An investigation into how library design and signage support children's navigation and wayfinding in international primary school libraries.

Janine Murphy

Abstract

This research examines how primary-aged children wayfind in an international school library. The focus is on children's use of wayfinding strategies, and how effectively they use signage and design features in their navigation.

Research into how adult patrons use signage, wayfinding and navigational strategies in public library spaces is a well-documented area. On the other hand, how children patrons use signage, wayfinding, and navigational tools in library spaces, both in school and public libraries, is a less well-researched area. As there is a gap in knowledge, this research specifically examines children's navigation and wayfinding in school libraries. By understanding how children search for resources and use a library space, librarians can better adapt signage, signings, and navigational tools to suit and plan for young patrons' wayfinding needs.

This research addresses the following objectives: to observe how children navigate the library space and locate resources; to explore what aspects of the navigation process children find enjoyable and beneficial; and to evaluate how architectural and design elements, along with signage, can be improved to facilitate their wayfinding.

The research methods are multimethod and inductive. Three sources of data were collected from: observations of 192 children aged 7 & 8 years old in a naturalistic school library setting; a follow-up survey of 175 children to further explore and develop their responses; and a final component of two semi- structured interviews with a Head of Library at a recently refurbished international school library, and three library professionals at a library furniture design company, Raeco.

Data from these three areas of research was collated and triangulated. The key learning outcomes from this research are that children wayfind and navigate using a variety of strategies and this is dependent upon their preferred searching styles. Therefore, libraries need to incorporate a range of wayfinding and navigation features to ensure all children are included and their wayfinding needs are met. There are a range of navigational tools that a library team can use to meet these needs.

Due to the context of the naturalistic settings, and since the international school community is ethnically diverse, the findings and recommendations of this research can be applied to all primary school libraries and children's sections of public libraries worldwide. The recommendations could be incorporated into future primary school library planning and design in children's libraries.

Keywords

1.0 Introduction

1.1 The context of international school libraries

International primary schools provide an education to children of parents and carers who are part of expatriate communities, and this is based on a different framework in comparison with their host country. In recent years, Southeast Asia (which forms the context of this study) has seen rapid growth in the development of international schools: 1,905 in 2022 versus 1,528 in 2017 (International Consultants for Education and Fairs (ICEF) 2022). The Southeast Asian region of international schools includes Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, and Vietnam (Association of Southeast Asian Nations (ASEAN) 2022), with the largest concentration of international schools situated in Indonesia, Malaysia, Vietnam, Thailand, and Singapore (ICEF 2022). The ICS Research white paper states, "Facilities in international schools are, in general, dramatically better than most government and domestic private schools throughout South-East Asia," (International Schools Consultancy (ICS) 2022).

Overseas international schools often have school libraries that are bigger and more well-resourced than state school libraries in their equivalent home countries. International schools operate within a competitive education market, where financial stability hinges on fee-paying parents. These parents, often elite professionals, and those aspiring for their children's success, prioritise English proficiency as a gateway to global opportunities, including access to prestigious universities and the global job market. As a result, there is a push-pull factor from parents with high expectations of facilities in international schools and excellence in academics. International schools face pressure to excel in teaching literacy, especially English literacy. With libraries as a hallmark of literary excellence, it is with utmost importance that they adhere to these ambitious standards. Therefore, school libraries are a priority for top international schools (Brown & Lauder, 2011) and are an area for financial growth and investment.

International schools, although unique, are similar in their offer of curriculum and facilities. They provide a standardised educational experience for a migrant child population. Children frequently stay in a school for just a term or a year and then move to another international school. There are many commonalities shared between international school libraries within this region, allowing for the smooth transition of children between schools. As children move from school to school, they should be able to navigate the library space with familiarity, find resources, and feel confident in their ability to navigate the space. The significance and uniqueness of these school libraries make them worthy of educational study.

1.2 A lack of research into this time and location

For the purposes of this research, wayfinding is defined as, "The process of how people orient themselves and navigate in a space or along a pathway. It is a combination of graphic design, architectural design, and landscape design.
Signage can help wayfinding." (Inclusive South Australia, 2024). Navigation is, "the process or activity of accurately ascertaining one's position and planning and following a route." (Oxford Reference 2024). An extensive literature review of qualitative research into signage and wayfinding in libraries, including university libraries, reveals that this area of research is well-documented (Li & Klippel 2012, Polger 2022); however, less research has been made in school libraries and even less so about children's experiences in international schools. Therefore, this research focuses specifically on the underrepresented groups of children in international library settings, specifically, children who wayfind in ways that differ to that of adults. For example, navigating intuitively without using signage, or collaboratively with their peers.

Some children are motivated to enjoy the library environment rather than find resources and explore their environment. They find resources by intuitive navigation. Xinyi outlines this principle in the research into patrons' wayfinding by the National Library Board libraries of Singapore (2019). Many children enjoy the sociable aspect of being with their friends and conversing over wayfinding and navigation choices. Helvacioglu and Olguntuek (2011) link the enjoyment of navigating a school environment with their psychological well-being. Motivational and intuitive navigation will be explored in this research.

Mandel noted that adult patrons' wayfinding patterns change when they are with other people. (Mandel 2019). However, there is little research about how children's wayfinding changes when they are with other children. Considering primary children are in school together and work collaboratively, it is likely that many of them will be searching for resources together in the library. In an international school, some children will be new and having arrived from another country, they will particularly need this support. Therefore, this will be an area of research - collaborative navigation.

1.3 Aims and objectives of this research

The aims of this research are to understand how children navigate a library and locate resources. It seeks to observe their navigation methods, identify what they find enjoyable and beneficial, and assess how library design and signage supports their wayfinding. The analysis of this data will help librarians improve library layouts and navigational tools to better serve child patrons.

The objectives are to:
· assess the variety of methods and tools children use to wayfind
· evaluate the effect of language, style, and positioning of signage as a navigational tool

· evaluate the impact of design features and organisation of layout upon navigation

1.4 Research questions

This research aims to answer these three research questions:
· RQ1 What types of design features do children find the most useful when navigating the library environment?

· RQ2 What types of signage do children find the most useful when navigating the library environment?

· RQ3 What replacements or modifications should teacher-librarians make to these navigational tools to improve students' wayfinding experience?

1.5 Practical reasons for doing this research

The research will take place at Tanglin Trust school (TTS). The school has three libraries with four teacher-librarians and seventeen library officers, serving a community of 3,000 children, their parents and 200 teaching staff. According to the annual user survey, TTS scores highly on customer service and provision of resources (TTS Patron User Survey, 2023). By finding out more about how children explore and navigate a library space, library professionals can develop and improve children's wayfinding experience.

The three libraries at TTS - Infant, Junior, and Senior - are undergoing a programme of refurbishment. The first, the Infant Library, has completed this process and is the setting for the observations of children's navigation in this study. The Junior Library will undergo its refurbishment in 2025 - the first in 24 years. This primary research will form evidence to make design choices and signage to support

children's wayfinding in the newly designed library. The children are part of participant action research as their feedback will be taken into consideration in the design of the new library. The teacher-librarians (TLs) at TTS belong to a network of TLs both in Singapore

- International School Librarians Network Singapore (ISLN) - and across South- East Asia. Librarians in the region meet annually at the Librarian Knowledge Sharing Workshop (LKSW). Sharing research and best practice across the network provides a continuous culture of professional development. The results of this research will be presented at a future LKSW to share the recommendations for library design to support children's wayfinding and navigation.

1.6 Rationale for this research

Over recent years, patrons' demand for, and library staff's provision of library services and environments has changed significantly. As a result, libraries have transformed their services to provide a more customer-led experience in an increasingly competitive landscape (Fawley 2012 p.414).

Libraries have diversified to serve not only as information hubs but also as places that promote a sense of comfort, belonging and wellbeing. A child's confidence and self-esteem in the library is intricately linked with their ability to navigate the environment successfully, knowing where to go and what to do.

According to Polger and Stempler (2014), to encourage independent searching, signage and wayfinding should effectively guide and connect the child within their environment (pp 67-95). Therefore, purposeful signage and navigational design features are an important focus for teacher-librarians within this modern library service culture and a focus of this research.

2.0 Literature review

This literature review is split into two parts: a summary of research that has been previously published about wayfinding and navigation in a variety of library settings, followed by an explanation of how this information has been used to structure this research.

Research into wayfinding and navigation in primary school libraries has been the recommendation of previous case studies. Johnston and Mandel (2013) claim there is a lack of empirical research into wayfinding in school libraries and misplacement of signage is commonplace. In addition, Stempler and Polger (2013) stated further research could be done for younger age groups on the placement of signage to aid wayfinding.

2.1 Visual language - clear and simple

As early as 1960, K.A. Lynch was researching signage as a cue to solve patrons' wayfinding problems, describing it as a visual language that is communicative, helpful and enhances intuitive searching (Yates, 2015; Jalees 2020). As patrons' needs became more of a focus, guidelines were developed to create clearer signage. This included using reading charts to guide font size, colour contrast for legibility, and avoiding both information overload and the clutter and noise created by ineffectual signage (Stempler and Polger, 2013).

Implications for this research: Clean and simple signage is particularly important within the context of international primary schools as children have various levels of English proficiency and ability, therefore pictograms and iconography on signage may prove to be useful. The effects of signage clutter on a child's spatial literacy will be investigated in this research, as well as the impact of the language and style of signage on wayfinding.

2.2 Positive and patron friendly communication

Many researchers into library signage have been critical of poorly made library signage and messages that do not support a patron-led service culture. Passive- aggressive messages on signs designed for the benefit of staff and amateurish homemade signs damage the library's image. Policing signage about lowering noise and negative commands such as "don't" are largely ignored by patrons and are ineffectual and unprofessional (Yelinek and Bressler, 2003). Taped-on signs and the use of passive-aggressive language on library signs affect patrons' sense of belonging and purpose. Barclay and Scott (2012 p.1) advocate for the use of positive language on signage. They also coined the phrase "bump points" which are navigational points where patrons pause to make decisions. Helpful instructions may be used to guide the patron at these bump points. It may seem obvious now, but back then, there was a general call for signage to switch to benefit the user rather than the library staff (Fawley, 2012 p.415). Signage may be directional, informational, regulatory, or promotional. It should set the tone for a professional, safe space and be professionally produced to indicate to patrons that their visit is valued. (White, 2010; Stempler AF, 2013). The benefits would be increased circulation and fewer questions for library staff (Jones DY et al., 2011). Arthur and Passini (1992) state that the focus should be on creating a simple wayfinding experience. The building and design should fit the users. The users should not adapt their behaviour to fit the design.

Implications for this research: The impact of signage language and style on improving children's confidence in a new library environment will be explored. The main focus will be on directional signage. Observations will include feedback on how children use signage bump points for changes in direction to navigation.

2.3 Space syntax and spatial literacy

Li and Klippel (2012) discuss patrons' use of "space syntax" as an umbrella term for the complex mix of language, signage, and wayfinding that people use to navigate their way around a library. Patrons' prior knowledge and expectations of library spaces are also included under this umbrella term. This spatial cognition is vital to wayfinding and navigation confidence in the library (Wiener, Buchner, & Holscher, 2009; Arthur and Passini 1992) and is a form of cognitive mapping, a process of creating a mental map that every human being uses regardless of age or gender (Cornell, E. H. and Heth, C. D. 1989). Children may require support as their spatial literacy may be less developed, and this is linked to their self- esteem and confidence as explorers (Helvacioglu & Olgunturk, 2011).
Architectural and design features, as well as colour design, adds to intuitive wayfinding and supports spatial literacy development (Helvacioglu 2007).
Landmark features such as story trees, zoned flooring, soft furnishings, and lighting can help to support spatial awareness. (Xinyi 2019). Johnston and Mandel (2014 p.3) state that it is especially important to support children's wayfinding in a library setting as this may be their first experience of using spatial awareness at this level and independently.

The benefits of developing patron's spatial literacy can be read in a case study by Dogu and Erkip (2000). Building configuration, visual accessibility, circulation systems, and signage all helped people to negotiate a shopping mall. The same principles apply to libraries. Patrons, including child patrons, should be treated as customers and the library as a business that needs them to find resources quickly and easily to stay in business.

Digital tools can be used to develop spatial literacy, linking the OPAC with resources on the shelf, and there is now a feature in many OPACs that has a wayfinding tool to show a map location of where resources are located in the library.

Implications for this research: This research will observe how children wayfind at diverse levels of

developing spatial awareness. Observers will take note of the variety of tools they use to wayfind and navigate a library space. This will include navigation from the front of the library; the use of sightlines to move between sections; effective use of signage and decisions made at bump points; and anything else that is of note

As there is no Online Public Access Catalogue (OPAC) available for children to connect what is in the digital catalogue with the arrangement of resources on shelves at TTS Infant Library, this form of space syntax will not be included in this research. If the children request OPAC access to assist with finding resources, this will be noted as a request for a navigational tool.

2.4 Limitations of previous research and case studies

A major limitation in previous research has been the scope of surveys and observations. Many research methods have not included feedback from children who visit the library. Some researchers have struggled to produce reliable results. Stempler (2013) found wayfinding challenging to measure beyond circulation figures; and Carr in her dissertation of 2006, was unable to establish consistent results in wayfinding over three weeks in university libraries.

Implications for this research: It is noted that observing patterns of student behaviour may be challenging. The observers have not been given training, and they are not experienced in making observational notes so information may be missed.

2.5 User experience (UX) and design thinking approach

Many researchers refer to the importance of User Experience (UX) Design when planning wayfinding. Even though she does not use this term, Eaton was talking about user experience as early as 1990 and stated that library buildings and call numbers are so complex in their arrangement that signage is essential to guide the user. Libraries should have a simple arrangement of materials, open lines of sight in the library space and the absence of visual clutter, avoiding a build-up of generational signage as the collections are changed. Stempler and Polger (2014) have explored the difference between what patrons want compared to what they get in terms of navigational tools with the conclusion that most patrons want tools that allow them to wayfind independently. These factors improve the library experience, making patrons feel valued and reducing anxiety (Kenneway 2006; Stimson 2007; Hennah 2014; Polger 2022). Anxiety decreases because asking directional questions may cause stress (Bosman and Rusinek, 1997).

Other researchers have looked at alternative forms of wayfinding. Jalees (2020) has researched the importance of visual, audio, and tactile signage to create an interesting and meaningful library experience for patrons. Jalees, along with other UX researchers, state that signage should be professionally produced to be aesthetically pleasing for the user, with font, style and colour repeated throughout to create a sense of familiarity and an established library brand.

Further innovation in library UX design can be seen in the collaboration between the National Library Board (NLB) and Singapore Polytechnic (Xinyi 2019). NLB uses design thinking methodology, trialing ideas with community groups and creating designs based on patrons' feedback and requirements. Design prototypes included removing circulation desks, creating shadow lighting signage; installing coloured lighting to track paths; and building conical hills with shelving of differing heights for wayfinding at a glance. NLB experiments by changing the proximity of related sections, e.g., adults' located next to children's

magazines so families may browse together. This combination of wayfinding strategies has a positive outcome on patrons' spatial literacy. Innovation through design thinking has increased footfall and circulation in Singapore public libraries since 2000 (Xinyi 2019).

In the Raeco Webinar 2024: "Colour my World," colour aesthetics were discussed between library designers and teacher librarians. They discussed the use of colourful seating as bump points, where children stop to renavigate, and potential change of the direction of the child's navigational path. They also recommended including the work of local and Indigenous artists to reinforce patrons' sense of identity and familiarity within the wayfinding experience.

Implications for this research: Data was collected outlining the effect of signage placement on wayfinding. The variations explored were height and style of signage which included use of images, models, and language (specifically, the language used in signage), use of 2D images and 3D models. The effect of design features on navigation are assessed in the survey, and the use of furniture bump points noted in the observations. The proximity of resources was also considered and if the children could wayfind using logic and category association.

2.6 A consumer-led approach and quality control

Professional, branded signage increases patrons' familiarity with the library environment. It is easier to read and navigate the library using branded signage (Mollerup 2013; Luca & Narayan 2016). Polger (2022) outlines the need for a signage policy with controlled vocabulary, design templates and image files of logos. Polger extended this to include a directory of section locations at the front of the library, so patrons may orient themselves at the start of the wayfinding process. Polger discusses using design thinking: incorporating patrons' views and requirements in the signage and wayfinding process.

Many researchers have complained about the lack of guidelines for library staff when producing library signage. Wakimoto (2016) claims that librarians are often self-taught graphic designers and there needs to be a process of quality control by a designer to standardise signage (Li and Klippel, 2012; Mandel, 2013; Wakimoto, 2016; Polger, 2022). Information about signage between library professionals may be anecdotal with many library designers adding signage as an afterthought (Eaton 1991, Carr 2006, Hennah 2014).

Implications for this research: The effects of branded signage upon wayfinding will be explored in the observations and survey stages of the research. Children will be questioned in the survey about how useful they find a directory of location at the front of the library. Design thinking is also discussed in the semi-structured interview with the library furniture designer, Raeco. User experience (UX) leading library design is included in the recommendations at the end of this research.

3.0 Methodology

3.1 Methodologies and approaches

For the observations, two teachers and two observers were present. The teachers added some anecdotal evidence, which was included in the data collection; however, their primary role was to supervise rather than observe the children. Two observers recorded how the children negotiated the unfamiliar library setting using the directional signage, landmark features, and sightlines.

The research was cross-sectional and conducted over one week. The observers were given prompts and space to record notes on an iPad. The prompts were adapted from previous observation notes created by Mandel (2013) and based on Passini's conceptual ways five styles and strategies of wayfinding.

The observers were asked to note down any observations about how the children navigate their way to find the resources on their supplied list. They were asked to observe how the children used signage and the frequency with which they noticed key signage: strategically placed models, signage at eye level etc. They noted if the children used signage at bump points that related to the Dewey Decimal Classification system and then the corresponding spine labels. They were asked to note how the children oriented themselves if they got lost in the navigation. Finally, participants were asked to include any further observations in wayfinding and navigational behaviour.

Previously published research studies about wayfinding tend to use qualitative data analysis. The methodology of this research is qualitative and based on evaluating searching behaviours and preferences. Initially, it was considered that there could be a quantitative data collection from the observations by measuring the time it took for the children to find resources, and their footfall in certain areas; however, this ethnography proved impractical once the observation groups arrived. The limitations were that there were just two observers for 24 children and the participants' movements were more changeable and random than initially anticipated. The children were excited and talked over one another frequently. Therefore, a pragmatic approach was adopted, and notes were taken from the observations rather than collating data numerically or by frequency.

Previous researchers have highlighted the difficulties in measuring wayfinding for young children (Johnston and Mandel 2013; Carr 2006). This could be a reason for the lack of published research in this area.

Previous research by Helvacioglu on children's wayfinding in school environments (2007), indicates that children's spatial awareness is developed enough by seven years of age to navigate an environment and by age eight, they can remember, sequence, and articulate the navigation they have undertaken (pp. 1,31, 36). It is important to use a natural setting for the children, so they are relaxed and confident enough to participate in the wayfinding process. (p.35). The purpose of their visit and the observation was explained to the children at the start of the process.

Many researchers begin with a signage audit divided into informational, directional, regulatory, or promotional use (Johnson 2003; Verostek 2005; Stempler AF & Polger MA 2013); and positioning (Eaton 1991; Li and Klippel 2012; Mandel 2013). This research looks solely at directional signage and repositioning it, swapping language for visuals etc.

The research paradigm for this study is interpretivism. The observations focus on the children's ability to navigate in a naturalistic library environment. The children are familiar with navigating a library; they are familiar with their peers; and they know the supporting adults who are observing them. They were told that their feedback would be used to make positive changes to the signage and library layout for future libraries. Therefore, the research strategy is participant action research, following the cycle of inclusion of participants in the feedback cycle.

The information from each section of the observation notes was scanned to find high frequency words and phrases. This was then colour coded to collate repeated information together. The data was then analysed into a summative paragraph of observation findings.

A multi-method approach was used to collect the information. Data from the observations was followed up with a survey conducted by individual participants answering a range of questions including multiple choice and short answers. The approach used was practical: questioning existing knowledge with an inductive approach, looking in detail at how children use their spatial literacy and how this can be supported with a range of navigational tools. The survey was conducted on Google which the participants are familiar with, and they each have their own iPad. This allowed individual responses to be saved and analysed. Google forms collate the multiple-choice information into pie

charts so they may be analysed.

The survey questions were written for children to encourage reflection upon their wayfinding experience and how it could be improved. This did not focus on improving their skills, but rather on their use of signage, bump points and landmarks. The process of answering questions, thinking aloud, and processing their wayfinding added rich data to the research (Mandel 2013). The survey data added clarity to the analysis. Think aloud methodology may be useful to clarify grey areas in responses where the observations may be vague.

The third qualitative method of semi-structured interviews addresses all three research questions. The interviews were conducted with Michael Kelly, Head of Infant Library at Tanglin Trust school and then with managers at Raeco. This is a library design company based in Australia that supplies library furniture and book shelving in Australia and the Southeast Asia region. The questions for both interviews were based on both the outcomes of the literature review, and the observations and survey responses of the children in this research. The interviews were conducted on Microsoft Teams and permission was given for the interviews to be recorded.

The interviews provide a broader scope for this research. The observations and surveys focus on children from one year group in an international primary school. By extending these interviews to a range of library professionals, they bring their experience of collaborating with many different schools.

The transcripts from the interviews were scanned for key points about wayfinding and navigation. The key information was then collated, analysed and presented with supporting photographs.

3.3 Context

The observations took place in a newly refurbished, previously unvisited, primary school library at an international school in Singapore. Tanglin Trust Junior School (TTS) has over 770 students with 60 nationalities represented. All children speak English fluently, although this may not be their first language. Tanglin Trust has a wide range of students in terms of student demographics: ethnicity, background, and nationality (TTS website, 2023).

The sampling size for each of the phases of data collection was:

Observations: 8 groups of 23-24 children aged 7-8 years old. A 50% ratio of girls and boys. A range of abilities was represented in the groups and a range of ethnicities.

Survey: 175 students participated as individuals. A 50% ratio of girls and boys. A range of abilities was represented in the groups and a range of ethnicities.

Interviews: the first interview was conducted online with Michael Kelly, Head of Infant Library, at Tanglin Trust School. The second was conducted online with three managers at Raeco. Both interviews were recorded with permission from the participants.

3.4 Meeting the objectives

The objectives were met using an inductive approach and thematic analysis of the qualitative data. Open coding was used to chunk the information into parts and create codes of keywords and phrases derived from research questions. This grounded theory method was conducted using features of the programme, Microsoft Word, and tables were created to organise coded information and concepts from the various transcripts. The research is achievable due to the researcher's access to participants

and permission to conduct the research with the children, interviewees, and professional librarian network connections. The research was conducted over 18 months in 2023 and 2024.

3.4.1 Potential barriers

Carr (2006) pointed out the difficulties of working with young children in her published dissertation: "An Experiment with Art Library Patrons, Signs and Wayfinding". She used moveable signage to observe the effects that sign placement had on students' wayfinding and resource finding. She presented the results in tables in three areas:

- ·   Success in locating the resource
- ·   Time taken to find a resource
- ·   Emotions felt when looking for the resource

Carr was unable to draw any conclusions from this area of the experiment; however, she did make useful observations about patterns in patrons' wayfinding behaviour, e.g., if they were persistent in trying again and whether they asked for help. Her suggestions and ideas about observing patrons have been incorporated into the observation stage of this research.

The people conducting the observations were known to the children as they work in the school. Having a professional connection with the teacher-librarians and library designers may make this research subjective.

The socio-cultural background of the participants is a specific demographic in the international school setting, and this should be considered in the interpretation of results.

Due to the difficulty of gaining information about children in other schools due to the protection of privacy, the only observations were inside Tanglin Trust school. To meet the research objectives, data collection was required from more than one library, so this information was gathered from the semi-structured interviews with Raeco.

3.5 Resource requirements

Observations

> · Permission from the school leadership team and Head of Infant Library, Tanglin Trust school.

> · To supervise the visit of the children to the infant school library, the class teacher and two library officers were present. Two teacher-librarians observed and made notes.

Survey
- ·   Permission from the school leadership team
- ·   Access to iPads and Google accounts for all participants

Semi-structured interviews
- ·   Access to Microsoft Teams
- ·   Permission from participants
- ·   A list of questions sent in advance

4.0 Results and reflections on data

4.1 Observations

The observations were conducted in a British International School, Tanglin Trust. It has been designed for patrons aged 4-7 years old. 720 children and their parents, plus 50 teaching staff extensively use the space. It was opened in 2023 and has a collection of about 10,000 books.

The TTS Infant Library non-fiction section is currently organised using the Dewey Decimal Classification system; however, the signage used differs from the traditional headings of Dewey and uses terms such as "Life on Land", "Life in the Air" and "Life in the Water" as sub-categories for classifying animals (Fig. 1).

Figure 1: Eye level signage (1.2m) in TTS infant library (own photo)

The fiction section is organised in alphabetical order by author's surname and is front facing. (Fig. 2)

Figure 2: Spine shelved and front facing junior fiction series in TTS Infant Library (own photo)

A signage audit was conducted before the observations took place as recommended and identified by previous researchers (Johnson 2003; Verostek, 2005; Stempler AF & Polger MA, 2013). The audit showed that all physical signage is directional; promotional and informational signage is displayed on a digital display only; and regulatory signage was not visible.

To explore the effectiveness of directional signage in this research, different prototypes were created: visual images on signage, replacement of signage with 3D models; moving and removal of signage. Positioning and design were based on the UX design principles and experimentation gathered from the literature review (Eaton 1991, Li and Klippel, 2012; Mandel 2013). There is no OPAC displayed in the library, so no link was observed between the digital and physical layouts.

Participants were split into eight groups of 24 participants and organised in this way:

· Two groups using existing library signage to wayfind
· Three groups with library signage supplemented with 3D models
· Three groups with library signage supplemented with images

The children were given a simple list of books to find *(*Fig. 3*)*. The books and topics were familiar to them. The list was the same for all groups so data could be compared. The focus of the observation is about exploring wayfinding rather than children's comprehension of terms. Therefore, findings would have an increased validity

○ Geronimo Stilton

○ Book on rocks

○ Biography (famous person)

○ Book on birds

○ Book on dinosaurs

Figure 3: An example of the books the children were asked to search for in TTS Infant Library

The observation notes show that the children's styles of navigation varied. It was possible to identify three types of searching styles adopted by patrons. These patrons did not switch searching style during the observation so they could be categorised into three types of way finders:

· Looking for and reading the signage. These children were referred to as "leaders"

· Following others and listening to their journey narrative. These children were referred to as "followers"

· Asking a teacher or member of the library staff. These children were referred to as "askers"

Leaders
The "leaders" made up about one-third of the participants. The leaders had expectations when they walked into the library. They assumed that there would be a fiction and non-fiction section. They scanned the library layout from the front, located the hanging non-fiction sign and from there, they were able to look for dinosaurs, birds, and biographies. They also learned how to navigate through the shelves by grouping categories together such as "animals" as an umbrella term for books on dinosaurs and birds. They logically concluded that books on animals would be shelved together. Leaders follow patterns outlined by Polger and Stempler (2014). Leaders use the layered combination of signage and pathways effectively to wayfind in the library environment.

Followers
"Followers" made up another third of participants. Observers noted that followers often tended to find books by chance. They were less goal-orientated than the "leaders" and many children quickly lost interest in locating the books on the list. They became interested in trying out the seating and paused to read a favourite book. The library experience was about enjoying the space, more so than the actual resource finding. Some of the children who were "followers" were asked further questions

about how they found books. With prompting, these children revealed that they often chose the same books every week and went to their usual shelves in the library for both fiction and non-fiction. If they finished a series, they tended to reread these books or ask a member of the library staff for a similar title. They also used recommendations from teachers and friends rather than trying to research and locate resources themselves. This backs up the observation that they were not using wayfinding tools to find resources. They found resources by chance or intuition. As suggested by Xinyi (2019) they use intuitive navigation and clues from the environment in their wayfinding. The reluctance of followers to use navigational tools and wayfinding to locate resources suggests a lack of motivation or confidence in their wayfinding skills.

"Followers" were observed using landmarks in the library to relocate the non- fiction section (story hub) and fiction section (treehouse). Children were initially working in pairs of their own choice, but they quickly worked out that they needed a "leader's" help to locate resources, so about half of the pairs dissolved into other larger groups.

Askers
Of the remaining participants, about one third of children could be grouped together as "askers". Rather than look for resources themselves, they asked others where to locate them. They were happy and open for other children to find resources for them as well as adults. The children may genuinely not know where to look, or perhaps not have the confidence to look; however, many seemed to enjoy communication with an adult and perhaps have affirmation of hearing what they already know. Mandel (2019) noted that adult patrons' wayfinding patterns change when they are with other people, and this was backed up by the data. Children who were capable of searching on their own, were happy to be led to resources by other children.

4.1.1 Potential barriers to validity of results
Each group size of 24 children was large, so some activity may have been missed by the observers. The observations were conducted at various times of the day which may have affected the performance of some of the groups.

There may be inconsistencies in the notetaking of the observers. A limitation is the lack of quantitative data; the observations are not objective and may be down to researcher bias. The observers did not discuss their findings following the observation, so there is a lack of inter-rater reliability.

The different ethnicities and cultural backgrounds could play a part in the search behaviour of the children. Collectivist cultures tend to help each other out and ask more for help, individualistic tend to venture off on their own. Therefore, instead of categorising types of wayfinders as "askers" or "leaders", they could be described as "collectivist" or "individualistic". The viewpoint of the researcher is biased in this respect.

4.1.2 Reflection on observations data
Many struggled to understand terms such as "life on land" and were heard asking, "Does that mean animals?" Likewise, they could not conceptualise "Life in the Air". When looking for the bird books, few children stopped at the large sign, "Life in the Air", even when placed at eye-level. In their conversations, they were looking for a sign of "Birds". Most participants found birds by walking along the shelves and looking at covers until they came to the books on birds.
When we added the 3D model, children located the section quickly. It was observed that placing the model on top of the shelf in a sightline was the easiest for patrons to spot (Fig. 4).

Figure 4: Example of 2D and 3D signage at eye level (1.2m) in TTS Infant Library (own photo)

It was observed that there are only so many models that can be used until "visual clutter" becomes counterproductive and leads to confusion or for the children to start playing with them. Consequently, the placement of models should be controlled: few in number and strategically placed for when a wayfinding need is likely to arise, such as the bird in Figure 4. Where the description of a category is unclear i.e., Life in the Air, the models add visual clues. They should also be similar in styling to maintain the brand image in the library

Resources that are not easy to classify proved difficult to locate. The "Rocks" section was visually signposted low on the shelf and was a smaller and less obvious section to find. Under Dewey, Rocks are classified as 552 in science; however, children milled around and did not think to look in the section categorised as "Weather and Seasons" where books about rocks had been shelved (Fig. 5). When children were asked where they expected rocks to be, very few said "science", and nobody chose "Weather and Seasons". They were more likely to say, "planet earth" or "materials" but often needed prompting to get to that conclusion. Most children did not know which category they would put rocks in so an OPAC with map would have been helpful in this instance.
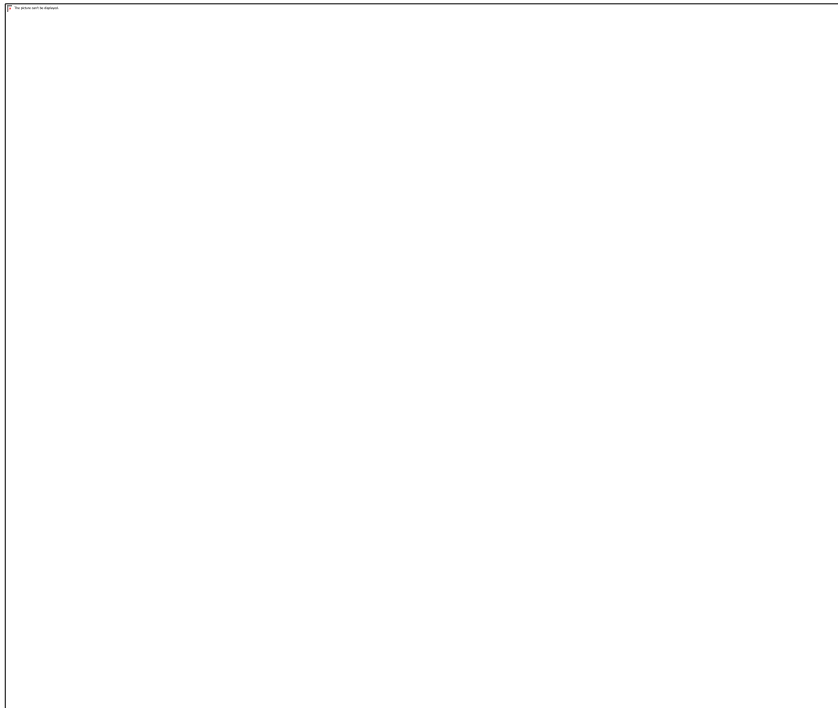
Figure 5: A non-fiction section in TTS Infant Library with Rocks section on the bottom shelf (own photo)

About one third of the children, the "leaders" showed logical thinking and deduction, working through a series of steps to categorise where resources should be located. Even though dinosaurs and rocks were not together on the list, the children returned to the dinosaur section. They deduced that rocks would be somewhere nearby. The skill of categorising where resources may be found could be improved with pre-teaching about organisation.

It also leads to the conclusion that science from 500-600 as a Dewey Decimal system would benefit most from strategically placed models, whereas other sections, such as biography, would not require this support.

Biographies were positioned at the end of the non-fiction section and most children had to ask where this section was located. Many participants did not understand the term "biography" and "famous people" was added after the first groups kept asking this question. Children were most likely to find this section - 920 - by recognising "Football Heroes" and "Little People Big Dreams" covers.
They then logically knew these were famous people. Front-facing recognisable titles in this way were more effective than using the signage of "biography". Using the term, "famous people" is inaccurate as not all significant people in biographies are famous. Therefore, front-facing or producing book covers as signage, with publishers' permission, could be a viable solution to wayfinding in areas such as these.

Less than 5% of children used the textual signage at the end of the bookshelves (Fig. 6). Only one child searched using the Dewey Decimals numbers on the spine labels. This shows that in a smaller or children's library, this level of textual detailed information on signage is not necessary for wayfinding. Barclay and Scott (2012) advocate for the use of purposeful bump points which function as navigational points where patrons pause to make decisions. As bump points, these areas in this library could be better utilised with a mixture of textual, 2D images and 3D models for wayfinding or as seating. This signage may be helpful to library staff, teachers, or parents but not to the main users of the library, the children.

Figure 6: Example of directional signage based on Dewey Decimal classification system with some modifications in

the terminology (own photo)

Geronimo Stilton was selected as the fiction choice for wayfinding as the children are familiar with the title and cover. In each group, about 22% of the children, usually the "leaders", knew that fiction books would be shelved in alphabetical order by the author and asked library staff who wrote the book. Geronimo Stilton had been chosen for ease as the title and author's penname are the same. Many looked under G, some under S but most were unable to work out the second alphabetical place as ST. They used their pointer fingers to scan across the books until they saw the image of Geronimo Stilton (Fig. 7). From this observation, the front-facing covers and using images is helpful in wayfinding. Using alphabetical order, especially when children must go to two alphabetical places, proves beyond their wayfinding ability. Changes in educational pedagogy mean that children are taught to read and write in phonics and there is no one "alphabetical order" anymore. Alternative ways of arranging fiction without alphabetical prompts would benefit this age group. Alternatively, more textual support can be given so they can visualise alphabetical order: e.g., **abcDef** to highlight authors whose names begin with D.

Figure 7: Junior fiction arranged in alphabetical order by author surname to three letter places (own photo

Reflection upon the observations

Children's library searching techniques seem habitual and they may have a fixed mindset over changing the way they search for resources. "Leaders" are open to employing a range of skills: map-reading, using signage, looking for model clues or building upon and using their prior knowledge. This range of cognitive mapping was identified by Polger and Stempler in adult wayfinders (2014).

"Followers" are less motivated to employ these skills. There needs to be a range of strategies to engage them in wayfinding. This may include eye-level signage, lit-up signs, seating clusters near books, models located at sections, collaborating with a partner, additional adult support, and verbal praise for working independently.

All the children recalibrated their searches at various points and went up the three steps of the treehouse (Fig. 8) to look out across the library to locate sections. This indicates that sightlines and viewing the whole library area are important for effective wayfinding.
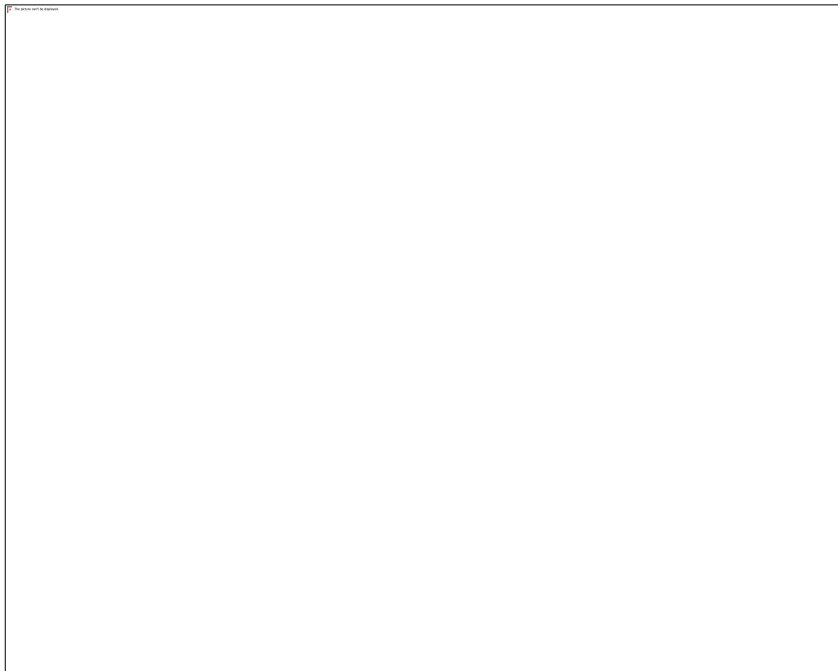
Figure 8: Treehouse at TTS Infant Library (photo from TTS website)

Children are influenced by their prior knowledge of wayfinding in libraries. Using the layers of signage, bump points, landmarks, classification systems and cognitive mapping is understandably difficult for many 7-year-olds as their "space syntax" has not yet fully developed (Li and Klippel 2012).

Children may require support as their spatial literacy is developing, and this is linked to their self-esteem and confidence as explorers (Wiener, Buchner, & Holscher, 2009; Helvacioglu & Olgunturk, 2011). This support may come from adults or their peers. Independent wayfinding may develop at a later stage.

Architectural and design features, as well as colour design, add to intuitive wayfinding and supports spatial literacy development (Helvacioglu, 2007) and this is why library design, not just signage, is so important to the wayfinding experience.

4.2 Survey

Following the observation, the participants completed a brief survey. It was taken by 175 children aged 7 and was conducted within 20 minutes of the end of the observations. The participants were informed that this was anonymous, and responses were individual to encourage honest reflection. The purpose of the survey was to collect additional data missing in the observations. It also allowed a closer examination of children's feelings about and reflections on their wayfinding and navigation experiences.

The first question, *What is your favourite area of the library? (Fig.9)* was intended to find out if the children saw landmarks as important. The response shows that children thought that the story hub and entrance *(Fig. 10)* were more popular than the books on shelves. These are the two areas where permanent staff are positioned to help, which suggests that the library staff are significant in the children's experience of navigating the library.
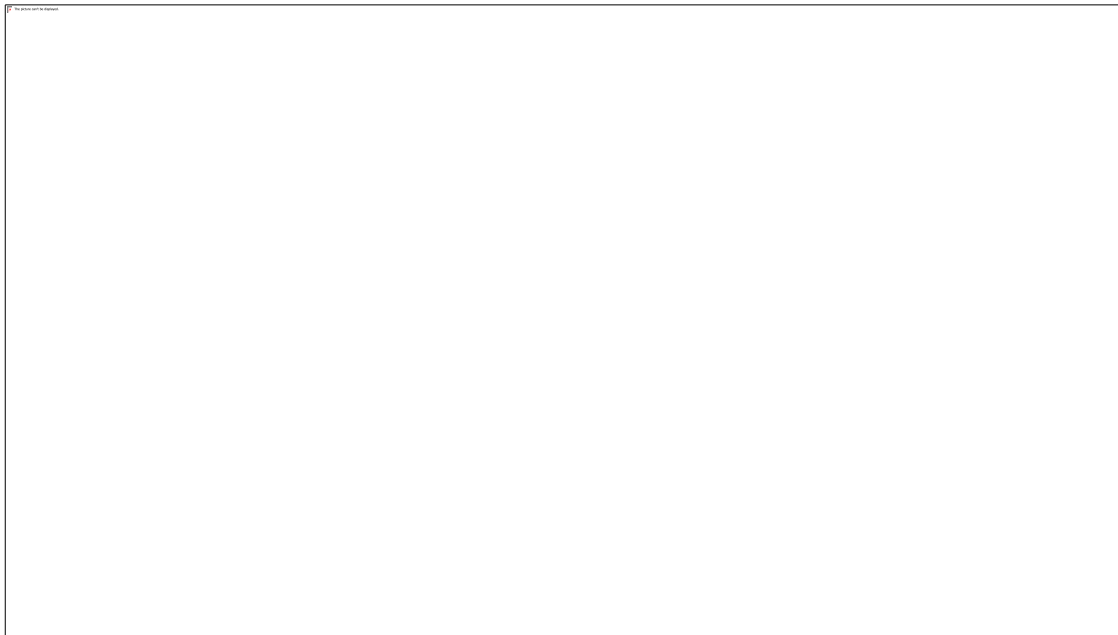
Figure 9: S c r e e n s h o t of responses to multiple choice questions conducted by TTS students (Google 2024)
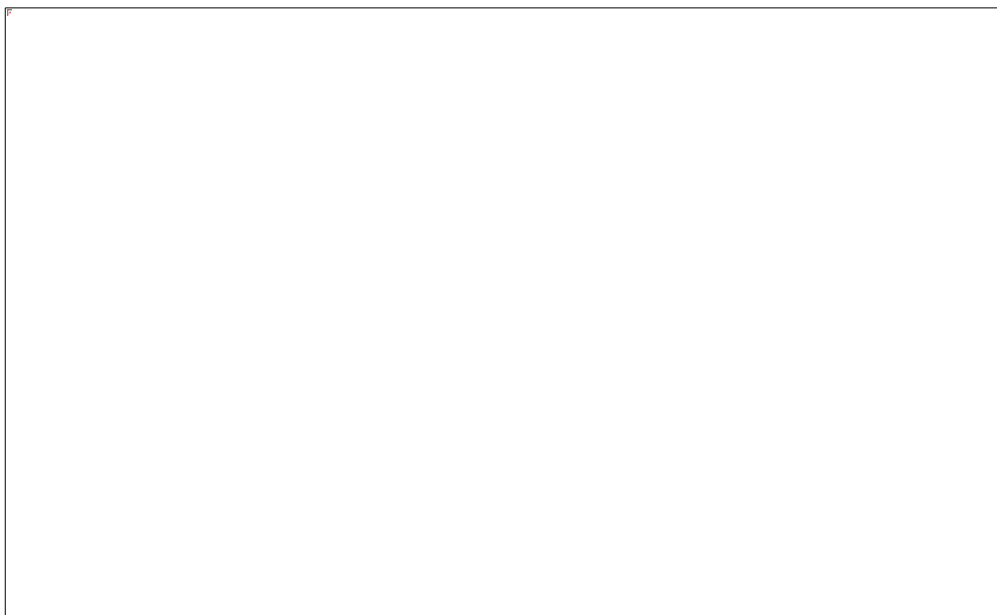
Figure 10: Examples of landmarks at TTS Infant Library (photos from TTS website)

Figure 11 shows the type of signage children prefer to use, with 2D signage with words and images as the most popular choice. This signage is more inclusive as it appeals to children who are proficient in language and those who may need visual support to access language. In the observations, it was noted that the 3D dinosaur model was a significant clue in locating the dinosaur books.
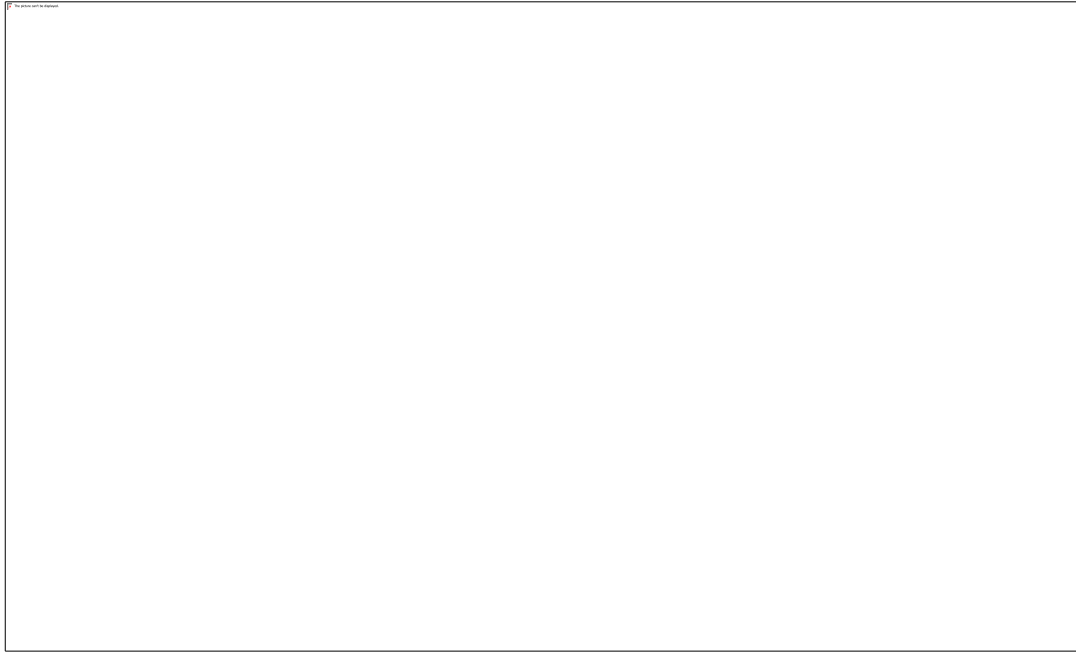
Figure 11: S c r e e n s h o t of responses from survey conducted by TTS students (Google 2024)

Figure 12 illustrates the children's response to the question: *Did you get lost in the library today? How did you find your way again?*

 Several children were indignant at this question and there were some vocal responses about never getting lost which suggests that "lost" is a trigger word for some participants and this might affect the results. For these short answer questions, the results were downloaded onto an excel spreadsheet to work out the frequency of how often the children felt lost during a 30-minute session. This is an indicator of how effective the navigation and wayfinding set up is in the library. Out of 175 children, 139 children felt that they did not get lost. The 36 children who did get lost used a range of navigational tools: 13 used the information signs for helpdesk and entrance; 9 used the visual landmarks, storyhub and treehouse and 5 asked for help, either from staff or friends. The remaining 9 children who felt lost were unsure about how they found their way again. Helvacioglu and Olguntuek (2011) link the enjoyment of navigating a school environment with their psychological wellbeing. Feeling lost or overwhelmed in a space can have a negative effect upon their wellbeing so it is important that this range of navigational aids are available to children.
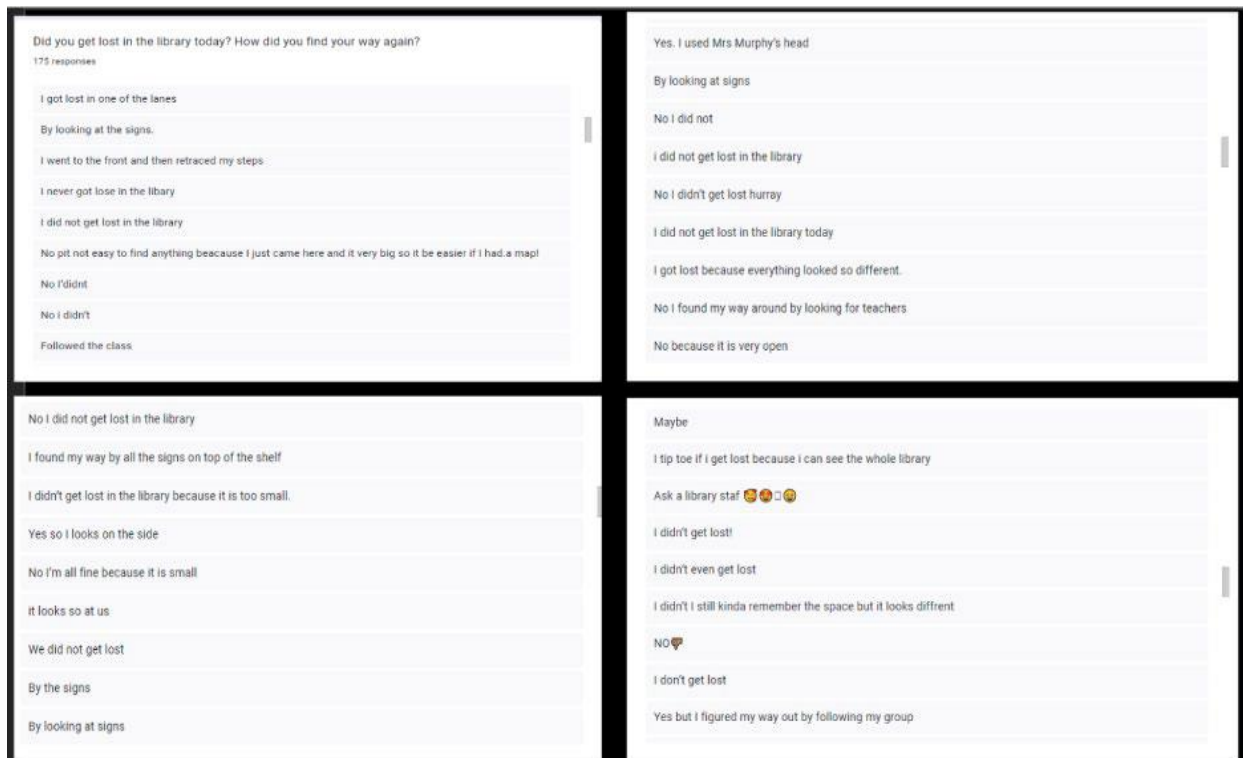
Figure 12: S c r e e n s h o t of responses from survey conducted by TTS students (Google 2024

Xinyi (2019 p.45) in *The Remaking of Singapore Libraries* states that sightlines are important in wayfinding. For optimum navigation, children should be able to see the whole of the library and the various sections when they walk into the library entrance. If they can spot landmarks when they walk in, e.g., the treehouse at the front and story hub at the back of the Infant Library, they feel grounded and more comfortable exploring. This prevents them from getting lost. This also benefits the library staff as they can see the children and ensure that they are safe if they gather at the landmarks.

Figure 13 shows the participants' response to *Would you like a navigational map at the front?* which indicates that children would like a visual overview of the library sections as they walk in. For the last two groups, a layout of the library map to aid with resource finding was provided (Fig.13). Observers noted that this did not have a significant effect on most children's ability to locate the books on the shelves but did help them spot the non-fiction section more quickly. Three to four children in each class liked using the map and acted in the role of leaders to "guide" the other children to the non-fiction section. Other children in the group simply followed the map readers who pointed to the sections.
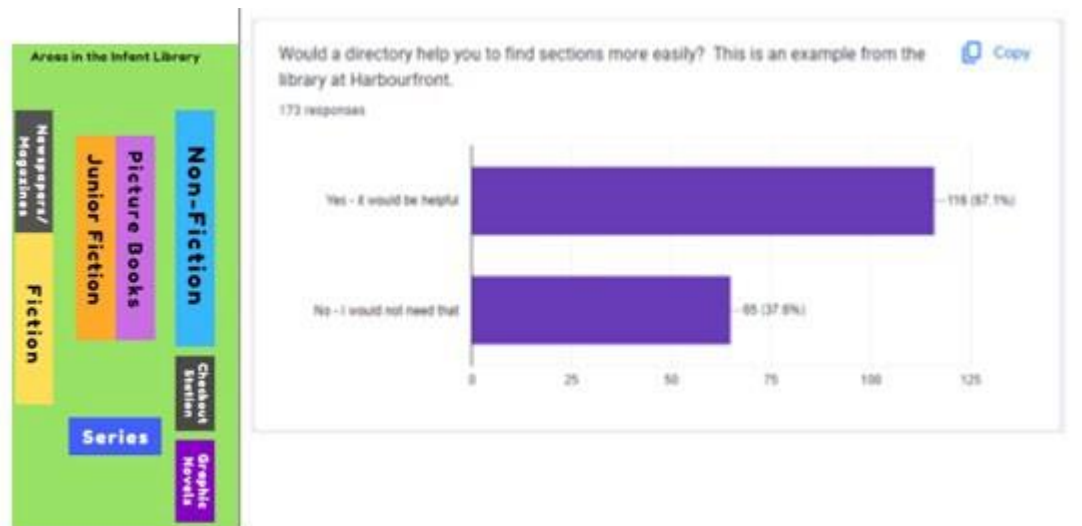
Figure 13: Image showing layout of TTS Infant library and screenshot of responses from TTS students (Google 2024)

Figure 14 highlights the main responses to the question *Did you see anything that surprised you in the infant library today?* We anticipated that children would pick out significant architectural and design features. The results were organised into thematic categories. Out of 175 children during the 30-minute observation, 38 did not see anything that surprised them; of the remaining 137, landmark features stood out for the children rather than the book collection itself. 8 were surprised by the beanbags; 21 by the seating, particularly the pods; 16 by the treehouse; 24 by the story hub; 18 by the lights and 10 by the entrance doors (Fig.10).

Overall, the key features they enjoyed were landmark features: e.g., storyhub, pods, and treehouse (Fig. 10) and lighting features such as shadow lighting on signage and coloured light effects in the storyhub. The children were able to identify the effect of landmarks, colour, and lighting on their wayfinding. Colour and lighting navigate children to a location, whereas seating and landmarks function as stop points for renavigation (Barclay and Scott 2013).

Figure 14: Sample of responses to a short answer survey question by TTS students (Google 2024)

Figure 15 shows responses to the question: *Is there anything that you want to see in the [new] Junior School Library?* There are no discernible patterns in these responses. They are personalised and individual. Some children may be change adverse which is understandable as they are fond of their current school library. Likewise, there are no significant patterns from the question responses: *Is there anything you do not want in the new Junior Library?* (Fig. 16). Overall, the impression is that: mood lighting and cosy seating are important; surroundings should make children feel secure and connect with their well-being and the book collection should not be crowded but well-weeded and easy to navigate.

Is there anything in the Infant library that you want TO SEE in the new Junior Library?

Add reading 20 pods
The way the book sections are organised
Lights that can change colour
Pods lights in the kiva and tree house
Circle chilling places
Monkey books
I like the colour
The pods
Aircon
The slime books
Led lights
The lights in the story hub
Yes i want colourful lights
Everything!!
A clock and signs
A book worm cubby up high with a lader

Reading sections
Better books
Lights
Reading sections and pods
I don't know
Everything
The pods with pillows in them.
The story hub but keep the pillows
No
A small story hub and a place to take of your shoes before you enter the library
Bean bags
Cozy spost
Better guiding
Something like the treehouse
Sofas,beanbags,colour
More reading spaces.
The curving beds
The aesthetics

Tree house coloured sighns
Reading hubs and treehouse
the ceeva [kiva] with the cool lights
Bigger treehouse
Treehouse, beanbags, smaller counter, brighter, decoration on ceiling
The glow sign for entry
I absolutely loved some of the books, and some coloured lights and plants in the junior kiva would be perfect!
The light on the front of the door and the pods
No
More reading areas
The lightning in the story hub
The hut
The little bits of reading corners
Grass on the walls
The reading corners and cozy story hub
Thick Star Wars books
Yes I do It is the tree house.
Signs that are easier to understand
A hot chocolate

Figure 15: Sample of responses to a short answer survey question by TTS students (Google 2024)

Figure 16: Sample of responses to a short answer survey question by TTS students (Google 2024)

For the final part of the survey, we asked the children to explore their feelings about their experience of navigating a new library. Figure 17 shows their preferences. The children thought that their existing Junior library was easier to find books in and had better books for them, which is logical as it is age-appropriate, and they are used to navigating it. Their existing library has more written signage including directional signage which could help them to navigate. They felt safer in the existing Junior library space (again this could be linked with familiarity); however, they felt calmer and more relaxed in the new infant library which could be attributed to seating, mood lighting and furnishings. For a visual comparison of the two libraries, see Figure 18.

Figure 17: Sample of responses to multiple choice questions by TTS students (Google 2024)
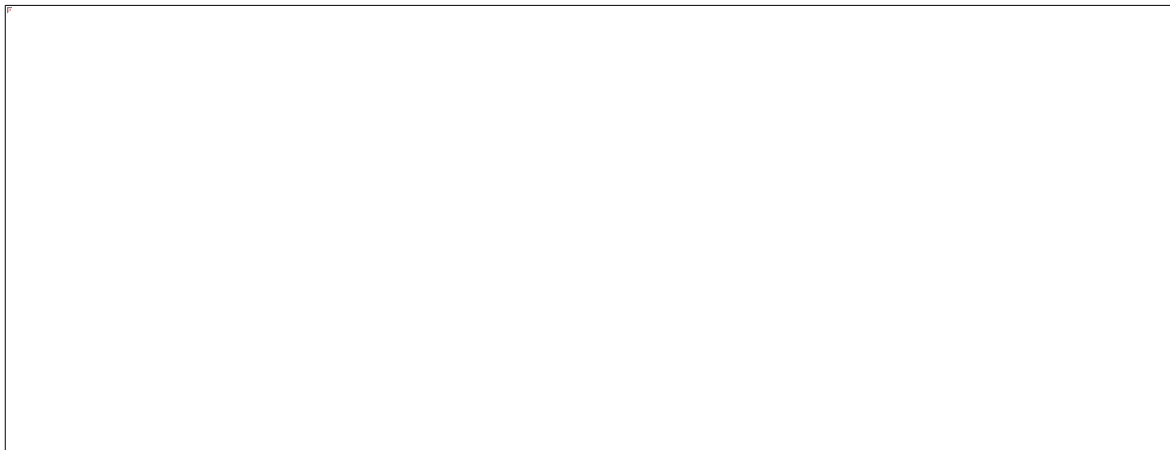

Figure 18: Current TTS Junior Library (left) and new TTS Infant Library (right) (own photos)

4.2.1 Potential barriers to the validity of the survey data

As the questions were pre-written, there was a chance of subjectivity in the question phrasing. However, the results did offer previously unknown information about wayfinding behaviour.

Although the children were asked not to share answers with the person sitting next to them, they inevitably did. Some of the answers are similar. For example, in Figure 10, "the wooden edges that can hurt your back", and "sharp edges on the seats" are two answers submitted by children sat next to one another in response to the question: "Is there anything you do not want to see in the new Junior Library" (Fig.16).

Some questions did not generate reliable results, so they were removed from the data. Children were asked to pick out where nonfiction, fiction, magazines etc. were located on a map but many children had difficulty conceptualising a 3D map onto a 2D diagram. This suggests that maps as navigational tools for children this age might not work.

4.2.2 Analysis of survey data

The process of reflection in the survey helped the children to form a meta- cognitive approach to their searching. Creating this mental map when wayfinding is an important part of cognitive development (Cornell, E. H. and Heth, C. D.

1989). Wiener, Buchner, & Holscher (2009) describe the spatial cognition required that is vital to wayfinding and navigation confidence.

Architectural and design features, i.e., landmarks and soft furnishings, function as significant navigational tools to support spatial awareness (Xinyi 2019; Helvacioglu 2007). The younger the child, the more navigational landmarks and seating are required in relation to book shelving.

Johnston and Mandel (2014 p.3) state that it is important to support children's wayfinding in a library setting as this may be their first experience of using spatial awareness at this level. Therefore, staff presence has a key role in supporting their wayfinding. All the landmarks that the children thought were important were located where the staff were positioned: the story hub, opposite the treehouse, the entrance, and this shows that they wanted to see that support was available. Adult presence helps child patrons to feel valued and reduce their anxiety (Kenneway 2006; Stimson 2007; Hennah 2014; Polger 2022). Even if the children did not ask the staff questions, their presence was important to their feelings of confidence.

Using a combination of images, models, and lighting makes signage more fun to use and encourages independent wayfinding. Motivating children to navigate is important and uses a variety of scaffolded approaches (Vygotsky, 1978) so they are able to navigate the library space with confidence. This variety of approaches makes library wayfinding more inclusive for all children.

Signage at eye level is easily spotted by children. As not all signage can be situated at this height, a variety of shelf talkers should also be used. Positioning is a key factor to the success of patrons' wayfinding (Eaton 1991, Li and Klippel, 2012; Mandel 2013). It should be used sparingly at stop or "bump" points and be for the purpose of the children rather than the library staff shelving books. When a topic is being studied in the curriculum, such as rocks or electricity, temporary models could be placed to draw attention to these sections. However, too much signage noise and model clutter can lead to confusion and sensory overload so it must be planned for in a balanced way.

Stempler and Polger (2014) have explored the difference between what patrons want compared to what they get in terms of navigational tools with the conclusion that most patrons want to wayfind independently. There was a range of navigational tools in the library: signage, bump points, landmarks, staff help etc. that enabled independent wayfinding; however, some navigational tools were not helpful and were distracting. This included Dewey Decimal spine labels; using alphabetical order to navigate the fiction section; using 2D maps in a 3D space; bump points that have too much information; and some subject headings that were beyond the children's cognitive understanding.

Polger (2022) suggests that including a directory of sections at the front of the library so patrons orient themselves at the start of the wayfinding process, can support the process of wayfinding. For children at this age, the map is only helpful if it is used as part of the reflection process. Children need to repeatedly use a space, build their range of navigational tools, and familiarity develops over time. It is

a cyclic process of exploration, using different navigational tools and reflection upon their wayfinding that develops the complex layers of spatial literacy required to navigate a library.

4.3 Semi-structured Interviews

4.3.1 An interview with Michael Kelly Head of Infant Library, TTS Singapore, where the observations and survey took place.

Michael Kelly collaborated with architects ATDR & Co to design the Infant Library at Tanglin Trust school. The questions were based on the data gathered from the observations and survey and shared in advance. MK stressed the importance of library branding for both parents and teachers. Adult patrons respond best to uniformity in colouring and font size on signage. Using white writing on a black background creates the highest colour contrast that makes the signage readable. For child patrons, consistency in text and readability are also important to ensure that signs are legible from a distance. However, this uniformity of design approach does not always work for children. Children like the engagement of interactive displays, seeing their work on display and quirky homemade design features.

Signage must be purposeful. 95% of the signage is the TTS Infant Library is in print and directional. Occasionally, 3D models will be used to aid navigation. The rest of the signage is digital and has minimal information about promotions, events, and opening times, and this is more directed towards adult patrons.
There is no regulatory signage because this becomes counter-productive. It has negative connotations about the way children might behave.

The Dewey Decimal classification system should be modified slightly to be more child centric. Some of the terms are outdated and are not easily recognised by children. The flow does not make sense as it does not follow a logical order. In this library, the flow of classification categories has been changed to family, school, community, Earth, and space. However, the concern is that this may make it more difficult for children to transition from one school to the next in an international setting when most school libraries still follow the Dewey Decimal classification system. If changed, the controlled vocabulary on the signage should match the OPAC headings. If adult or child patrons perform searches, the search terms produce the same results both in the physical and online library catalogue.

In terms of UX design principles, it is important to put the child at the centre of the library design. The shelves should not be too high, and the signs should be lowered too. Cosy seating and landmark features should be part of the navigation to add interest to the journey. Sightlines are important so children can orient and reorient themselves during their library navigation. Elevated seating, coloured lights to highlight zones and hanging signs for nonfiction and fiction can all help with this process. Images and models are used to support younger children's focus, particularly if there is a curriculum or festival focus such as Diwali.

To ensure all children are included in the library and represented, gender-specific headings such as 'princesses' and 'mermaids' should be removed. Inclusive terms such as "Magical World" include all genders. Categories such as 'families' should represent all family groups including families with adopted children, same sex couples and single parent families. Wherever possible, a representative display of books should be front faced in these sections.

A digital mapping system is now available with most library OPACs to assist with locating resources in the library. The function of this is well-suited to parents and teachers. Younger children may have fun using this feature. From the ages of seven and above this may be useful in the wayfinding experience and motivate children to find resources in an interactive way. Mobile shelving and floor zones may also

map out ways for the children to wayfind.

Overall, it is important to maintain a clutter-free environment to support navigation. Excessive signage and visual highlights may hinder navigation if they become overwhelming and confusing.

4.3.2 Interviews with Dean Parker, Marketing Manager; Chhaya Patel, General Manager; and Trevor McCann, Director of Sales at Raeco.

Raeco is an Australian-based company that specialises in library furniture and book display design. The questions were prepared based on the data gathered in the observations and surveys and shared in advance.

The Raeco team put much emphasis upon spatial planning. The library should be divided into distinct zones, so the children know where they are navigating, and they have a purpose. Suggested zones could be reading, classroom area, story time area, and collaboration zone. Traditionally, libraries have been set out with circulation desks, long aisles of books and directional signage to support children's navigation to these zones. However, modern libraries have dropped these fixed features and have more fluid arrangements where furnishing and shelving are arranged integrated to define areas. Designers create paths through the library that children follow intuitively to arrive at these zones (Fig. 19).
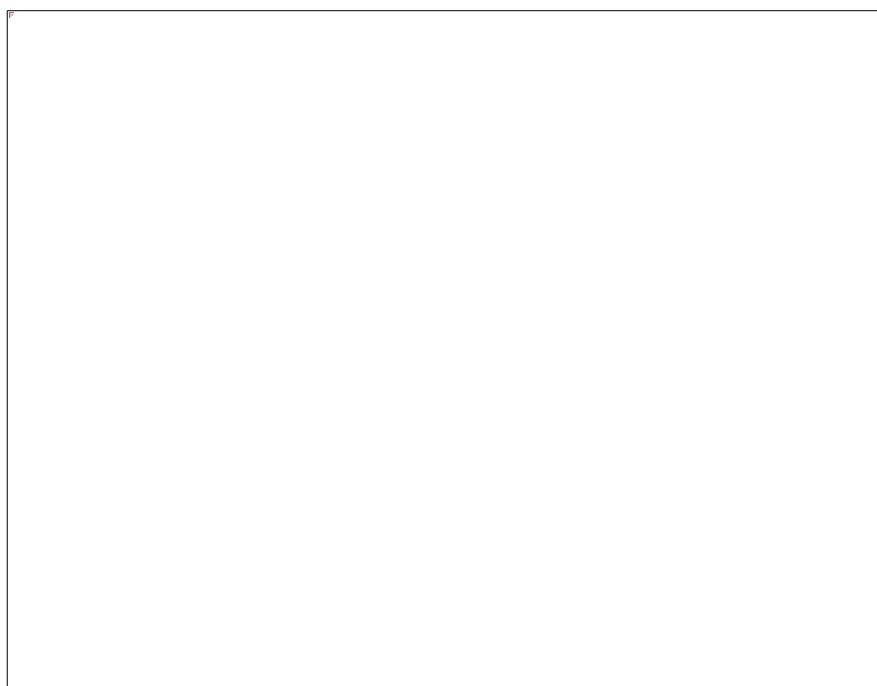

Figure 19: Example of flexible shelving and seating configuration to create navigational pathways (photo from Raeco brochure 2024)

In a modern children's library, shelving is multi-functional and is no longer just for book storage. The function of shelving is to display books, configure navigation paths and to highlight the age range of the children accessing the collection. This may be indicated by height and shape of shelving. Lower shelving in a geometric design can signal that the area is for younger children. The height differentiation intuitively guides children's wayfinding without the need for signage. Without reading signage, the pace of wayfinding increases.

Other ways to indicate the age range without signage is to introduce 3D models which signal a younger demographic. Figure 20 shows these features. There is no signage required as children in

lower primary would naturally gravitate towards this area. Intuitively, they move towards the colourful artwork on the walls which attracts their attention.

Figure 20: shows design features that support intuitive navigation to this area by younger primary children. (image supplied by Raeco from a compilation video of Raeco projects, 2024) https://www.raeco.com.au/projects/

Intuitive navigation can also be created with front-facing book displays. Books can be grouped thematically. For example, easily recognised graphic comics such as dog man, bird and squirrel etc. will attract a different audience to older children looking for YA graphic novels. In Figure 21, there is no real need for signage as the books on the bay ends clearly highlight the theme and target audience.
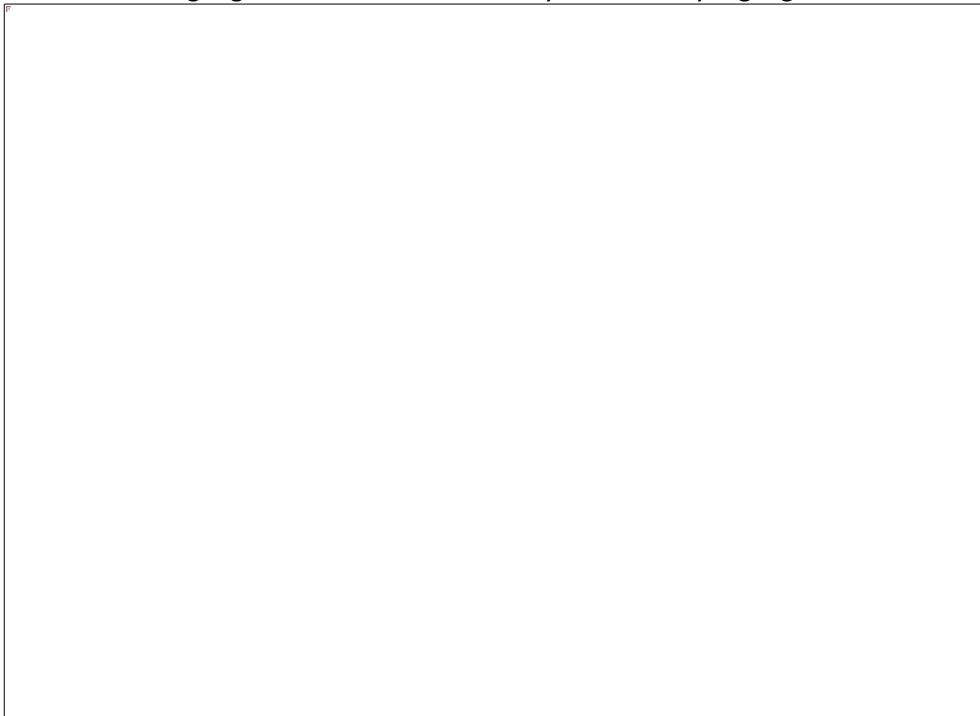

Figure 21: Example of shelving with front facing book displays (photo supplied by Raeco, 2024)

The backplates of the bookshelves on the left of Figure 21 have been removed, which also improves the sightlines to help children move through the library space.

Flexible and movable shelving are essential in contemporary children's

libraries. Wayfinding requirements change over time and the configuration of the navigation paths of a library needs to change with them. This change could be in usage patterns of the collection or zones. Modular seating and adjustable shelving allow these adaptations to happen. Figure 22 shows an aerial view of a library with different configurations that can easily be realigned. There are no long aisles, and seating is arranged near the shelving to encourage pausing and collaboration.

Figure 22: Aerial view of school library configuration: furniture, bookshelves, and screens (photo supplied by Raeco 2024)

Library designers may draw inspiration from the retail industry. Retail centres or malls are designed so you can see the whole space from the entrance. This is how a young child likes to view the library space: they like to see everything as they walk through the door, then they like to zone in. Figure 23 shows a waterfall set up in a library. It is staggered so children can see all the library zones from the front and navigate to the appropriate one. Xinyi (2019) highlights design features such as conical displays and waterfall shelving at the NLB that enable children to see picture books with ease. All her findings show that these design features support children's confidence in navigating a library environment.
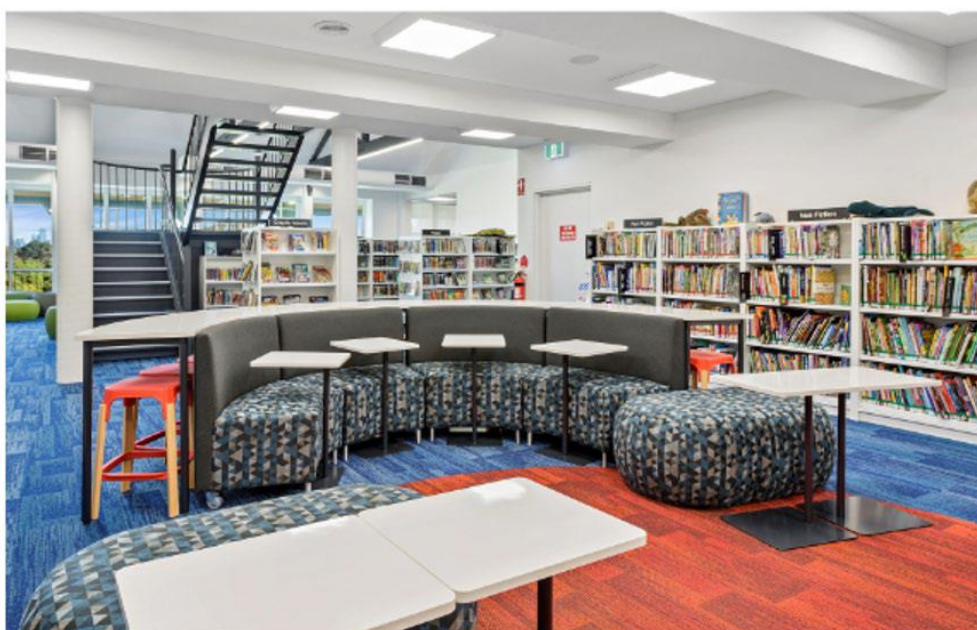

Figure 23: Waterfall seating and shelving can improve sightlines that allow intuitive navigation for children. Image from a compilation video of Raeco projects (photo supplied by Raeco 2024)   https://www.raeco.com.au/projects/

Another design feature of retail stores that libraries can mimic is displaying new products at the front. For example, a shelf or table of new books may signal the entrance to a library. For the youngest children, browser tubs are a clear indicator of age-targeted wayfinding. It is worth looking at the younger children's section of a library after the children have browsed to see if their wayfinding has been successful. The shelves that have been browsed indicate that the wayfinding has been successful.

Signage is still a key component in assisting in navigation, however, it is less important than it once was, and the trend is more towards increased intuitive navigation. The use of signage should be strategically placed and minimally used to avoid the confusion that occurs when children are faced with too much language. Effective signage is placed on top of shelves and double sided so it can be seen from various angles of the library. Figure 24 shows how a crowded library space can be navigated by top level signage. Without this signage, children would struggle to recognise sections.

Figure 24: Top level signage is necessary for navigation of crowded library aisles. Photo of an unspecified public library (image supplied by Raeco 2024)

Another visual aid to navigation is the use of colour blocking. Linking colour between shelving, signage and furniture denotes a specific zone. If a library is categorised by genre, yellow could denote fantasy, and purple realistic. Scales of the genre, i.e. the subgenres of science fiction, dystopia and mythology could be picked out in colours on the yellow colour family: oranges, yellows. This leads to intuitive wayfinding. Colour coding can be used to show the age that the collection is aimed at. By using assorted colours for furniture and signage to denote various zones, libraries can help users quickly identify and navigate to their age-appropriate areas. For instance, bright colours may be used to highlight sections for younger children, while more subdued tones might mark areas for older students (Fig.25).

Figure 25: Front facing picture books and bright ottomans indicate that this area is for younger primary students. The waterfall display supports intuitive navigation as all books are on display. There is no need for signage. Photo of an unspecified primary school library from Raeco brochure (image supplied by Raeco 2024)

Whilst lighting and sound do not directly assist in navigation, they contribute to the overall ambiance of library spaces. Neutral flooring with strategically placed rugs can subtly guide users through different zones, varying the textures underfoot. Natural light from windows enhances reading areas and seating should always be placed near a window as this is an area relaxing. However, it is also important to ensure that lighting and acoustics do not become fixed elements that limit the flexibility of the space. Contemporary trends in Singapore public libraries have included lighting on fixed shelving to highlight specific collections and pathways (Fig. 26). This is in the context of a public library and fixed lighting features may not be suitable for school libraries where collections and layouts frequently change
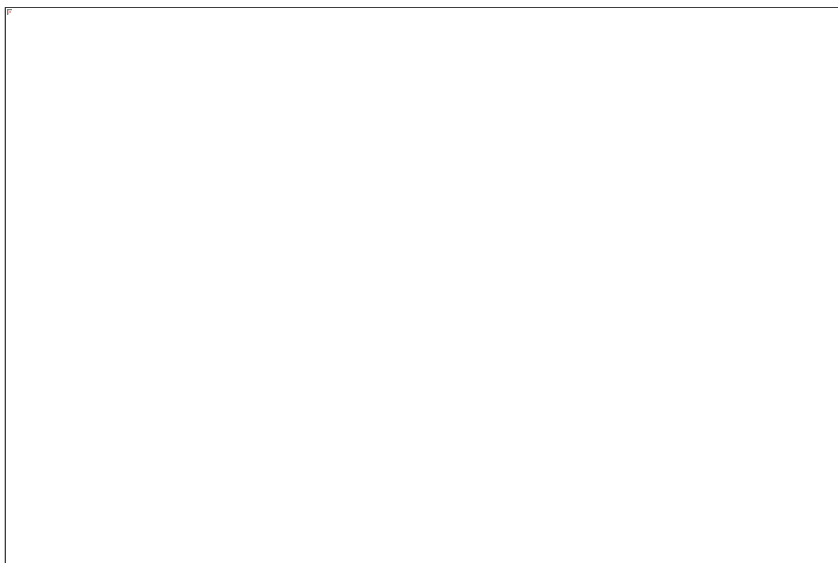

Figure 26: Image of Harbourfront Library, National Library Board, Singapore showing fixed lighting for navigation and natural lighting to indicate a relaxation zone (image from NLB website 2024)

https://www.nlb.gov.sg/main/visit-us/our-libraries-and-locations/libraries/library-harbourfront

Modern library designs increasingly call for more accessibility and inclusivity for all patrons. Adaptations such as adjustable shelving, lowering shelf and signage heights, accessible seating arrangements, and tactile features help to ensure that children with physical disabilities can navigate the space comfortably. For child patrons with special needs, libraries are integrating features like spinner displays and textured flooring to aid navigation. These elements cater to various sensory preferences and physical requirements, enhancing the overall user experience (Fig. 27).

Figure 27: Image of children's libraries adapted for young patrons with additional or special needs (photos supplied by Raeco 2024) https://www.raeco.com.au/projects/

Libraries are also incorporating culturally representative furnishings and artworks to make spaces more inclusive for a range of user groups. Figure 28 and 29 shows two library collaborations in Australian artists. Peter Fowler is an artist whose artwork represents the Australian Indigenous population. Claudia Rubenstein is a local artist whose dreamscapes are used in children's libraries.
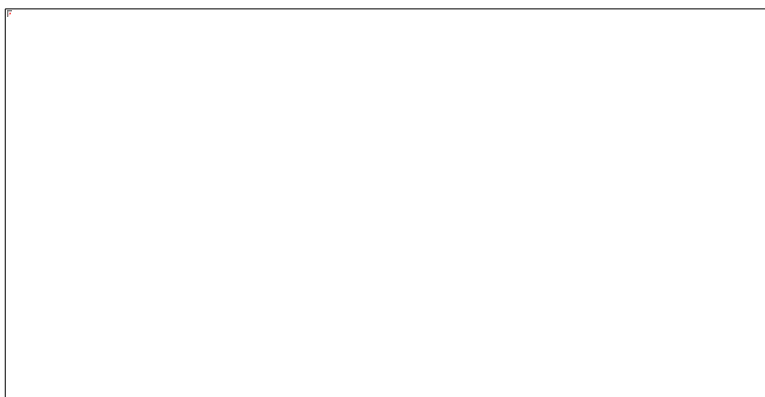

Figure 28: Image of Aboriginal artist, Peter Fowler, with one of his designs at Boonah Library, Queensland, Australia (image from Raeco 2024) https://www.raeco.com.au/wp-content/uploads/Indigenous-Fabric-Discover-the-Story.pdf
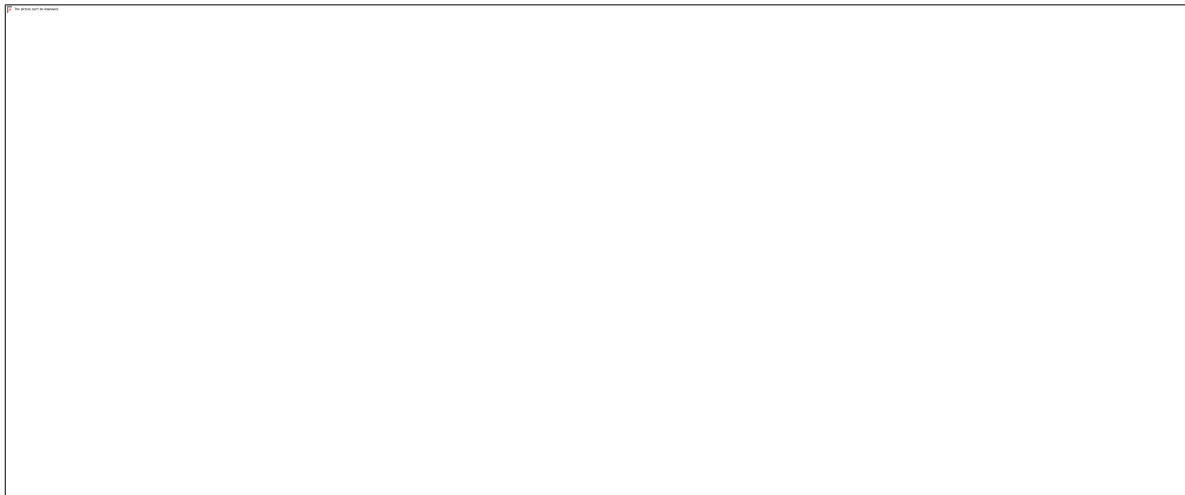
Figure 29: Image of Australian artist, Claudia Rubenstein, with two of her dreamscape designs (image supplied by Raeco 2024) https://www.raeco.com.au/wp-content/uploads/Imaginarium-Fabric-online-spec.pdf

Using textiles specifically designed for children can make them feel included in the space. They will instinctively navigate towards designs specially for them. This ties in with the ideas of Polger and Stempler (2014), who claimed that to allow for purposeful and confident wayfinding, library design must connect the child with their environment. In these children's libraries, they have been connected through artwork.

Bilingual signage also improves representation of more user groups in children's libraries (Fig.30). In an international school library where there is a large ethnic minority group, they can be well-represented through signage in two languages.

Figure 30: Photo from an unspecified school library shows how bilingual signage can include under-represented groups (image supplied by Raeco 2024)

4.3.3 Reflection on both interviews

The design of library layout plays a crucial role in a patron's ability to wayfind. As Passini (2000) points out, this is the responsibility of the library designers. They must adapt to the emerging needs of the patrons, not expecting the patrons to adapt to the library environment with ever-increasing layers of signage. Careful research and consideration should be given to the patrons who will use, or will potentially use, the library space in the future. Wayfinding paths may then be planned from a child-centric viewpoint.

Modern children's libraries have moved away from using traditional aisles, large circulation desks and packed rows of spine-shelved books. As Fawley (2012) pointed out this is for the benefit of the library staff rather than the children and was not supporting a customer-led environment. Libraries have since reinvented themselves by using different configurations of bookshelves and furniture for children to explore rather than walk straight through. Clusters of furniture and bookshelves may be arranged to create zones with clear sightlines that eliminate the need for signage in many areas. By combining colour, thematic displays and flexibility, the library can be configured in many different ways. Colour-coding zones and moveable landmarks make the environment more engaging and easier to navigate and the whole library layout is more child-centric and purposeful than ever before.

Modern wayfinding requires children to be involved and interactive in the process. Using intuition is an integral part of the child's library experience. Attracting and maintaining a child's attention using visual and tactile clues is well thought out and engaging. Jalees (2020) has researched the importance of visual, audio, and tactile signage to create an interesting and meaningful library experience for patrons.

In recent years, library design has responded to consumer demand, providing a cohesive look that appeals to children, parents, and teachers alike. Jalees (2020), along with other UX researchers (Mollerup 2013; Luca & Narayan 2016), state that signage should be professionally produced to be aesthetically pleasing for the user, with font, style and colour repeated throughout to create a sense of familiarity and an established library brand. Library signage is planned by design, not added onto by different library staff creating visual clutter (Wakimoto, 2016). This model has been designed based on the retail industry and UX design. It makes good business sense to put the customer or patron at the centre of the wayfinding experience with regular focus groups and patron consultation to influence thinking and keep ideas current. Dogu and Erkip (2000) put forward the ideas of building configuration, visual accessibility, circulation systems, and signage which all helped people to negotiate a shopping mall. The same principles apply to library models. Patrons, including child patrons, should be treated as customers and the library as a business that needs them to find resources quickly and easily to stay in business. Polger discusses using design thinking: incorporating patrons' views and requirements in the signage and wayfinding process as a way of making the library navigation truly patron centric.

Libraries with excellence in service culture are inclusive and represent children well. By incorporating adaptable furnishings for children with disabilities, a wider range of children may be welcomed to the library space. Their sense of belonging and well-being is tied into their confidence in navigating a library.

All children can well be represented in the library space, they are more likely to use and enjoy the experience. They can be represented culturally through artwork, textiles, and bilingual signage. The aim of a children's library should be to produce a welcoming and inclusive space that allows for easy navigation and may be accessed and enjoyed by all.

In summary, the design features of a library, including spatial zoning, furniture arrangement, signage, and accessibility—play a crucial role in enhancing navigation. By integrating these elements thoughtfully, libraries can create user- friendly environments that facilitate easy access to resources. The ongoing adaptation and flexibility in design ensure that libraries remain functional and welcoming for all patrons, adapting to their needs and preferences over time.

5.0 Analysis and recommendations

The following recommendations are based on the data collected from the observations, survey, and interviews in this research. They are in response to the research questions outlined in section 1.4.

How can design features contribute to a child's effective navigation of the library environment?

1. **Incorporating interactive elements**: 3D models, thematic displays, and movable fixtures create engaging and interactive wayfinding experiences. If children can interact with navigational tools, they are likely to use a greater range and develop enhanced spatial awareness. This also encourages collaborative navigation.

2. **Maintaining flexibility:** libraries with flexible layouts allow for easy reconfiguration of furniture and shelving. This flexibility facilitates better navigation as young patron's needs change.

3. **Using clusters for navigation:** furniture and shelving should be designed with varying heights and colours to create clear sightlines and spatial zones. Furniture can function as navigational landmarks to help guide children through different sections of the library. By using all areas of shelving, including bay-ends, intuitive navigation can be supported.

How can signage features contribute to a child's wayfinding when navigating the library environment?

4. **Adopting a child centric approach:** signage and navigation tools should be age appropriate and easily accessible. By using clear, simple language and including 2D images, the navigation process becomes more inclusive. Complex signage that represents abstract concepts should be avoided as this might confuse or distract children from their wayfinding goals.

5. **Implement consistent branding:** consistency of text, font, and colour across all signage ensures readability and brand coherence. High contrast colours provide better visibility from a distance. Library professionals should use professional guidelines, to ensure that the signage is cohesive, child-friendly and age-appropriate.

6. **Minimising visual clutter:** the minimalist trend avoids overwhelming children with too much visual information. Keeping signage to a minimum and placing it in high-visibility areas, such as the top of shelves, eye level or on end bays, will focus children's attention on navigation.

7. **Using tactile signage:** directional signage for children should be physical and tactile to ensure that it is engaging. This could include the use of 3D models to supplement signage in wayfinding; or hanging models and bright colours to guide children to age-appropriate sections. Textural variation in seating and flooring can also add interest to the wayfinding experience.

What replacements or modifications should teacher-librarians make to these navigational tools to improve students' wayfinding experience?

8. **Inclusivity:** signage and design features should be inclusive and reflective of the diverse identities and cultures of children who visit the library. Bilingual signage, non-gendered terms, and cultural representation all contribute to making child patrons feel represented and welcomed.

9. **Accessibility:** depending on where the international school is based, accessibility should be based on the guidelines of the host country or the home country, whichever is the most inclusive. Adaptations could include positioning signage for easy viewing and widening aisles for wheelchair users; and using tactile furnishings and features like Braille for children with additional needs.

10. **Customer-led service:** library managers should regularly gather feedback from focus groups. In a children's library, this should be children, parents, and teachers. By continually assessing and improving wayfinding and navigation, signage and design elements can be continually adapted to meet the developing needs of library users.

References

ARTHUR, P. and PASSINI, R., 2000. Wayfinding: people, signs, and architecture. *Information Design Journal,* 9(2-3), pp.220-222. Available from: https://doi.org/10.1075/idj.9.2-3.14gen [Accessed 03 February 2023].

ASSOCIATION OF SOUTHEAST ASIAN NATIONS (ASEAN), 2020. *Homepage.* [online]. Jakarta, Indonesia: ASEAN Secretariat. Available from: https://asean.org/ [Accessed 10 March 2024].

BAILEY, N., and Taylor, B., 2023. An exploration of the role of nonfiction in our libraries, ideas on how to change Dewey system to suit your needs and to promote use of nonfiction books. LKSW, Singapore, 2024. Available from: https://docs.Google.com/presentation/d/1on9-tAewPfQ4TihrnmM- T1dCRpLSa_jNWi78N0TBaOI/view [Accessed 02 July 2024]

BARCLAY, D. and SCOTT, E., 2012. Directions to library wayfinding. *American Libraries,* 43 (3/4), pp. 36–38. Available from: https://ezproxy.rgu.ac.uk/login?url=https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=llf&AN=74413008&scope=site [Accessed on 13 February 2023].

BOSMAN, E. and RUSINEK, C., 1997. Creating the user-friendly library by evaluating patron perceptions of signage. *Reference Services Review,* 25(1), pp. 71–82. Available from: https://www-emerald-com.ezproxy.rgu.ac.uk/insight/content/doi/10.1108/00907329710306599/full/ht ml [Accessed on 13 February 2023].

BROWN, C. & LAUDER, H., 2011. The political economy of international schools and social class formation. In: schooling internationally: Globalisation, internationalisation, and the future for international schools. Abingdon: Routledge, pp. 39-58.

CARR, A., 2006. *An Experiment with Art Library Patrons, Signs, and Wayfinding. school of Information and Library Science, Master's Thesis.* [online] University of North Carolina at Chapel Hill. Available from: https://ils.unc.edu/MSpapers/3150.pdf [Accessed on 09 Feb 2023].

CORNELL, E. and HETH, C., 1989. Children's wayfinding: Response to instructions to use environmental landmarks. *Developmental Psychology,* 25(5), pp. 755–764. Available from: https://web-p-ebscohost-com.ezproxy.rgu.ac.uk/ehost/pdfviewer/pdfviewer?vid=0&sid=97565c75-ede3- 4c84-b479-9d09e349c6c3%40redis [Accessed on 09 Feb 2023]

EATON, G., 1991. Wayfinding in the library: Book searches and route uncertainty. *Reference Quarterly,* 30(4), pp. 519–527.EQUALITY AND HUMAN RIGHTS COMMISSION, 2023. *An Introduction to the UK*

Equality Act 2010. [online]. UK: Equality and Human Rights Commission. Available on: https://www.equalityhumanrights.com/en/equality-act-2010/what- equality-act [Accessed 03

February 2023].

FAWLEY, N., 2012. Appearances do matter! What libraries can learn from Clinton Kelly. *College & Research Libraries News*, 73(7), pp. 414-415. Available from:
https://crln.acrl.org/index.php/crlnews/article/view/8797/9381 [Accessed 03 February 2023].

HEDRICK, K., 2023. Dynamic Shelving (ish): Connecting Books to Readers. *LKSW, Singapore, 2023.* Available from: https://docs.Google.com/presentation/d/1x1jue0nS14W7H5sxEC9tDqpxB9Gej8-t2Yv4TamGXZk/edit?usp=sharing [Accessed 04 February 2024].

HELVACIOGLU, E. and OLGUNTURK, N., 2011. Colour contribution to children's wayfinding in school environments. *Optics & Laser Technology,* 43(2), pp. 410–419. Available from: 10.1016/j.optlastec.2009.06.012 [Accessed 06 February 2023].

HENNAH, K., 2014. Library Innovations. *The ANZTLA: Australian and New Zealand Theological Library Association ejournal,* no 13. Available from:
https://scholar.Google.com.sg/scholar?cluster=15398694663919019127&hl=en&as_sdt=0,5&as_vis=1 [Accessed 10 February 2023].

HENNAH, K., 2023. Inspired Library Layout and Furniture [online]. Australia. Website available on: https://kevinhennah.com.au/ Recording unavailable [Accessed on Friday 17th May 2024]

INTERNATIONAL CONSULTANTS FOR EDUCATION AND FAIRS (ICEF), 2023. *What is behind the dramatic expansion of the international schools sector?* [online]. Bonn, Germany: ICEF GMbH. Available from:
https://tinyurl.com/bdeyvxd6 [Accessed on 01 March 2023].

INTERNATIONAL SCHOOLS CONSULTANCY (ISC), 2023. *What Makes the International schools Market Different?* [online] Faringdon, Oxfordshire: ISC Research. Available from: https://iscresearch.com/reports/international-school-differences/ [Accessed on 01 March 2023].

INTERNATIONAL SCHOOL LIBRARIAN NETWORK SINGAPORE, 2024. *Homepage* [online]. Singapore: ISLN. Available on: https://www.isln.org.sg/ [Accessed on 01 February 2024].

JALEES, D., 2020. Design thinking in the library space: problem-solving signage like a graphic designer, *Art Libraries Journal,* 45(3), pp. 114–121. Available from:
https://doi.org/10.1017/alj.2020.17 [Accessed on 10 February 2023].

JOHNSON, C., 1993. Signs of the times: Signage in the library. *Wilson Library Bulletin,* 68(3), p.40. Available from: https://web-p-ebscohost-com.ezproxy.rgu.ac.uk/ehost/detail/detail?vid=0&sid=15357ce5-5c9d-4a3a-ad7f-c32249d0030f%40redis&bdata=JkF1dGhUeXBlPWlwLHNoaWImc2NvcGU9c2l0ZQ%3d%3d#AN=502794358&db=llf [Accessed on 07 February 2023].

JONES, D. et al., 2011. Simple Marketing Techniques and Space Planning to Increase Circulation. *Collection Management,* 36(2), pp.107-118. Available from: https://www-tandfonline-com.ezproxy.rgu.ac.uk/doi/pdf/10.1080/01462679.2011.553774?needAccess=true& [Accessed on 08 February 2023].

KENNEWAY, M., 2006. Branding for libraries: Communicating your value to increase reader awareness and usage of the library service. *The Journal for the Serials Community,* 19, pp.120–126. Available from: https://librarysearch.rgu.ac.uk/permalink/44RGU_INST/1rujgbf/cdi_unpaywall_primary_10_1629_19120 [Accessed 02 March 2023].

LI, R. and KLIPPEL, A., 2012. Wayfinding in Libraries: Can Problems Be Predicted? *Journal of Map & Geography Libraries,* 8 (1), pp.21-38. Available from: https://www-tandfonline-com.ezproxy.rgu.ac.uk/doi/full/10.1080/15420353.2011.622456 [Accessed 04 March 2023].

LIBRARIAN KNOWLEDGE SHARING WORKSHOP (LKSW), 2024. Jakarta Available from: https://www.librariansworkshop.org/lksw-january-2024- jakarta/links-to-presentations/

LUCA, E. and NARAYAN, B., 2016. Signage by Design: A Design-Thinking Approach to Library User Experience. *Weave: Journal of Library User Experience,* 1(5). Available from https://quod.lib.umich.edu/w/weave/12535642.0001.501?view=text;rgn=main [Accessed on 11 February 2023].

MANDEL, L., 2013. Finding Their Way: How Public Library Patrons Wayfind. Library & Information Science Research. *Science Direct,* 35(4). pp. 264–271. Available from: https://www-sciencedirect- com.ezproxy.rgu.ac.uk/science/article/pii/S0740818813000613?via%3Dihub [Accessed on 20 February 2023].

MANDEL, L. and JOHNSTON, M., 2014. Are we leaving them lost in the woods with no breadcrumbs to follow? Assessing signage systems in school libraries.' School Libraries Worldwide, 20 (2), pp. 38-53. Available from: https://digitalcommons.uri.edu/cgi/viewcontent.cgi?article=1007&context=lsc_facpubs [Accessed on 01 February 2023].

MANDEL, H., and JOHNSTON M., 2017. Evaluating Library Signage: A Systematic Method for Conducting a Library Signage Inventory. *Journal of Librarianship and Information Science,* 1–12. Available from: https://digitalcommons.uri.edu/cgi/viewcontent.cgi?article=1009&context=lsc_facpubs [Accessed on 04 March 2023].

MOLLERUP, P., 2013. *Wayfinding: Basic & Interactive.* Amsterdam, Netherlands: BIS Publishers. OXFORD REFERENCE, 2024. Available from: https://www.oxfordreference.com/display/10.1093/oi/authority.2011080310022 5894 [Accessed on 10 July 2024].

POLGER, M., 2022. Library Signage and Wayfinding Design: Communicating Effectively with Your Users. US: ALA Editions, 2021.

POLGER, M. and STEMPLER, A., 2014. Out with the Old, in with the New: Best Practices for Replacing Library Signage. *Public Services Quarterly,* 10(12), pp. 67–95. Available from: https://doi-org.ezproxy.rgu.ac.uk/10.1080/15228959.2014.904210 [Accessed on 25 February 2023].

RAECO, 2024. Colour My World. [online]. Australia. https://www.raeco.com.au/presentations/ Recording unavailable [Accessed on 13 June 2024].

RAECO, 2023 Projects Archive. [online]. Australia: Raeco website. Available from:

https://www.raeco.com.au/projects/ [Accessed on 09 August 2024].

RAECO, 2024. Website homepage [online]. Australia: Raeco website. Available from: https://www.raeco.com.au/ [Accessed on 09 August 2024]. SOUTH AUSTRALIA, DEPARTMENT OF HUMAN SERVICES, 2023. What Is

Wayfinding and Signage? [online]. Inclusive SA, Australia. Available from: Inclusive.sa.gov.au,inclusive.sa.gov.au/resources/state-authority- resources/accessible-wayfinding-and-signage/what-is-wayfinding-and-signage#:~:text=Wayfinding%20is%20the%20process%20of. [Accessed on 25 July 2024].

STEMPLER, A., 2013. Navigating Circular Library Stacks: A Case Study on Signage. *Reference Services Review,* 41(3). pp. 503–513. Available from: https://ouci.dntb.gov.ua/en/works/7BQyAAw9/ [Accessed on 01 March 2023].

STIMSON, N., 2007. Library change as a branding opportunity. *College & Research Libraries News,* 68, pp. 694–698. Available from: https://web-p- ebscohost-com.ezproxy.rgu.ac.uk/ehost/pdfviewer/pdfviewer?vid=0&sid=dba2c4fa-d4b9- 41a9-bfbe-277fb17937fe%40redis [Accessed on 17 March 2023].

TANGLIN TRUST school, 2023. *Homepage.* [online]. Singapore: TTS. Available on: https://www.tts.edu.sg/about-tanglin/main [Accessed on 01 February 2023].

VEROSTEK, J., 2005. Affordable, effective, and realistic marketing. College & Undergraduate Libraries, 12(1/2), pp. 119–138. Available from: https://www- tandfonline-com.ezproxy.rgu.ac.uk/doi/abs/10.1300/J106v12n01_09 [Accessed on 18 March 2023].

WAKIMOTO, D., 2016. Library Graphic Design Best Practices and Approval Processes. New Library World 1, no2. Pp. 63–73. Available from: https://www- emerald-com.ezproxy.rgu.ac.uk/insight/content/doi/10.1108/NLW-07-2015- 0049/full/html [Accessed on 26 February 2023].

WHITE, L., 2010. Signage: Better None Than Bad. American Libraries Magazine, 41 (8), p.23. Available on: https://americanlibrariesmagazine.org/2010/07/12/signage-better-none-than- bad/ [Accessed on 09 February 2023].

WIENER, J. and BUCHNER, S., 2009. Taxonomy of human wayfinding tasks: A knowledge-based approach. *Spatial Cognition and Computation,* 9(2), pp.152–165. Available from: https://www.tandfonline.com/doi/abs/10.1080/13875860902906496 [Accessed on 07 February 2023].

XINYI, H., 2019. *The Remaking of Singapore Libraries.* Singapore: National Library Board. Available from: https://www.nlb.gov.sg/main/book- detail?cmsuuid=a00bfd15-9d71-4ed5-b114-83007f29d8f7 [Accessed on 10 January 2023].

YATES, D., and PRICE J., 2015. *Communication Design: Insights from the Creative Industries.* New York, USA: Bloomsbury Publishing. Available from: https://web-p-ebscohost-com.ezproxy.rgu.ac.uk/ehost/pdfviewer/pdfviewer?vid=0&sid=b633fee2-ea2f- 44d2-ad42-

[d0a23b9c21d8%40redis](#) [Accessed March 28 2023].

YELINEK, K. and BRESSLER, D., 2013. The perfect storm: A review of the literature on increased noise levels in academic libraries. *College & Undergraduate Libraries,* 20 (1), pp. 40–51. Available from: [https://www-](#) [tandfonline-com.ezproxy.rgu.ac.uk/doi/full/10.1080/10691316.2013.761095](#) [Accessed 10 February 2023].

Further Reading

RIETDIJK, W. 2012. schooling internationally: globalization, internationalization, and the future for international schools. *international Journal of Research & Method in Education*, *35*(2), 219–220.

[https://doi-org.ezproxy.rgu.ac.uk/10.1080/1743727X.2012.696482](#)
BAILEY, N., and Taylor, B., 2023. An exploration of the role of nonfiction in our libraries, ideas on how to change Dewey system to suit your needs and to promote use of nonfiction books. LKSW, Singapore, 2024. Available on: [https://docs.Google.com/presentation/d/1on9-tAewPfQ4TihrnmM-T1dCRpLSa_jNWi78N0TBaOI/view](#)

HEDRICK, K., 2023. Dynamic Shelving (ish): Connecting Books to Readers. *LKSW, Singapore, 2023.* Available here: [https://docs.Google.com/presentation/d/1x1jue0nS14W7H5sxEC9tDqpxB9Gej8-t2Yv4TamGXZk/edit?usp=sharing](#)

WALSH, D., CLOUGH, P. and FOSTER, J., 2016. User Categories for Digital Cultural Heritage. *CEUR Workshop Proceedings,* 1611(6). Available from: [https://ceur-ws.org/Vol-](#) [1611/paper6.pdf](#) [Accessed on 09 March 2023].

WIDATY, D W., 2023. Gentrifying the Children's Fiction Collection. *LKSW, Jakarta, 2024.* Available on: [https://www.canva.com/design/DAFag7WAstY/Xobeg-TJYLeL6GlwS62O5w/view?utm_content=DAFag7WAstY&utm_campaign=designshare&utm_medium=link&utm_source=publishsharelink](#) [Accessed on 04 February 2024]