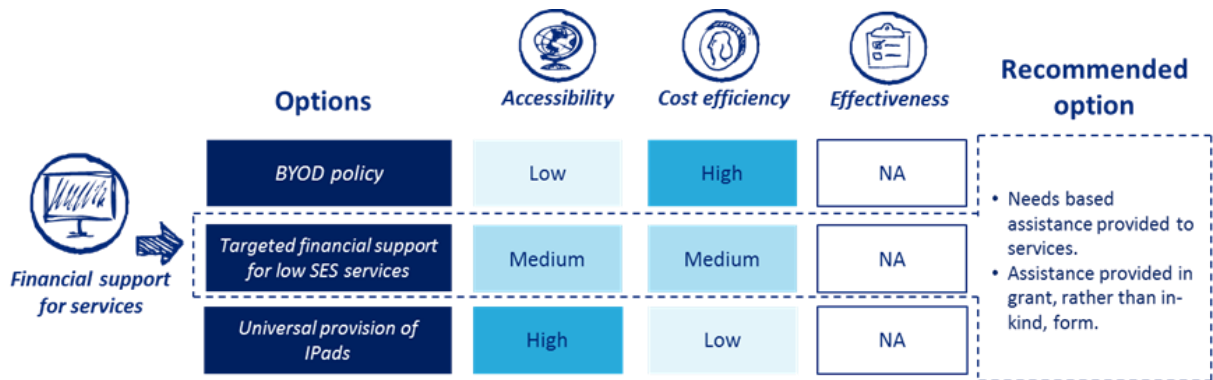
Given the recommendation to take-up a staged approach to the ELLA trial expansion, and the recognised uncertainty in future demand, it appears the most cost-efficient option for marketing and communications would be to begin with a low-scale approach, and increase marketing and communications over time if deemed necessary to facilitate the desired expansion rate.

Summary of recommended option for recruitment of additional services

- Evaluation findings support a staged expansion of the ELLA trial over the next three years, providing opportunity to establish a more comprehensive understanding of demand for the program and the level of resources required to support the expansion.
- As demand for the ELLA trial and the strength of word-of-mouth advertising will become more apparent over the course of this year, it is advised that the marketing strategy be determined at the end of 2016. Depending on expected demand, this will consist of either a minimalist marketing campaign centred on social media and word of mouth advertising, or an extensive campaign including print and radio advertising.

¹⁹ It is noted that this will only be an accurate reflection of the strength of informal advertising if current participating services are made fully aware of this arrangement and their ability to recommend the programme to other interested services.

7.2.3 Financial assistance for services



Distinct from the format of technical and programme delivery support provided to services is an option regarding the nature of (if any) financial or in-kind support provided to services to either (1) encourage participation; or (2) support equity objectives.

The figure above highlights the two extreme approaches to device provision, on the left side of the spectrum a blanket BYOD model, which would maximise cost-efficiency but may lead to equity implications as services with limited ability to access funds would be excluded from the trial. At the other extreme, while provision of devices for all participating services would maximise the accessibility of the ELLA trial, the high cost implications associated with this approach render it an unlikely option from a cost-efficiency standpoint. Between these two options sit an array of mid-point possibilities, including providing financial support to targeted services.

While the proportion of services that currently have access to iPads is unknown, it is expected that many services would either already have tablet devices or be able to access tablets without significant barriers. Access to devices is also supported by a range of ad-hoc grant programs in various jurisdictions to encourage growth in the use of digital tools in educational institutions. For example, in the past 3 years, Queensland issues grants to kindergartens to allow them to purchase iPads. However, given the sporadic nature of these grants programs, it is contended that *to appropriately balance the facilitation of equitable access to the ELLA trial and the cost-efficiency parameters of the trial, there should be some level of funding or in-kind support available to support services for which purchase of an iPad presents a prohibitive cost barrier.*

One possibility for increasing the cost-efficiency associated with financing additional support is to partner with a hardware provider that may facilitate the large scale distribution of discounted hardware.

Summary recommended option for financial assistance

- A portion of funding is made available to support low SES services in the purchase of devices through which to support the delivery of the ELLA trial.

7.2.4 Scope of trial

Options	Accessibility	Cost efficiency	Effectiveness	Recommended option
Maintain current scope	Lowest	Highest	Lowest	<ul style="list-style-type: none"> In the immediate future, maintaining the current scope is the most cost efficient means of increasing participation. In 2019, it would be worth considering an expansion of scope.
Increase age to early primary years	Highest	Medium	Highest	
Increase to Australian Curriculum languages	Highest	Lowest	Highest	

Given the high quality of the current ELLA apps, and the cost-efficiency gains to be made through increased participation, the immediate priority is to extend trial participation to a greater number of preschool services rather than investing in the development of additional apps. It is not envisioned that there will be large software investments within the next three years. However, in the medium-term, there are two distinct areas for further expansion of the trial; the extension of the programme into other age groups and the development of additional languages (noting these are not mutually exclusive extensions).

As such, the discussion below is for consideration in the future (at least not until 2019), and dependent on the structure and success of the ELLA trial at that point in time.

Inclusion of additional age groups

The options considered in this section are:

1. Maintaining current scope and limiting the ELLA trial to preschool
2. Expanding provision of the ELLA trial into other age groups

The positive reception of the ELLA trial raises obvious questions as to the extension of the programme into other age groups. The logic of this expansion is supported by the fact that one of the major concerns raised about the format of the ELLA trial (by both educators and educational authorities) was the lack of continuity for children and the risk that the language learnt over the course of the year would be lost when the child entered primary school.

Consultations with the educational authorities found that LOTE is typically not required in primary schools until Year Three, although this varies between jurisdictions. Given this, additional apps created for the early years of primary school may provide an opportunity to bridge this gap in language learning that currently exists between preschool and the later years of primary school. The breadth of the ELLA trial objectives could then also be progressively expanded to incorporate a higher focus on language learning, in addition to language exposure, as links with formal primary school LOTE programmes become easier to facilitate. Such an evolution of the ELLA trial, to the extent that this increases the likelihood of children learning an additional language later in life, would increase trial effectiveness.

Another possibility for expansion is to allow younger children to access the apps (if deemed age appropriate). One concern with the current format of the ELLA trial, as noted throughout the evaluation, is that by restricting enrolment to four year olds, the iPads can potentially act as a divisive

feature in the room. In these cases, allowing three year olds in shared classrooms to access the ELLA apps may reduce difficulties in classroom management for the educators as well as providing children with a longer period of exposure to the trial for those services. It is noted, however, that a formal extension of the ELLA trial to three year olds may have implications in the context of current funding arrangements for early childhood services. Moreover, extending the trial to three year olds, while seemingly a logical extension, is not expected to be an immediate priority and could be reassessed at some point in the future.

As discussed in Section 6.3, there is also a cost-efficiency argument to be made for any increase in participation of the ELLA trial as the greater the number of participants, the lower the unit cost of programme delivery per child.

Development of additional languages

The options considered in this section are:

1. Maintaining current scope and delivering the ELLA trial in the current five languages
2. Expanding the number of languages offered by the ELLA trial to the 11 curriculum languages

It was however noted by a number of educators, families and educational authorities throughout the evaluation that a greater choice of languages within the ELLA trial would be desirable, allowing services increased flexibility to cater to their community demographic or better link with local primary school language trials.

However the ELLA programme in its current form, as a one year trial for pre-school aged children, often with no formal links to language learning in the subsequent years of early primary school, is focused on facilitating language exposure rather than language learning. The main objective of the programme is to expose children to language. The language being exposed is a secondary consideration.

As such, unless increased continuity of language learning can be achieved through either (1) the extension of the ELLA trial into the early years of primary school; or (2) the extension of formal LOTE programmes into the early years of primary schools in each jurisdiction; there are minimal gains to be made from the development of additional languages – as any language will suffice to provide language exposure.

If there is potential for a continued language learning experience to be established for children, reaching from preschool through to secondary education, then the decision to invest in the development of additional languages becomes more pertinent. It is suggested that the decision as to whether additional languages should be developed is revisited at a later date and evaluated on the basis of the potential for language learning pathways to be developed, and the success of the ELLA trial in facilitating language learning (rather than exposure).

Summary of recommended option for expansion of trial scope

- In consideration of the analysis parameter that expansion into preschools is the Australian Government’s immediate priority, and in recognition that increased participation in the current model is the most cost-effective means of achieving this, there should be no extensions to trial scope in the short term.
- Evaluation findings support an expansion of the ELLA trial into the early years of primary school in the medium term, to assist with language continuity for children and increase the potential for language learning, as well as language exposure, to occur as a result of participation in the ELLA trial.
 - The Evaluation findings also suggest that it would be logical to include three-year olds in the ELLA trial for the same language continuity objectives and to increase inclusivity in mixed-age classrooms. However, it is not expected that this will be an immediate priority, and can be reassessed at some point in the future.
- The Evaluation findings support the expansion of the ELLA trial to incorporate the 11 languages endorsed by the Australian Curriculum. However, this is conditional on language pathways first being established for children between preschool and primary school. As such, the development of additional languages should not take place until deemed feasible by a future evaluation.

7.3 Implementing the recommended option

The following table provides a summary of the potential investments to be made in the ELLA trial over the next three years, as supported by the recommended options for a staged extension and expansion of the trial detailed above. The cost estimates are based on a costing study undertaken for ESA by Dandolo Partners. Any modifications to the cost estimates made in this work have been documented in the assumptions column in Table 7.1 below.

The table below only considers investments that will be made in the next three years. It is noted that any potential expansion to the ELLA scope would be revisited in 2019.

Table 7.1: Recommended investments for ELLA trial 2016-18

Investment	Assumptions	Cost (over 3 years)
Project management office	Derived from cost estimates	\$1.3 million
Administration of the help desk	The cost estimates for the labour associated with the administration of the Help Desk have been revised down by 50% in recognition that the facilitators of the Help Desk would typically hold other program management responsibilities and as such, cost efficiencies would be achieved.	\$1.0 million
App maintenance and storage	Derived from cost estimates	\$0.065 million
Marketing and communication	The cost of the marketing campaign will depend on the strategy chosen – which in turn is dependent on information gathered through the initial expansion stages (i.e. how effective the word of mouth advertising emerges to be) this has been presented as a range. This range has been derived from the cost estimates but assumed that the advertising campaign (for both the minimal campaign and the more extensive campaign) are repeated on an annual basis, rather than only in Year 1.	Between \$0.6 million and \$2.5 million

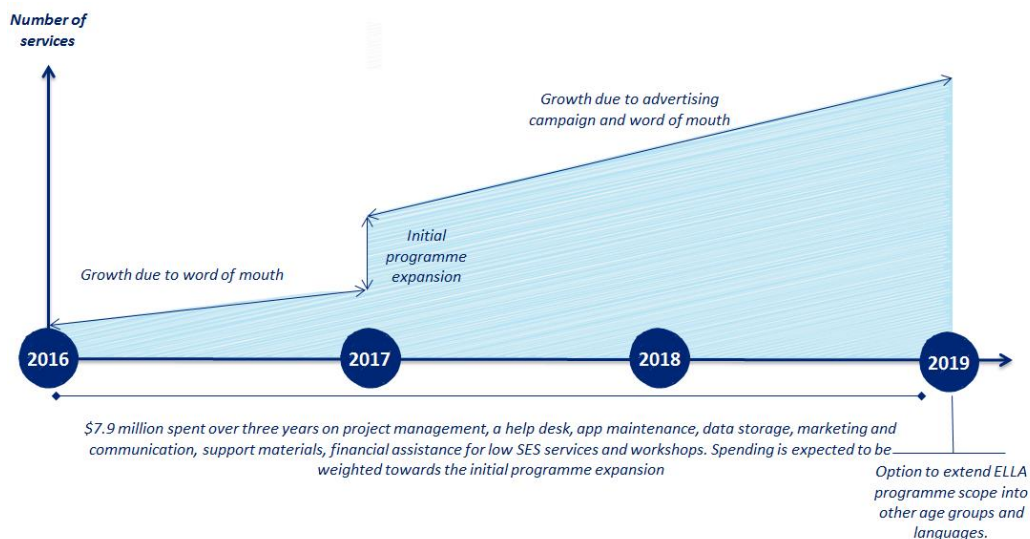
Investment	Assumptions	Cost (over 3 years)
Development of support materials	Derived from cost estimates	\$1.5 million
Financial assistance for low SES services	The quantum of this funding is flexible and dependent on trial funding and the extent to which equitable access is a priority. For the purpose of this exercise it has been assumed that the quantum of funding allocated to financial support will be determined on the amount of funding made available from the marketing and advertising campaign, in the context of an \$8 million budget. I.e. if marketing costs \$2.5 million, only \$0.5 million will remain for financial assistance.	Between \$0.4 million and \$2.3 million
Face to face workshops to encourage communities of practice	Derived from cost estimates for 'ELLA Awareness Demonstrations' and assumes approximately 600 workshops per annum.	\$1.1 million

Source: Deloitte Access Economics adaption from DandoloPartners (2015)

As seen in the table above, the total quantum of funding the extension of the ELLA trial is anticipated to be approximately \$7.9 million over three years. This estimate assumes approximately \$3 million in spending on the combined sum of marketing and financial assistance, while the proportion allocated to each is to be determined at a later date. It is expected that the investment associated with this floating funding will be concentrated towards the beginning of the expansion period, in order to encourage increased engagement early on and maximise potential impact.

A summary of these investments, and their expected impact on trial participation, are provided in the figure below.

Figure 7.1: Summary of ELLA recommended expansion timeframe



Source: Deloitte Access Economics

Appendix A: Overview of evidence sources

This appendix provides a more detailed overview of the evidence sources informing this interim report.

A.1 App data from DT Millipede

This appendix describes the app data provided by the software developer – DT Millipede – from a technical perspective.

The ELLA apps have been designed to collect raw data every time a child or educator interacts with the iPad (i.e. data is collected every time an iPad is touched). Identical raw data extracts are provided to Deloitte Access Economics, ESA and the Department by DT Millipede once a week. Fields are included for app, centre and (de-identified) user identification, enabling changes in app, centre and individual use to be analysed over time. There is also an event field, with further descriptive columns for the tasks undertaken – these fields are explained in the data dictionary in Table A.1.

Table A.1: Data dictionary

Data field	Description
Device_time	The device time is a unix EPOCH UTC (the number of second since 01/01/1970).
Language	Which language does the entry relate to?
App	Which app does the entry relate to? (1 through 7).
Centre	Which preschool is the data entry from?
Group	Each group has their own ID. This is useful for comparing different groups within the same preschool.
Year	The year the observation took place.
Month	The month the observation took place.
Week	The week of the trial.
Day	The day of the month the observation took place.
Day of year	The day of the year the trial took place, with January 1 st being 1, and December 31 st being 365.
User_id	The unique user id attached to each child.
Type	The nature of the child’s interaction with the iPad. (access, app, activity or language). The analysis is mainly interested in activity and language.
Event	Each interaction has a range of associated events. For example: <ul style="list-style-type: none"> • Select user: A child has logged in on the log-in page • Begin: a child has selected an activity to enter • Interaction: a child has touched the screen to perform a task within an activity
id1	Each event has a range of associated values in id1. The analysis is mainly focussed on which activity the children are choosing to engage with.

Data field	Description
id2	<p>Each id1 entry has a range of associated values in id2. For example, within the maze, there are several actions a child can take, or several phrases they are exposed to:</p> <ul style="list-style-type: none"> • maze.tam.problem_thankyou – Tam says ‘thank you’ in the target language • talo.found – the child find Talo (one of the characters) in the maze.

The functional specifications and language transcripts of each app are also provided to Deloitte Access Economics, which allows code in the raw data to be matched with app usage. This has been used to understand app usage, popular activities within the app, language exposure and progression through activities.

Finally, DT Millipede also provides two summary reports in Microsoft Excel:

- event_summaries – This report presents the total time, mean and median usage time, in seconds by each site over the duration of the entire trial to date. It also divides usage into activity type (for example, time spent playing with maze or the spaceship), and interaction type (for example, the user opened a gate, or popped a bubble).
- event_by_group_by_week – This report presents the time, mean and median usage time, in seconds, by each site for each week of the trial. It also divides usage into activity type (for example, time spent playing with maze or the spaceship).

These reports have been used to cross check results from Deloitte Access Economics’ analysis.

A.2 Profile of educator and director surveys

At least one August Educator Survey was received from every trial site.

- In total, 112 responses were received, 14 of which were incomplete.
- Of the 112 responses, 22 (20%) were from directors, while 85 (76%) were from educators. The remaining 4% did not state their role.

At least one complete December Educator Survey was received from 37 out of the 41 trial sites. One of the four trial sites that did not complete a survey submitted an incomplete survey.

- In total, 81 responses were received, 13 of which were incomplete
- Of the 81 responses, 15 (19%) were from directors, while 63 (78%) were from educators. The remaining 4% did not state their role.

A.3 Profile of trial sites for face-to-face visits

The descriptive statistics for the sample of 21 sites participating in the face-to-face visits are compared to those for the total trial population in Table A.2.

Table A.2: Descriptive statistics for site visit sample

Variable	Site visit sample No. of sites (% of total sample)	All sites No. of sites (% of total sites)
State/territory		
NSW	5 (24%)	12 (29%)
Victoria	5 (24%)	9 (22%)
Queensland	4 (19%)	8 (20%)
WA	2 (10%)	6 (15%)
SA	2 (10%)	3 (7%)
Tasmania	1 (5%)	1 (2%)
NT	1 (5%)	1 (2%)
ACT	1 (5%)	1 (2%)
Language		
French	3 (14%)	8 (19.5%)
Indonesian	5 (24%)	8 (19.5%)
Mandarin	4 (19%)	8 (19.5%)
Arabic	5 (24%)	8 (19.5%)
Japanese	4 (19%)	9 (22.0%)
Capital city		
Yes	15 (71%)	22 (54%)
ARIA categorisation		
Metropolitan	13 (62%)	22 (54%)
Inner/outer regional	7 (33%)	17 (41%)
Remote/very remote	1 (5%)	2 (5%)
Socio-economic status[^]		
Low	6 (29%)	11 (27%)
High	7 (33%)	9 (22%)
Service type		
Stand-alone-preschool – Government	3 (14%)	4 (10%)
Stand-alone-preschool – Independent	4 (19%)	7 (17%)
Pre-school-attached to school – Government	5 (24%)	8 (20%)
Pre-school-attached to school – Independent	2 (10%)	3 (7%)
Long-Day-Care-With-A-Preschool-Programme	7 (33%)	19 (46%)

[^] Socioeconomic status (SES) was determined on the basis of the ABS index of relative advantage and disadvantage. Suburbs in the lowest 20% of scores were classified as low SES, while suburbs in the highest 20% of scores were classified as high SES.

A.4 Profile of parent/guardian surveys

For the August Parent/Guardian Survey, at least one response was received from a parent or guardian at 36 of the 41 sites. 309 responses were received from parents or guardians in total, of which 59 were incomplete.

For the December Parent/Guardian Survey, at least one response was received from a parent or guardian at 35 of the 41 sites. 241 responses were received from parents or guardians in total, of which 41 were incomplete.

Table A.3: Overall parent survey responses rate

	Responses	Total children	Proportion
August Parent/Guardian Survey	309	1764	17.5%
December Parent/Guardian Survey	241	1771	13.6%

Note: There 41 responses from the August Parent/Guardian Survey, and 24 responses from the December Parent/Guardian Survey, which did not state which ELLA trial site the child of the respondent was attending and therefore could not be included in the more detailed analysis below.

Table A.4: Descriptive statistics for August Parent/Guardian Survey response rate

Variable	Parent/guardian responses	Total parent/guardians	Percent of total parents/guardians
State/territory			
NSW	89	461	19.3%
Victoria	70	458	15.3%
Queensland	31	245	12.7%
WA	50	240	20.8%
SA	9	159	5.7%
Tasmania	3	24	12.5%
NT	12	60	20.0%
ACT	4	117	3.4%
Language			
French	51	311	16.4%
Indonesian	62	348	17.8%
Mandarin	35	346	10.1%
Arabic	46	339	13.6%
Japanese	74	420	17.6%
ARIA categorisation			
Metropolitan	158	990	16.0%
Inner/outer regional	107	750	14.3%
Remote/very remote	3	24	12.5%
Socio-economic status[^]			
Low	45	442	10.2%
Medium	157	772	20.3%
High	66	550	12.0%
Service type			
Stand-alone-preschool – Government	37	287	12.9%
Stand-alone-preschool – Independent	59	323	18.3%
Pre-school-attached to school – Government	55	416	13.2%
Pre-school-attached to school – Independent	42	157	26.8%
Long-Day-Care-With-A-Preschool-Programme	75	581	12.9%

^ Socioeconomic status (SES) was determined on the basis of the ABS index of relative advantage and disadvantage. Suburbs in the lowest 20% of scores were classified as low SES, while suburbs in the highest 20% of scores were classified as high SES.

Table A.5: Descriptive statistics for December Parent/Guardian Survey response rate

Variable	Parent/guardian responses	Total parent/guardians	Percent of total parents/guardians
State/territory			
NSW	74	450	16.4%
Victoria	33	456	7.2%
Queensland	57	252	22.6%
WA	19	243	7.8%
SA	21	162	13.0%
Tasmania	1	23	4.3%
NT	1	64	1.6%
ACT	11	121	9.1%
Language			
French	33	354	9.3%
Indonesian	40	302	13.2%
Mandarin	54	337	16.0%
Arabic	65	438	14.8%
Japanese	25	340	7.4%
ARIA categorisation			
Metropolitan	145	999	14.5%
Inner/outer regional	70	749	9.3%
Remote/very remote	2	23	8.7%
Socio-economic status[^]			
Low	47	442	10.6%
Medium	94	776	12.1%
High	76	553	13.7%
Service type			
Stand-alone-preschool – Government	25	291	8.6%
Stand-alone-preschool – Independent	57	314	18.2%
Pre-school-attached to school – Government	49	422	11.6%
Pre-school-attached to school – Independent	11	161	6.8%
Long-Day-Care-With-A-Preschool-Programme	75	583	12.9%

^ Socioeconomic status (SES) was determined on the basis of the ABS index of relative advantage and disadvantage. Suburbs in the lowest 20% of scores were classified as low SES, while suburbs in the highest 20% of scores were classified as high SES.

Appendix B: Evaluation questions

Table B.1: Key evaluation questions

Evaluation question	Sub-evaluation questions
1 Was the overall design of the ELLA programme appropriate and based on evidence	1.1 What is the evidence regarding the link between early exposure to other languages and educational and developmental outcomes? 1.2 Is there evidence that the ELLA trial was designed in accordance with available evidence from research literature and demonstrated good practice approaches in comparable programmes?
2 Was the design of the software appropriate? Is it fit for purpose?	2.1 Did the apps incorporate a level of functionality that was appropriate for their purpose? 2.2 How user friendly were the apps for preschool aged children? 2.3 How user friendly were the apps for educators? 2.4 Could educators easily engage with children about and during use of the apps?
3 Was the programme able to be implemented effectively? Did children use the programme?	3.1 Was the initial availability of apps and subsequent app updates timely and accessible for the trial sites? 3.2 To what extent were children engaged with the apps? 3.3 Was the involvement of parents/guardians throughout the trial appropriate? 3.4 Why did children use the apps more or less? 3.5 Were iPads an appropriate platform for children’s use of the apps? 3.6 Were services adequately supported in use of the apps within the sites? 3.7 Did services and their staff receive adequate and appropriate training in use of the apps throughout the trial? 3.8 How often were the apps used? 3.9 What were the patterns of usage? 3.10 Did usage vary across languages? 3.11 Why did usage vary across certain apps or app series? 3.12 Why did usage vary across sites?
4 Did the ELLA programme make a difference to children’s outcomes?	4.1 What did children learn as a result of the ELLA trial? 4.2 In what ways did exposure to another language through the ELLA trial contribute to the development of children?
5 What would be the cost of expanding the programme to more children?	5.1 What was the cost of the ELLA trial and its components (fixed and variable; operating and capital)? 5.2 What did it cost to implement? 5.3 What did it cost to operate? 5.4 Are there economies of scale which will reduce the per child cost if the programme is expanded?

Evaluation question	Sub-evaluation questions
6 Are there other options or pathways for the ELLA model?	6.1 What are the key lessons from the ELLA trial that should be applied to any future programme or service model? 6.2 What are the options for models of ongoing delivery of early childhood language education utilising digital technology? 6.3 What model is recommended? 6.4 What role should the Australian Government play in this area? 6.5 What role should state and territory governments play in this area?

Appendix C Literature review

Introduction

The objective of the Early Learning Languages Australia (ELLA) trial is to expose preschool children to languages other than English using a selection of language applications (apps) to be used on iPads in the classroom. The languages selected in the trial are Chinese (Mandarin), French, Indonesian, Arabic and Japanese. The trial is part of an Australian Government commitment to increase the number of students studying additional languages in the later years of schooling. Deloitte Access Economics has been engaged to undertake an evaluation of the ELLA trial, which is being conducted in 2015.

A literature review was undertaken to provide a qualitative understanding of the current rationale for, and best practice approach to, using digital technology for language learning in preschools. Accordingly, a number of research questions were identified, which are outlined in Appendix A. Approximately 65 documents were canvassed in the course of the literature review, and consequently sorted to determine relevance to the ELLA trial. The literature review methodology is also detailed in Appendix A.

The findings of the literature review are structured as follows:

- Chapter One illustrates the current policy context in relation to both language education in preschools and the integration of digital technology in preschools.
- Chapter Two details the literature supporting the underlying rationale for the learning of languages and the use of digital technology in preschools.
- Chapter Three presents the literature findings relating to the best practice approaches to the use of digital technology in preschools, the teaching of languages in preschools and the design of apps.

1. Policy context

This chapter outlines the policy context for the ELLA trial, including the growing emphasis on the importance of language education in Australia, the national current early childhood education policy framework and emerging policy design relating to the use of digital technology in educational settings. The design of the ELLA trial, and how this aligns with the policy context, is also considered.

Language education

Over the past 40 years, policy on language education in Australia has advocated for a greater uptake of language learning (Lo Bianco & Slaughter, 2009). Policy documents recognise the advantages of learning a foreign language, specifically citing the benefits to cognitive development, the improvements to intercultural understandings and the broadening of social, personal and employment horizons (ACARA, 2011). The recently released White Paper *Australia in the Asian Century* (2011) suggested that Australia should increase Asian languages education, to prepare students for their inevitable exposure to Asia, given the rapid growth of several Asian economies. The *National Statement on Asia Literacy in Australian Schools 2011-2012* supports this recommendation, stating that learning an Asian language will provide students with a competitive edge in an increasingly globalised world.

Based on the findings of these recent policy reports, the Australian Government has committed to increase the number of students studying a second language in Year 12 to 40% within a decade, up from 13% in 2013 (Australian Government, 2013). Specifically, the Government intends to:

- develop a national curriculum for 13 languages;
- work with the states to make language study compulsory between Year 5 and Year 10;
- actively recruit language educators, including adding specialist language educators to the Skilled Occupation List;
- improve educator training courses;
- actively recruit for specialist language educators through Teach for Australia;
- consider options to increase language study in senior secondary years; and
- provide preschool children the chance to study a language other than English, through the use of digital technology.

The ELLA trial is intended to support this stated government objective by exposing preschool children to languages other than English through the use of iPads. It is anticipated that early exposure will encourage further language learning in later years of education.

Early childhood education

The current national early childhood education policy framework for learning outcomes is outlined in *Belonging, Being & Becoming: The Early Years Learning Framework* (Department of Education, Employment and Workplace Relations, 2009). The framework consists of five outcomes:

1. Children have a strong sense of identity
8. Children are connected with and contribute to their world
9. Children have a strong sense of wellbeing
10. Children are confident and involved learners
11. Children are effective communicators

The policy framework encourages a programme focus on the promotion of creativity and interaction in the learning processes, as well as high levels of engagement and communication (Yellend & Gilbert, 2013). As such, the apps being used throughout the ELLA trial have been mapped to the Early Years Learning Framework (EYLF), specifically to outcomes 4 and 5.

The use of tablets in early childhood education

The use of tablets in education is still a relatively novel concept, although results from initial trials suggest tablets support positive educational outcomes for young children.

Most states and territories have implemented trials to ascertain the effectiveness of digital tablets in education (for a list of past programmes, see Table C.1 below). As most of these programmes are either ongoing or only recently completed, tablet use in education, particularly early childhood education, is yet to feature explicitly in policy documents. While the use of digital technology is encouraged, there is no specific policy objective to increase the use of tablet technology as a teaching aid. Some states, however, do offer targeted support and guidance in this area. For

example, the Western Australia Department of Education outlines methods and techniques educators can employ to support the use of tablet in an educational setting.²⁰

Comparable programmes

A number of programme trials which are comparable to the ELLA trial have been identified (Table C.1 below). The learnings associated with these programmes have been incorporated in the discussions of best practice in the following chapters.

²⁰ This documentation can be found on the [WA Department of Education website](#)

Table C.1: Programmes related to the ELLA trial

Study name	Author(s)	Jurisdiction	Target participants	Study description	Key student outcomes
iPads for learning. In their hands.	I & J Management services	Victoria	Primary and Secondary students	The purpose of the trial was to assess if iPads enrich children’s learning experience across all fields of education. Over 650 iPads were placed in 10 primary, secondary and special schools around the state. The trial ran for 13 months. Schools were provided with \$100 spending money per iPad, to download apps.	<ul style="list-style-type: none"> •Students found learning was more fun with an iPad •Most teachers noted iPads improved learning outcomes •iPads had a greater impact on younger students
Use of tablet technology in the Classroom	Goodwin, K	NSW	Grades 3-6	The trial was rolled out to six classrooms across three primary schools. In some classes there was one iPad for each student; in others, there was one iPad between two students. Schools were provided with \$50 spending money per iPad, to download apps.	<ul style="list-style-type: none"> •iPads place additional demand on teachers •Both students and teachers found that iPads supported and enhanced learning
Smart Classrooms	Queensland Government	Queensland	Years 8-10	The iPads were used in four classrooms across two schools. One school gave one iPad to every student; the other shared the iPads between students. The trial ran for 6 months	<ul style="list-style-type: none"> •Outcomes improved when there was one iPad for every student
Early childhood iPad initiative	Western Australian Department of Education	WA	Grades 1 and 2	The trial was implemented in 19 schools in metropolitan, regional and rural areas, with a focus on teaching literacy and numeracy. Over 850 iPads were distributed to schools, and were used by 1,671 students. iPads were generally used on a shared basis.	<ul style="list-style-type: none"> •Students usually disinterested with learning were engaged when using the iPad •Teachers reported the iPads created a more relaxed learning environment

Study name	Author(s)	Jurisdiction	Target participants	Study description	Key student outcomes
Schools going mobile	Pegrum, M; Oakley, G & Faulkner, R	WA	Kinder – year 12	This was a two phase project, with researchers examining the use of digital technology in 10 schools across Western Australia. The focus was on literacy outcomes, but this evolved throughout the programme. The initial phase was concerned with schools existing practises with handheld technologies. Only schools already using digital technology in the classroom were eligible.	<ul style="list-style-type: none"> •At younger levels, one iPad for many children was the preferred model. •Children are more motivated and engaged when using iPads
Exploring the pedagogical applications of mobile technologies for teaching literacy	Pegrum, M; Oakley, G & Faulkner, R	WA	Kinder – year 12	This is the second phase of the above programme. It involved six case study schools, again with a focus on teaching literacy. The focus of this study was on teachers views on the benefits and challenges of digital technology	<ul style="list-style-type: none"> •Preliminary empirical studies show the iPad improves test results among primary students •iPads work best for younger students, as the iPad allows freedom for play-based learning.
Studying Asian languages with web technology	Salt Group	Victoria	Secondary students	The study was conducted over two years. 51 schools partook in the first year; 41 schools in the second year. The study sought to uncover whether digital technology improved learning outcomes in language education.	<ul style="list-style-type: none"> •The iPad generated a positive student attitude toward learning •Students took responsibility for their learning •Teachers were confident the iPad was leading to increased language skills

Study name	Author(s)	Jurisdiction	Target participants	Study description	Key student outcomes
iPlay, iLearn, iGrow	Yellend, N & Gilbert, C	Victoria	Children aged 0-6	The study was designed to explore the use of tablet technology with young children. There were 95 children (including 20 in kindergarten) involved in the trial. The trial ran for six weeks. iPads were introduced to the classroom as necessary.	<ul style="list-style-type: none"> •Tablets stimulated conversation •Students self-regulated their use of the tablets
<i>International examples</i>					
AlphaEU	Lazar, A	Various countries	Children aged 2-6	The study used digital media to promote multilingualism in the EU, through digital alphabet books, alphabet-related games and interactive activities. It aimed to develop perception and recognition of sounds and concepts of at least one foreign language, and to then understand and use the language in an interactive manner.	<ul style="list-style-type: none"> •iPads found to effectively teach additional languages
NA	McPake, J & Stephen, C	Scotland	Preschool	A four-week trial teaching Gaelic in preschools, rolled out across several playrooms. The trial was aimed at reducing teaching load and acting as a new strategy to more effectively teach Gaelic to preschool children. The app involved arranging a sequence of photos that either the child or teacher would take on the iPad, and then add captions and related sound files. The children could therefore repeatedly listen to the retelling of familiar events, which stimulated them to respond in Gaelic.	<ul style="list-style-type: none"> •Children were found to be enthusiastic about their learning. •Those who were relatively unfamiliar with iPad use and navigation quickly learnt from their peers. •In doing so, the app encouraged collaboration and scaffolding among students •Ground rules needed to be set by teachers in order to ensure that the iPads were equitably shared.

2. Supporting rationale for ELLA

This chapter documents the literature on the benefits of learning a second language, the benefits associated with early exposure to foreign languages and the benefits of integrating digital technology in preschool classrooms. Together, these three separate elements form the evidence base which underpins the rationale of the ELLA trial design.

General benefits of learning a second language

The review of the literature identified three common benefits to learning a second language:

- improved cognitive function;
- cultural awareness; and
- improved health.

Improved cognitive function

Studies have demonstrated that learning a second language at an early age improves (among other things) children’s cognitive development and problem solving skills. Furthermore, these effects have been shown to continue beyond childhood, with bilingualism shown to offset age-related declines in executive functions, such as memory, reasoning, and problem solving ability (Bialystock and Craik, 2010; Gold et al, 2013).

Cultural awareness

With the rise of globalisation, interactions between people of different languages and culture have been increasing steadily. The ability to engage and communicate with people of different languages and cultures is fundamental to participation in the global economy (Graddol, 2006). Learning a second language has been shown to facilitate cultural awareness, and improve people’s understanding of human behaviour (Baker, 2006; Crozet and Liddicoat, 1997). Not only does this prepare people for the increasingly globalised economy, it can also lead to improvements in social unity and harmony. UNESCO highlights the importance of language diversity, stating that language diversity improves cohesion, and makes countries more effective members of the international community. This is encapsulated in the quote below.

“Languages are indeed essential to the identity of groups and individuals and to their peaceful coexistence. They constitute a strategic factor of progress towards sustainable development and a harmonious relationship between the global and the local context”.

- Mr Koichiro Mastuura, Director General of UNESCO, 2008

Improved health

Studies have shown learning a second language can delay the onset of dementia (Craik et al 2010). Craik et al posit that bilingualism is a cognitively demanding skill, and therefore increases the brain’s resistance to damage.

Early exposure to a second language

Early exposure to a second language has been found to have multiple benefits, including:

- Increased probability of successfully acquiring the second language;
- Increased learning and development outcomes in other areas;
- Heightened language support for bilingual students.

Second language acquisition

It has been consistently found in literature that the early years are a crucial period for the successful acquisition of a second language. A literature review focused specifically on the role of early language intervention in kindergarten found that ‘there is a wide consensus that infants develop two separate but connected linguistic systems during the first years of life’ and as such, the early years are ‘a critical period for a child to learn a second language’ (Griva & Sivropoulou, 2009).

The review found that:

- children’s enjoyment and openness towards other languages and cultures are ‘key factors’ for the potential benefits of early language learning; and
- this early dual language exposure does not delay development in either language.

Generally, the literature points to the fact that ‘younger children are more receptive to language learning and develop a more native-like pronunciation when second language learning begins before the onset of adolescence’ (Stewart, 2005). This is attributed to the developmental stage of younger children, in that they are more receptive to language learning and the adaptability it requires. Research finds that younger students question language structure to a less extent, which helps with pronunciation and the learning of different grammar structures.

Supporting this, a study using 100 Chinese-Spanish bilinguals looked at the difference in language ability between those who began learning the second language early in life (between 3 and 6 years of age) and those who began learning at the age of 16 years or older. The study found that the learning mechanisms of early learners were not fundamentally different to native speakers, although they still may differ from native speakers in the ultimate success of learning the language. Conversely, those who started to learn the second language at an older age found that their learning mechanisms were fundamentally different from native speakers, having to rely on reference to their first language and learnt problem-solving mechanisms rather than accessing the intrinsic learning mechanisms which children use to learn a first language (Granena, 2013).

Increased outcomes in other learning areas

Aside from the increased ability to learn a second language, research has also indicated that the introduction of a second language in early years increases outcomes in other learning areas. An Australian study found that the introduction or maintenance of a second language in the early years ‘improves cognitive abilities, positively influences achievement in other disciplines, and results in higher achievement test scores’ (Jones Diaz, 2014).

Supporting this, an American study conducted in 2004 found that ‘possessing a second language allows children to participate in two social worlds and become more attuned to subtleties of communicative interactions, expanding cognitive abilities, creative thinking, adaptability and problem solving skills which are all transferable to other academic areas’(Stewart, 2005). This study also found that exposure to a second language develops ‘an understanding of geographical and

cultural perspectives that enhances learning in other classes such as social studies, science, art and music’.

Reduced language loss for bilingual students

As a side-note, it is found in literature that exposure to a second language in preschools is of great importance to bilingual students. Jones Diaz (2014) argues that explicit policy initiatives for children between birth and five years of age are needed in Australia as ‘language shift in early childhood and primary education occurs when children are exposed to English-only educational settings at a young age’. In light of this, the introduction of, or maintenance of, alternative languages in preschool is expected to be of importance in reducing the language loss of bilingual children attending English speaking preschools.

Digital technology as an educational tool

While evidence relating to the effectiveness of digital technology on the learning of a second language in preschools was the primary objective of the literature review, it was found that there have been limited studies conducted at that level of specificity. As such, this section first presents the findings relating to digital technology and the teaching of other languages, and then discusses digital technology as an early childhood educational tool more broadly.

Second language learning and digital technology

In relation to the increased opportunities presented by digital technologies, one of the primary constraints in providing for language education in preschools is the difficulty of recruiting and retaining well qualified language educators (Stephen et al, 2012). In this context, technology offers an **alternative teaching method to relying on the language capabilities of preschool teachers** (Nemeth & Young, 2013). A national position statement made in the US on the use of technology in education drew an explicit link between the emergence of new technologies and the ability to better support second language speakers. This is highlighted in an excerpt from the position statement which is given below.

‘Digital technologies allow teachers to find culturally and linguistically appropriate stories, games, music, and activities for every child when there may be no other way to obtain these resources...with technology, adults and children can hear and practice accurate pronunciations so they can learn one another’s languages. If teachers do not speak a child’s language, they may use technology to record the child’s speech for alter translation and documentation of the child’s progress. As linguistic and cultural diversity continues to increase, early childhood educators encounter a frequently changing array of languages. Appropriate, sensitive use of technology can provide the flexibility and responsiveness required to meet the needs of each new child and ensure equitable access for children who are dual language learners’

– National Association for the Education of Young Children, 2012

Further, a study looking at the use of computers in aiding second language learning found that ‘as computer games enable language to be put in the context of dialog, they enable language to be situated. This provides an ideal environment for language learning as verbal information is given just in time and is provided in an appropriate context’. The study also found that the use of personal avatars creates a high degree of immersion which increases motivation and is a key factor for successful language learning (Peterson, 2010).

Supporting this, a recent Spanish study found multimedia to be a useful tool in early childhood language learning. Multimedia uses interactive games to (1) increase vocabulary, (2) improve pronunciation, (3) reinforce learning through repetition, and (4) contextualise learning, through engagement with shapes, colours, sounds and letters (Agudo, Rico & Sanchez, 2015).

Digital technology in early years education

Due to the relatively recent emergence of digital technology as an educational tool, the integration of technology into preschool classrooms was initially met with a level of concern by both educators and parents. However, as the impacts of digital technology on learning outcomes become clearer, these concerns have largely subsided. There is currently a weight of evidence to suggest that on balance, digital technology enhances the learning experience for preschool children and results in increased child outcomes in relation to learning and development.

Evidence supporting digital technology as an educational tool

It is generally considered that children born into a Westernised society after the 1980’s are technologised, and engage with technological artefacts on a daily basis. As this engagement with technology is vastly different from the childhood experience of parents, teachers and early years practitioners, the integration of technology into the learning environment of children has been met with some level of concern, specifically ‘negative assertions about technology being socially detrimental for children...despite contemporary empirical research **substantiating technologies as tools around which pro-social, collaborative and helping interactions can emerge**’(Arnott, 2013).

In contradiction to these reservations, a comprehensive literature review looking specifically at the influence of technology on learning in the early years found that technology typically had **a positive impact on most areas of learning**, and that the impact was conditional on the child’s age, experience, time spent using technologies and gender (Hsin et al, 2014). The literature review found the following frequencies among the 87 selected studies (from a pool of 273) relating to the learning effectiveness impacts of digital technologies.

Table C.2: Impacts of digital technology on learning effectiveness

Domain	Learning effectiveness			
	Positive	Negative	No difference	Depends
Developmental domain				
Cognitive aspect	53	2	20	47
Social aspect	13	1	4	3
Emotional aspect	10	0	1	1
Physical aspect	2	0	0	0
Cognitive domain of development				
Language and literacy	26	1	16	32
Math	8	0	2	7
Science	4	0	1	3
Digital literacies	17	1	0	5
Cognitive abilities	7	0	2	3
Others	2	0	0	0

Source: (Hsin et al, 2014)

Impact of digital technology on literacy outcomes

An American study used a software program designed to facilitate early learning literacy development to engage 265 kindergarten children from a high-risk community. 151 students in eight experimental classrooms used the program for approximately 15 minutes per day. Additionally, 114 students in seven non-intervention classrooms had varying amounts of access to older hardware and software that was not integrated into the classroom in a systematic manner. Pre and post testing of students found that students in the experimental classrooms performed significantly better than non-intervention students on one literacy test (TERA-2) and better (though not to a significant extent) on the other form of testing, the Lindamood Auditory Conceptualization Test (Tracey & Young, 2006).

A second American study found that providing iPads to 266 kindergarten students improved their literacy scores, specifically in the Hearing and Recording Sounds in Words subtest, in which the iPad group scored 2.1 points higher than the control group (Bebell & Pedulla, 2015). Subsequent years of education showed that the iPad group experienced continued greater benefits, with better reading and writing skills.

Impact of digital technology on social interactions

In relation to the impact of digital technologies on social interactions between children, the following studies found positive correlations:

- A Scottish study analysing the impact of digital technologies in a kindergarten found that ‘one of the fundamental aspects of children’s interactions around technologies is the need to negotiate with, and mediate, the other children’. The study observed children managing the social aspects of sharing the technology between themselves, and concluded that the introduction of technology in the classroom ‘moves beyond technological affordances to considering children as active agents who have considerable influence over their own social experiences’ (Arnott, 2013).
- A recent Australian study found that after the distribution of several forms of digital technology in a class room ‘the most common activity children engaged in were ‘social interactions’...including cooperating together using a device’. It was found that even though an iPad is typically a solitary device, children rarely used it by themselves. Instead, groups of children would watch and encourage the user (Bird, 2013).
- The literature review of 87 studies (outlined above) of relevance found that ‘only one reviewed study revealed that the use of a touchscreen increased children’s behaviour of pursuing individual goals instead of collaboratively achieving the same goal...most of the studies, however, showed that various technologies support children’s social development’.

Impact of digital technology on learning style

Aside from social learnings, the experiments with the use of digital technologies in early years education have generally found that the technologies encourage a high level of **self-motivated learning**. It has been found that ‘kindergarten children benefit from technology when technological tools are integrated into learning tasks that allow children to work at their own pace with adult support’ (Gimbert & Cristol, 2004). Specifically, tablets have been found to be an appropriate tool for engaging learning among preschool students. A study analysing the use of touch screen tablets to increase literacy in young children found that ‘in contrast to traditional computers, touch screen

tablets provide an easier to use and more intuitive interface for a child’ (Neumann & Neumann, 2014).

More generally, an Australian study found that the distribution of iPads and iPod touches in a kindergarten practice gave the participant children **an increased independence and agency** in their choices and experiences of play. Overall, the early years practitioners involved in the study found that ‘the introduction of this technology has strengthened many areas of early education practice and encouraged our children to be more capable, enthusiastic and independent learners’ (Forbes, 2013). Similarly, the Western Australia study highlighted in Table C.1 found that ‘the standout conclusion in the current literature is that m-learning (learning using a mobile device) is highly engaging for students’ and cited ‘greater student ownership of learning processes’ as a key contributor to the **increase in student motivation** (Oakley et al, 2012).

Digital technology in autistic education

Many countries have adopted greater use of digital technology, particularly tablets, to facilitate better learning for students with special needs, including Autism Spectrum Disorders (ASD). Most research in this area has been confined to small clinical trials, involving 1-4 children, due to the heterogeneous nature of the ASD student population. As such, general claims are difficult to support. Nevertheless, several studies have looked specifically at how digital technology can assist in better academic outcomes for ASD children, as complementary to standard teaching practice.

A study involving 4 students with ASD, aged between 11 and 13 years, looked at the effect of iPad use on academic outcomes (Tanner, Dixon & Verenikina, 2010). The research found that the performance of the children improved across the board, although the extent varied between 15% and 60%. While academic improvement was clearly noted, the level was very sensitive to the individual. This is in line with past pedagogical research that has found education for ASD children needing to be tailored to the specific student, in order to optimise learning outcomes.

In Western Australia, there was a similar trial assessing whether iPads were useful educational tools for students aged 5-13 with special needs, over an 8 month period (Johnson, 2013). The study found that autistic children in particular were very responsive to tablets being used as a learning aide.

An American study examined the comparative differences in instructional effectiveness between iPads and traditional learning materials such as flashcards, specifically in the case of students with ASD (Neely, Rispoli, Camargo, Davis & Boles, 2013). Once again, the trial was with a very small sample of two students. It found that the use of iPads reduced the incidence of challenging behaviour from ASD students, whilst simultaneously improving academic engagement, serving a motivating purpose.

Other forms of technology have also found to be beneficial in improving learning outcomes for children with ASD. Specifically, virtual reality technology was particularly effective as it was able to offer individualised treatment – previously noted to be of special import for children with ASD – and providing opportunities for the child to have active control (Parsons & Cobb, 2011). The children were found to be able to meaningfully interact and respond to various stimuli during trials. Furthermore, behaviours and responses could be practised and reinforced, and facial expressions could be better integrated into the virtual reality experience, which helped build social and emotional skills.

This area continues to be an emerging field of research, with a study currently underway in NSW looking at the effectiveness of digital technology for children with ASD, between kindergarten to Year 12 (Tanner, *et al.*, 2010). It is expected that in the coming years there will be a growing interest in conducting longitudinal surveys and research in this field, to isolate the real effect of digital technology in improving learning outcomes for children with ASD.

A growing acceptance

As the evidence base supporting digital technology as an education tool grows, and as society becomes more accustomed to the integration of technology in everyday life, it is anticipated that the historical concerns of parents and educators will be further dispelled. Supporting this, a study conducted across several European countries regarding parental attitudes towards technology found that rather than feeling concern towards the use of technology in preschools, **parents felt a level of anxiety around the lack of use of technology.**

Specifically, the study found that ‘parents felt there was a ‘generational digital gap’ between how their children interact with digital technologies at home and in their early years settings’. Whilst the parents still believed in and valued teachers and the classroom, a desire was expressed for classrooms with no boundaries that ‘bound the home experience with that to be found in early years settings’ and stated that pedagogical practices needed to incorporate the changing technologies (Palaiologou, 2014).

3. Best practice approaches

Given that both language education and the use of tablets are relatively new additions to early childhood teachers’ pedagogical repertoires there is a level of uncertainty surrounding:

- how to best integrate tablets into a preschool environment;
- which app design features are most useful for preschool students; and
- the best techniques for teaching a second language in preschools.

This section explores the findings of previous programmes and studies in relation to best practice digital technology approaches in the preschool setting, and early learning language techniques.

Digital technology integration in preschools

The emergence of touchscreen devices has expanded the role digital technology can play in early childhood education. Several programmes have introduced tablets into both preschool, primary and secondary school classrooms, and have found that tablets have a broadly positive impact on student educational outcomes. While this literature review focusses on the integration of digital technologies in preschools, findings from the younger year levels of primary schools have also been included to ensure all relevant learnings were canvassed.

Lesson 1 – Tablets do not replace good teaching

Tablets have proven to be an effective and engaging learning tool. However, studies have found that tablets works best as an instrument to support, rather than replace, teachers. To achieve the best outcomes, teachers should organise activities which guide and support students, but also allow some scope for students to explore their own work. Apps, when designed well, create an environment of enquiry for students, and teachers reported better outcomes when some responsibility for learning fell on the students (I & J Management Services, 2011).

As digital technology is still relatively new, teachers may require support in expanding their teaching techniques to unlock the potential of new tablet technologies in early childhood education (Yellend & Gilbert, 2013). However, given the myriad of ways a tablet can be used, there is no ‘typical’ lesson

structure which can be detailed, therefore no single 'best method' for teachers using tablets (Goodwin, 2012).

Lesson 2 – Provide a range of pedagogical support for teachers

As mentioned in Lesson 1, the notion of best pedagogical practices in relation to digital technology in education is still evolving. Consequently, most programme managers developed a range of tools to support teachers and students (Western Australian Department of Education, 2014; I & J Management Services, 2011; Oakley et al, 2013).

The most popular tool developed was a forum for educators to suggest new ideas and discuss educational techniques, which allowed educators to improve the quality of the educational experience they could provide. This was established in six of the programmes listed in 0. Other tools used are listed below:

- At least three programmes produced a suite of support resources such as handbooks, tips and guides, resource lists, protocols and research summaries. These were provided directly to schools, and also uploaded to a website dedicated to the programme.
- The Victorian programme *iPads for learning: In Their Hands* established a twitter account, to increase the channels of communication between the programme managers and participating schools.
- Five programmes provided professional learning days for teachers participating in the tablet programme, for teachers to develop their skills, and learn how to introduce digital technology to the classroom.
- The *Early childhood iPad initiative* in Western Australia appointed a project coordinator, who was the first point of call for trial schools if they encountered any issues.
- The AlphaEU project in Europe made e-learning modules available in order to inform and train teachers and classroom facilitators (Lazar, 2014).

These tools were used to support a smooth implementation of the programmes. Some schools noted there was a significant cost associated with the time committed to educating teachers and to gaining familiarity with the apps. Support tools were found to reduce these time costs, and improve teacher quality (Western Australian Department of Education, 2014).

An alternative method of pedagogical support is through the provision of technology to complement the tablet, to enhance children's learning experience. For example, children's learning outcomes were found to improve when their tablets were integrated with other digital technologies, such as interactive whiteboards and Apple TVs (Western Australian Department of Education, 2014). However, such technology is costly to provide.

Lesson 3 – Provide technical support to schools

Technical issues can often arise with the use of digital technology, so programme managers often provided technical support for schools. The literature acknowledged the importance of solving technical issues promptly, as inoperative technology deters children from using digital devices (Goodwin, 2012). Two types of technical problems have been identified: network issues and software issues (Oakley et al, 2013).

- **Network issues**, such as internet connectivity, are particularly a problem for remote schools. The tablet's usefulness as a teaching tool may be limited in cases where internet connectivity is inadequate.
- **Software and hardware issues**, such as an app freezing, or issues with iTunes accounts, can affect schools regardless of location. Throughout the trials, technical issues were solved more efficiently if the programme managers organised specialist resources dedicated to providing support, rather than relying on general support (such as Apple staff) to solve technical issues.

Lesson 4 – Tablets are most effective when used in a supportive school and home environment

Student outcomes were generally better when the teacher used the app as an enabler to broader lessons. Ideally, the teacher would encourage activities that transfer a child's interaction with the app into the real world, enabling children to consolidate what they have learned (Goodwin, 2012).

In the Victorian trial, *iPads for Learning: In their Hands*, schools made deliberate efforts to promote the trial to parents, finding that widespread parental support is an important part of using iPads in education. As the iPad is a mobile device, and apps are typically readily available through the Apple app store, students were encouraged to continue using the apps at home with their parents. Educators found students learned better when parents were included in the educational process.

To keep parents engaged and informed, some schools provided regular emails and newsletters encouraging parents to explore the apps with their children. However, schools also acknowledged the risks in relying on parental support, as parents were sometimes found to be dismissive of digital technology use in education. This was particularly the case if tablets were not used by parents and were an unfamiliar concept. As such, to the extent that it is possible, parents should be informed of the positive influence tablets can have on child development and educational outcomes.

Lesson 5 – The ratio of tablets to students matters

Early childhood students were found to work best when sharing one tablet between several students (Oakley et al, 2013). However, there is a trade-off to consider when deciding the optimum number of tablets per children. Fewer tablets will encourage greater collaboration and communication between children (two important benefits of using tablets in an early childhood education setting), but will also allow less scope for children to personalise their learning experience, as they experience less face-time with the app. As learning often comes from interaction with the tablet, some teachers report uncertainty as to whether the benefits accrue to students who are merely watching (Oakley et al, 2013).

It has also been found that in order to ensure each child is able to enjoy the benefits of interacting with the iPad, ground rules may need to be established by teachers, to encourage children to share the iPads equitably (McPake and Stephen, 2016).

Lesson 6 – The choice of app is important

In previous programmes, programme managers provided spending money for teachers and students to purchase publicly available apps. Teachers would therefore be required to research appropriate apps for children, increasing the time spent with the tablet (Western Australian Department of Education, 2014). There is also the risk students waste time by using ineffective and poorly designed apps. However, the upside to this approach is that students can personalise their learning experience

due to the wide range of educational apps available (I & J Management Services, 2011). The greater choice and flexibility afforded to students was associated with positive outcomes, as students will choose content most relevant to them.

Teaching a second language in preschools

The research describes various approaches towards teaching languages to preschool aged children. Some accepted techniques in supporting language learning amongst young children include:

- **Play based learning is important in early language learning** - it has been recommended that play be utilised as a method of teaching young children to develop language abilities, with one study finding that ‘play is considered to be a powerful, flexible, amusing and pleasant learning experience which promotes oral communication and interaction’ and encourages children to use language in meaningful exchanges (Griva & Sivropoulou, 2009).
- **Repetition** – this gives the child more than one opportunity to understand what is being said (Clarke, 2009). The greater the frequency with which a child hears new words and sounds, the more familiar they become and the easier it is for them to learn the language (Harris et al, 2011). One of the key steps in language learning is identifying and recognising words, sounds and basic language structures, which is facilitated by greater engagement (Lazar, 2014).
- **Develop listening skills** – preschool children are generally preliterate, and therefore need to hear the language spoken in order to learn it. A common approach to encourage children to listen is to rely on songs, rhymes and games, which ensure children maintain their attention (Clarke, 2009). Studies have found that children quickly become familiar with the gist of stories and teachers can adopt a question-and-answer style of storytelling to encourage language use (Mhathuna, 2008).
- **Using contextualised language** – learning is aided through the use of hands-on activities and visual materials (Clarke, 2009). Visual cues, facial expressions and hand gestures can all provide meaningful contextual clues to children, which can support children in understanding new words and phrases. Learning by doing is also an important part of contextualised learning (Harris et al, 2011).
- **Social and cultural context** - It can also be beneficial to provide social and cultural context to language learning. The use of cultural symbols, music and food encourages engagement among children, as well as reinforces opportunities to develop intercultural understanding. This is particularly relevant for educators who have little experience in language teaching (Nemeth and Simon, 2013).
- **Use of decontextualised language** – as language skills develop, students may be able to learn without relying on visual materials (Clarke, 2009). An example of decontextualised learning is through dialogic reading, where children learn through developing stories, or recalling past events. Educators should question or prompt children, encouraging them to actively participate in a dialogue with their teacher (Parish-Morris et al, 2013).
- **Language production** – as their skills develop, children should be encouraged to use the second language (Clarke, 2009).

Optimal app design features for early learners and language education

As mentioned above, studies have so far focussed on the use of tablets as an educational tool, with limited research into app-specific features that encourage learning among preschool aged children. The ELLA trial is unique in that an app has been designed specifically for the trial; it is therefore

important to determine the optimal design features for apps to support early childhood education. Features listed below were found to improve child educational outcomes consistently across most, if not all, programmes.

- **Allowing content creation** - at an early childhood level, teachers and students generally expressed a preference for content-creation apps, also referred to as ‘productivity’ or ‘constructive’ apps, instead of content receiving, or instructive apps (see for example Yellend and Gilbert, 2013, and Oakley et al, 2013).²¹ Such app design has been found to pique curiosity and engender commitment from children, which facilitates longer-term learning (Agudo, Rico & Sanchez, 2015).

The app should allow for directed (or modelled) play, so teachers can direct and assist children, and open ended play, allowing children to explore as they wish. The app should also allow for framed play –a combination of directed and open-ended play. All three play types have proven to be effective in delivering outcomes to preschool children.

- **Mixed learning methods** - the apps should provide access to multimodal learning. In other words, there should be opportunities for children to learn via visual, spatial, oral and aural means (Yellend and Gibert, 2013). This is particularly pertinent for language exposure, as relative to relying on traditional educational tools (such as story books), the technology can increase oral and aural learning opportunities (Strickland & Grantham, 2013).
- **Personalised pathways** - the app should provide multiple tasks and pathways for children to complete, allowing them to personalise their learning experience. Early child outcomes improve if a child has some control over their learning, as they can adopt practises best suited to themselves, and develop at their own pace (I & J Management Services, 2011).
- **Engaging content** - the apps should be engaging and encourage persistence. To fulfil the tablet’s potential as a learning device, the tasks within the app should be sufficiently complex that children maintain attention and do not get bored with the content. On the other hand, the content should not be too challenging, as children will not use the device if they do not understand the activities (Goodwin, 2012). The tasks within the app should be interesting, fun, and something children can relate to. If possible, the children should be able to replicate activities within the app in the real world.
- **Flexibility in play options** - the apps should provide context and opportunities for solitary and social play (See for example, Yellend and Gilbert, 2013 and Oakley et al, 2012). A key feature of childhood learning with tablets is that the preferred apps encourage collaboration, interaction and peer to peer learning among children. The apps should also stimulate discussion between children, educators and parents. Alternatively, children may want to use the app by themselves, which can also provide educational benefits for the child. The optimal app design will therefore allow for opportunities for individual play as well.
- **Appropriate hardware** - the display needs to be appropriately sized, to get maximum benefit from tactile interactions.
- **Encourage skill development** - playing with the apps should provide an opportunity to encounter and use foundational skills for learning (Yellend and Gilbert, 2013). In the case of the ELLA trial, the apps should allow children opportunities to practise their language and literacy skills, not just to listen and watch the characters speak another language.

²¹ A constructive app is more open-ended, and allows users to create their own content, while an instructive app involves the app delivering a predetermined task, which elicits a homogenous response from the user.

4. Implications for the ELLA trial

The findings of the literature review largely support the rationale for, and the design of, the ELLA trial. The introduction of languages is consistent with bipartisan policies directed to increasing language uptake in Australia, while the focus on Asian languages is consistent with the policy objective of increasing interaction with Asia.

The ELLA trial design, while a novel concept, appears prima facie to be consistent with features of optimal programme design located within the literature. There are three key reasons this is considered to be the case:

- Introducing a language in preschool, as opposed to in the later years of schooling, brings a range of identified benefits including an increased ease in second language acquisition, more native pronunciation and increased learning outcomes in other areas.
- Digital technologies have been found to increase learning outcomes in preschools, particularly given children's increasing digital literacy and the ability for children to work at their own pace.
- Digital technology has been identified as a method through which to increase second language learning in early years, in the absence of a second-language speaking teacher.

The literature did identify several questions which will be worth considering throughout the ELLA trial in order to maximise learning outcomes. These include:

- Is the introduction of iPads to the classroom supported with the following predictors of success:
 - a range of pedagogical options for the teacher to utilise;
 - high levels of technology support;
 - linkages to broader lessons and integrations with the real world;
 - high levels of parental support; and
 - a suitable iPad:child ratio?
- Does the app and supporting language activities include repetition, stories, songs, rhymes, games, contextualised language and encourage language production?
- Does the app design allow for multi-modal learning, engage children, encourage persistence, provide for both social and solitary play and give opportunities to practice speaking the language?

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