

WEICIBI (Weiji Chinese Braille): Website Development to Improve Simple Conversational Text Writing Skills in Chinese Braille for Totally-Blind Students

Neddyana Pahlawaty*, Imas Diana Aprilia, Sunardi

Universitas Pendidikan Indonesia, Bandung, Indonesia

*E-mail: neddyana.pahlawaty@upi.edu, imasdiana@upi.edu, nardilembang@upi.edu

Abstract: The use of website as an accessible media can be an alternative in learning to write Chinese text. The purpose of this research is to develop an accessible website which can improve the skill of writing simple conversational Chinese texts writing skills for totally-blind class XI students. The research method used is RnD with ADDIE model. The data were collected through interviews, observations, documentation studies, and tests. This research produced a website that was developed based on the analysis of students' ability profiles and the application of MiBee Braille application. Weicibi can improve students' writing skills as shown by an increase in the mean level of phase A1 of 29.25, phase B of 61, and phase A2 of 83. Weicibi has learning and translator features supported by video tutorials. The conclusion is that the Weicibi developed is feasible to use and be effective in improving the writing skills of totally-blind students.

Keywords: Weiji Chinese Braille; Website Development; Simple Conversational Text; Chinese Braille; Totally Blind.

INTRODUCTION

Mandarin is one of the foreign languages studied in Indonesia (Sutami, 2012). This foreign language is learned because it is one of the international languages used with the number of speakers (1.28 billion) in the world besides English, which is spread in 37 countries in the world or about 16% of the human population in the world (McCharty, 2020). Mandarin learning aims to advance the Indonesian nation by utilizing science and technology to face free competition (Sutami, 2012). After entering into the Reformation Era, the Chinese nation was allowed to carry out all forms of cultural expression openly, as evidenced by the number of schools that provide Mandarin language learning and there are several universities that have Mandarin language majors (Charisty, 2016).

In preparing for Mandarin learning, schools conduct coaching and development so that the function of Mandarin as a foreign language can be implemented (Sutami, 2012). Guidance and development carried out by schools include curriculum development, teaching materials which are in accordance with student needs and the development of language teaching methodologies, professional Chinese teaching staff, adequate Chinese teaching facilities and utilization of information technology in Chinese, teaching methods, textbooks, conducting research on mastery problems in the fields of lexicon, grammar, phonology, phonetics, semantic, and pragmatic, improving the ability and teaching skills of teachers through training and developing Chinese teaching theory (Alwi, 2003).

Along with the evolving education service system, Chinese language learning can also take place in schools that provide Inclusive Education services. Permendiknas No.70 of 2009 chapter 1 states that Inclusive Education is "An education delivery system which provides opportunities for all learners who have abnormalities and the potential for intelligence and/or special talents to attend education or learning in one educational environment together with general learners." (Permendiknas, 2009). Both of these do not rule out the possibility that Special Needs Learners have the same opportunity to learn Mandarin at school. The initial finding of this research is that there is one totally-blind student who studies Mandarin in one

of the Inclusive Senior High School in West Jakarta. Then, the researcher conducted an objective condition analysis from the teacher and the student during the learning process.

Before the lesson (writing simple conversational Chinese text) was delivered, the teacher must be able to have competence in recognizing student learning characteristic, especially in the class which have students with special needs (Kartini, 2022). Evaluation also needed to analyze the student with special needs' progress on learning objectives that have been designed (Aprilia, 2017).

In addition to found out student's basic skills in writing simple conversational Chinese text, the skills are consists of: oral, written, and fine motor skills. Oral skills consist of: (1) spelling, including: preparation (knowledge of consonants, vowels, and punctuation), basic words (address, subject, verb, interrogative particle, adverb, base, and number), (2) auditory knowledge of phonemes (distinguishing punctuation sounds), and structural analysis (distinguishing base words and suffixes). Written skills consist of: (1) graphemes (writing the smallest unit in Mandarin or punctuation tone), (2) writing mechanism (consisting of: consonants, vowels, punctuation, punctuation marks, numbers, and capitalization). Fine motor skills include the ability when typing using the six-finger typing system and the ten-finger typing system (Choate, 1995).

During Chinese language learning, the method used by Chinese teacher to teach hanzi letters is using the *Hanzi Method*. *Hanzi Method* or post lingual pedagogy method which allows one to dig deeper into the structure of hanzi letter formation (Han, 2017). Teaching materials are delivered in writing through digital documents, and the media used are Google Classroom, Whatsapp, Power Point, and conventional written media such as whiteboards. Teachers also provide special teaching materials for totally-blind students with the material title "Mainland Chinese Braille", or the procedure for writing Braille in Mandarin.

The perceived limitation is that teachers have not found the right formulation to implement Mandarin learning which is accessible for totally-blind students. As blind children's visual learning has a big impact, making some subjects difficult to understand (HN et al., 2023). *Hanzi Method* teaching methods used in the classroom more often use visual media such as whiteboards and Power Point, explanations of the text or images displayed are often not clearly defined and detailed. Teaching materials provided through digital documents are mostly visual materials, requiring teachers to work with special assistant teachers to convert them into text that is accessible and can be printed with a Braille embosser.

The alternative media for writing simple conversational Chinese text is MiBee Braille application. This application can improve totally-blind students' literacy ability. This application can be used to write Braille with six-dot typing system, ten-finger typing system, and convert Ms. Word text into Braille Text. Six-finger typing system makes totally-blind students easier to write other Braille symbols that cannot be found in Latin symbols (Pahlawaty, 2022). MiBee Braille application also has several disadvantages such as: a six-finger typing system which does not have input that suits students' comfort, a Chinese writing database, and visual and audible Braille output in Chinese.

In relation to the basic skill of writing simple conversational texts, students have the following abilities: orally, students are able to say: (1) the consonants, vowels, and tones in the words ni, nimen, and wo, (2) the greeting words hao and zao, (3) the subject words wo, Lina and Li Fang, (4) the verb zhu zai, (5) the interrogative particles ma and ne, (6) the place adverb na'er, and (7) the numbers 1-3, 5-8. In writing, students are able to correctly write Chinese Braille as follows: (1) 6 out of 21 consonants, (2) 6 out of 58 vowels, (3) all four tones, (4) capitalized words, (5) two punctuation marks, and (6) Latin numbers 1-10. Students are able to type with two typing systems, namely the six-finger typing system and

the ten-finger typing system. For the ten-finger typing system using the Latin alphabet: (1) students have memorized the layout of the ten-finger typing system so that they make fewer mistakes when typing, (2) if there is a mistake in writing, the writing can be corrected and read by NVDA.

The obstacles faced by students are as follows: Students have not been able to correctly mention several things such as (1) punctuation tones found in some words and numbers 4, 9-10, (2) consonant letters in numbers 4, 9-10, and (3) distinguish the word ending in a word. Students made several mistakes in writing consonant letters, vowels, and punctuation marks. This results in errors in writing words which combine consonants, vowels, and punctuation, including numbers in Mandarin. Students also do not remember the punctuation marks in Mandarin Braille because there are some differences with Latin Braille punctuation marks.

Other obstacles related to the use of media were (1) students made several mistakes in combining dots according to Chinese Braille letters when using the six-finger typing system, (2) Chinese Braille letters were not read by NVDA, and (3) the teacher also could not correct through the translation of lay writing, so they had to correct through lay Braille writing on the work screen.

Broadly speaking, the obstacles faced by students are based on limitations in the use of learning media. Learning media is one of the most important elements in learning (Arsyad, 2017). In learning Chinese, the development of media and teaching materials tailored to the needs of students is a basic principle of learning so that the function of Chinese can be implemented.

As technological developments take place, alternative learning media are increasingly developing and one of the media that is often developed is media in the form of websites. Website or web is a simple designation of a network of various networks connected via the internet (Smaldino, 2019). The website allows users (usher) to access, view and store documents that can include text, audio, video and images (Sari, 2019). Interactive web-based learning is accessible for blind (by text and audio from videos) and deaf (by text and subtitle from videos) students through various devices and make the learning process two-way learning and effective (Astuti, 2023).

Another example of researches using websites as a media for learning is also used for Chinese language. The first study entitled "Application of Web Based Learning in Mandarin Vocabulary Learning" by Rosalin, Mariska, & Aryanti in 2021 with the results: "By using website-based games, it can improve the results of learning Chinese vocabulary and student's enthusiasm. Web-based learning media makes learning more interesting and students can learn better." (Rosalin, 2021). The second research entitled "Making Interactive E-Books for Learning Mandarin Basic Letters for Web-Based Beginners" by Liwang and Jennifer in 2013 also explained the results of their research that: "Making web-based e-books makes it easier for users to write and understand the meaning of Hanzi writing, pronounce pinyin letters, practice through questions on the web, and make it easier for users to get material files in the form of text and sound." (Liwang, 2013). The third study entitled "The Effectiveness of Using Web Quizlet for Online Chinese Vocabulary Learning in Grade 5 of Santo Xaverius Catholic Elementary School" explained the results that: "Web Quizlet can be declared effectively because the percentage of student evaluation results increases, the average score of students also increases, and student responses are very positive." (Yanggah, 2022).

One other study which inspired this development research is the Liblouis website by (Egli, 2009). This website is an open source accessible website that supports the development of Braille which is hampered by fragmentation and a small market, by providing Braille transcriptions of a complete range of languages, and emerging as a

universal solution. The website is free and can be used on Windows, Mac OSX, and Unix operating systems. There is also a source code that can be used for free by communities of developers who are enthusiastic about creating similar websites and making the Liblouis website continue to grow and develop.

Seeing these problems, the purpose of this research is to developed an alternative media in the form of a website that can be used flexibly and has been adapted to the basic skills of writing simple conversational texts in Mandarin. This website designed with several features, such as: learning features consisting of audio, video, and writing materials, as well as a translator feature to speed up Mandarin Braille writing, another supporting feature is the existence of video tutorials to use this website. This website also can be used with ten-finger input system, had their own database of Chinese Braille letters from “Mainland Chinese Braille” that include: the alphabet (pinyin), tones (shengdiao), numbers and punctuation, and also had output in the form of sound while typing, reading a text and from the description in the videos.

METHOD

The subject of this research is one totally blind student in class XI who attends one of the Inclusive Schools in West Jakarta.

This study used Research and Development method with ADDIE model. ADDIE model is a development model that is often used to develop teaching materials (HN et al., 2023; Cahyadi, 2019). However, it does not rule out the possibility that this model can also be extended to the development of learning media which is part of teaching materials. The ADDIE model consists of five stages of development, namely: analysis, design, development, implementation and evaluation.

This model started with analyze step, the researcher gets the objective condition from the students and the teacher during Chinese language lesson. Before that, researcher designed a writing simple conversational Chinese text test and validated by Expert Team. The following is a list of the Expert Team:

Table 1. Expert Validation Team of Chinese Simple Conversation Text Writing Skill Test Instrument for Totally Blind Students Grade XI

No	Name	Department	From
1.	Hendera,S.Kom.	Chinese Language Teacher	SMA Negeri 78 Jakarta
2.	Yani,S.Ag.	Classroom Teacher	SLB A Pembina Jakarta
3.	Marja,M.Pd.	Head of Study Program and Lecturer of Visually Impaired Specialty	Universitas Negeri Jakarta
4.	H.Sudarman, M.Pd.	School Principal	SLB A Citeureup Kab. Bandung

After that, the data collected by test, observation, and documentation. After analyzing students' objective condition, evaluation is needed to formulate programs and design for the website.

This following instrument is used for a test to determine the objective condition of totally-blind in writing simple conversational Chinese language text:

Table 2. Writing Simple Conversational Chinese Text Skills Guideline Instrument

Indicators	Sub-Indicators	Descriptor	No	Remarks	
Hand Writing	Fine Motor Skills	<ul style="list-style-type: none"> • Able to press keyboard keys with dictated letters according to the correct finger position with the six-point typing system. • Able to press keyboard keys with dictated letters according to the correct finger position in the ten-finger typing system. 	1, 2	Observation	
	Knowledge	<ul style="list-style-type: none"> • Able to write Chinese Braille consonant letters. • Able to write Chinese Braille vowels. • Able to write Chinese Braille reading tones. 	1, 2, 3	Written	
Spelling	Readiness	<ul style="list-style-type: none"> • Able to distinguish the sounds of consonants, vowels, and punctuation from dictated words. 	1	Oral	
	Basic words	<ul style="list-style-type: none"> • Able to distinguish greeting words from dictated sentences. • Able to distinguish subject words (person names and personal pronouns) from dictated sentences. • Able to distinguish verbs from dictated sentences. • Able to distinguish question words from dictated sentences. • Able to distinguish adverbs of place from dictated sentences. • Able to mention numbers 1-10 	2-7	Oral	
		Auditory recognition of phonemes	<ul style="list-style-type: none"> • Able to distinguish the reading tone sound of the dictated word. 	8	Oral
		Graphemes	<ul style="list-style-type: none"> • Able to write the smallest unit (Braille) of reading tone of the dictated word. 	4	Written
		Structural analysis	<ul style="list-style-type: none"> • Able to distinguish prefixes and root word formers from dictated words. 	9	Oral
		Writing Mechanism	Capital Letter	<ul style="list-style-type: none"> • Able to write Chinese Braille capital letters. • Able to use proper Chinese Braille capital letters in simple conversation text sentences. 	5, 6
Punctuation	<ul style="list-style-type: none"> • Able to write Chinese Braille punctuation. • Able to use proper Chinese Braille punctuation in simple conversation text sentences. 		7, 8	Written	
Numbers	<ul style="list-style-type: none"> • Able to write Latin numerals in Chinese Braille. • Able to write <i>pinyin</i> numerals in Chinese Braille. • Able to use proper Chinese Braille numerals in simple conversation text sentences. 		9, 10, 11	Written	

The next step is design. This stage started with is aimed at making the design of the website, guidebook, and learning program. At this stage the design that has been done, is evaluated by the expert team with a formative evaluation instrument. This formative evaluation is to get the evaluation score from design step. The following is a list of the Expert Team:

Table 3. Expert Validation Team of Formative Evaluation Instrument for Weicibi (Weiji Chinese Braille) Website Development

No	Name	Department	From
1.	Hendera,S.Kom.	Chinese Language Teacher	SMA Negeri 78 Jakarta
2.	Budi Darmulyana	R&D	Yayasan Mitra Netra Jakarta
3.	Yani,S.Ag.	Classroom Teacher	SLB A Pembina Jakarta
4.	Marja,M.Pd.	Head of Study Program and Lecturer of Visually Impaired Specialty	Universitas Negeri Jakarta
5.	Subagya,S.Pd.	Blind-Teacher	SLB A Citeureup Kab. Bandung

This following instrument is used for Weicibi (Weiji Chinese Braille) Formative Evaluation in design and development:

Table 4. Formative Evaluation Instrument Design

Indicator	Sub Indicator	Descriptor	
Suitability to the Characteristics of Totally Blind Students	Learning Media Modification	Using writing media that relies on the sense of touch (typing)	
		Using writing media that relies on the sense of hearing (has sound output when typing and reading the results of writing)	
		Use a typing system that is customized to the student's comfort (10-finger typing system or QWERTY)	
	Learning Objectives	Explaining the learning objectives in the guidebook and the development of learning media	
	Content support of teaching materials	Make it easier for students to understand how to write Chinese Braille from the smallest language units, namely vowels, consonants, reading tones, numbers, and punctuation marks.	
	Technical		Ease of website production
			Clarity of <i>pinyin</i> font size on screen
			Clarity of lay Braille letters on the screen
			Ability to create student learning attraction
	Content	Input	Availability of website usage guide
Website practicality			
Ten-finger Typing System (QWERTY)			
Availability of Chinese Braille <i>pinyin</i> consonants			
Availability of Chinese Braille <i>pinyin</i> vowels			
Availability of Chinese Braille <i>pinyin</i> punctuation tone			
Availability of Chinese Braille <i>pinyin</i> numbers			
Availability of Chinese Braille punctuation letters			
Concordance of Mandarin Braille <i>pinyin</i> consonants			
Concordance of Mandarin Braille <i>pinyin</i> vowels			
Concordance of Mandarin Braille <i>pinyin</i> punctuation tone			
Concordance of Mandarin Braille <i>pinyin</i> numbers			
Concordance of Mandarin Braille punctuation letters			
Availability of vocabulary list contained in simple conversation texts			
Process		Availability of Database and Translation system from modified Chinese <i>pinyin</i> into Chinese Braille	
Output			Clarity of screen reader typing letters with ten-finger typing system
			Clarity of screen reader of vowels and consonants that have been written
	Clarity of the tone screen reader that has been written		
	Clarity of screen reader numbers that have been written		
		Clarity screen reader punctuation that has been written	

Indicator	Sub Indicator	Descriptor
		Availability of lay writing that makes it easier for subject teachers and accompanying teachers to correct writing
		Availability of material videos
		Availability of downloadable material documents
		Availability of pinyin writing practice features that can be directly translated into Chinese Braille

After that, we move to the development step. At this stage the website, guidebook and learning program are developed in accordance with the results and evaluation obtained from the analysis and design stages as well as input from the expert team. The same formative evaluation is also done to get the final score of the developed product, so we can see the progress from the design evaluation score and the final product score.

The next step is implementation. This study also used the Single Subject Research method with the A-B-A model to determine the development of students' writing skills before, during and after the intervention using the developed website. From this method, the data is analyzed with .in-condition and inter-condition analysis.

RESULT AND DISCUSSION

The results and discussion of this research are as follows:

1. How is the Weicibi website developed?

This website was developed by the researchers and the Team using the Laravel framework and PHP version 7.4 for the backend, while for the frontend (display) using bootstrap 4. The development team consists of an IT Team of two people, and a Design Team consisting of researchers and one designer. The following is a list of the development team and their division of labor:

Table 5. Weicibi Website Development Team Name List

No	Name	Job
1.	Ramdhan	IT Developer
2.	Rizki Ferditama	IT Developer
3.	Riyan Tamara Aji Putra	UI/UX Designer

Broadly speaking, the design development process is preceded by the stages of making designs and guidelines, formative evaluation of designs and guidelines, making websites and guidelines, formative evaluation of websites and guidelines, and summative evaluation.

The design process went through several stages, namely the idea search process, sketching process, and then making the initial design. In the idea search process, the Design Team conducted simple research to determine the color palette, typeface, and outline of the web design to be used. The basic color palette used is gray, purple, white, and gold (on the logo) as the base color to be used. For the typeface, the one used is the "Montserrat" type, and uses a website with illustrations of teachers in it. For the logo, the researcher wanted a logo in the form of an emblem with Weiji *hanzi* writing and Weiji Chinese Braille pinyin writing in it. This process also went through the first internal evaluation stage to determine the design of the website and guide that would be submitted for expert evaluation.

At this stage, the researchers also developed materials to be included in the website in the form of videos uploaded to YouTube, written learning materials, and also developed a Chinese pinyin to Braille database. The database creation process itself was developed three times during the first and second internal evaluations. The researcher also conducted a

formative evaluation by the Expert Team to ask for suggestions and input on the design of the website and its use that was being developed by the Team. The researcher and the team then made revisions, resulting in the final design.

The results of the evaluation conducted by the Expert Team on Website Design and Guidelines can be concluded that the Expert Team gave an overall average score of 4.5 which means that the Expert Team agrees that this media needs to be realized and applied to totally blind students. At this stage there were no inputs and suggestions given by the Expert Team, so the researchers did not make design improvements again.

2. How was the Weicibi website development implemented?

In general, the process of developing this website and guide went through three stages until the website version 3 was created. These stages went through several evaluations as follows:

Version 1 to Version 2

An internal evaluation was conducted to create the website, and the guide. This process was carried out by the IT Team before being evaluated by the Expert Team at the second Formative Evaluation stage. The points that were evaluated by the internal IT team were updating the database, modifying the function of symbols or punctuation marks to be read by the system, changing the words from "learn now" to "start now", improving the logo on the website tab, fixing technical errors such as errors in writing and translating pinyin to Mandarin Braille, updating the material, updating the input of questions and answers, and feedback errors on question answers that should be correct to be wrong. After the website was improved at this stage, the development continued to the formative evaluation stage by experts.

The second (final) formative evaluation is a step to improve the website, and its guidelines that have been made. The evaluation includes several sub-indicators that are the same as those in the design formative evaluation. This formative evaluation was conducted by the same expert team as the formative evaluation at the design stage.

The results of the evaluation conducted by the Expert Team on Website and Guidelines can be concluded that the Expert Team gave an overall average score of 4.6 which means that the Expert Team strongly agrees that the media developed is very suitable for the indicators assessed and can be used to assist student learning at school. At this stage there are several inputs from the Expert Team to complete the overall function contained in this Weicibi website. The following are the inputs given by the Experts which will then be updated in the third internal evaluation:

- 1) Increase the size of the title and content of the material in each lesson.
- 2) Make a video tutorial on the use of the website.
- 3) Adding a database of Latin numbers from 1-10 to 1-100.
- 4) Evaluate the accessibility of the website by using the website: <https://accessible.com/ace> or <https://wave.webaim.org> and so on.
- 5) Adding a link to download lay material documents for blind teachers or assistants.

The results of this formative evaluation were continued to the improvement stage according to the results of the expert formative evaluation as well as additional internal evaluation by the team carried out in the third internal evaluation so as to produce version 2 of the website and guide. The final version 2 results have transition changes in the form of updating the database, modifying the function of symbols or punctuation, changing the size of the title and content of the material in each lesson, making video tutorials for using the website, improving the accessibility of the website so that it can be fully read by a screen

reader, and adding links to download documents. Version 2 of the website then entered the implementation and summative evaluation stages by the research subjects.

Implementation Results

The implementation of the use of this website was conducted through two phases, Baseline (A), Implementation (B), and Baseline (A2) phases. The Baseline (A1) phase consists of four meetings, the Implementation (B) phase consists of six meetings, and the Baseline (A2) phase consists of four meetings. The media used is the Weicibi website. The results of the two phases are contained in the following graph:

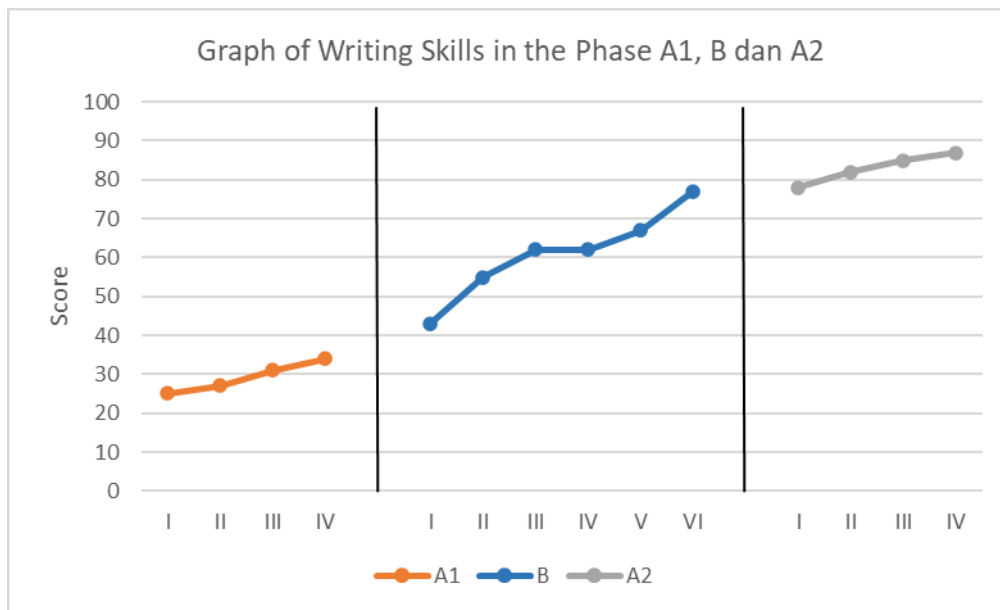


Figure 1. Chinese Simple Conversational Text Writing Skills in Phases A1, B, and A2

The results of students' writing skills are analyzed into two, namely analysis within conditions and between conditions. The following is a visual table of the results of data processing at this stage:

Table 6. In-Condition Visual Analysis

Condition	A1	B	A2
Length Condition (Interval)	4	6	4
Estimated Directional Tendency	(+)	(+)	(+)
Stability Tendency	50% (Unstable)	33% (Unstable)	100% (Sttable)
Data Trail	(+)	(+)	(+)
Stability Level and Range	Unstable 23 - 34	Unstable 43 - 77	Stable 79 - 87
Level Changes	25 - 34 = -9 = 9 (+)	43 - 77 = -34 = 34 (+)	78 - 87 = -9 = 9 (+)

Table 7. Inter-condition Visual Analysis

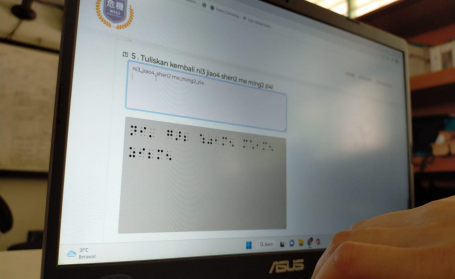
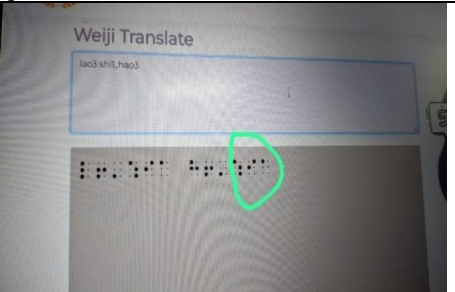
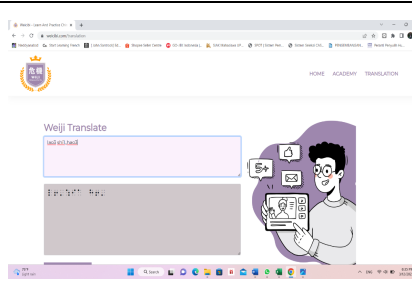
Condition	B to A1	A2 to B
Directional Tendency	(+) (+)	(+) (+)
Stability Change	Unstable to Unstable	Unstable to Unstable
Level Changes	+9	+1
Overlap Percentage	0%	0%

Version 2 to Version 3

Summative evaluation is a step to provide suggestions and input from the research subjects who have used this website during learning, as for the suggestions and input from students and Chinese language teachers are to fix the sound output error that does not come out when the answer has been entered and eliminate excess Braille writing that comes out in the output of lay writing. The rest, students feel happy, enthusiastic and helped by this website.

The results of this summative evaluation were then used as material for the last internal evaluation and have been improved into Weicibi version 3. The explanation of the transition of website changes before and after the summative evaluation and the fourth internal evaluation is described in the following table:

Table 8. Transition of Fourth Change (Final) Stage of Summative Evaluation and Internal Evaluation

No	Improvement Focus	Change Transitions	
		Before Evaluation	After Evaluation
1.	A feedback error where the answer to a question that should be correct becomes incorrect or vice versa	 <p>Correct answer, no voice feedback on some questions</p>	<p>There is already feedback for correct "ting nung ting nung" and incorrect "teet tet" sounds.</p>
2.	Eliminate excess Braille text that comes out in layman's output		

The final results of website development can be seen directly on the page:
www.weicibi.com or <https://weicibi.com>

The website developed is a website for learning the basics of Mandarin Braille writing to writing simple conversational texts used in everyday life such as greeting, asking questions and introducing names and regions of origin. The features of this website are the

home feature which is the initial page to introduce the website as a whole, the academy feature which contains lessons or lessons equipped with questions and correct and incorrect voice feedback, and the translation feature which can be used by writing directly the modified Mandarin pinyin text or copying the pinyin text that is in accordance with the writing systematics which will then be automatically translated into Mandarin Braille. This Mandarin Braille can later be copied to be moved into a Braille file on the MiBee Braille application and then printed using an embosser.

Conclusion of the formative evaluation results (on a scale of 5) conducted by the Expert Team on the design: average result of 4.4 and the development result: average result of 4.6, indicating that the website developed is very much in accordance with the assessment indicators and can be used to assist learning in schools with minor revisions. The improved website was then implemented to the subjects and successfully improved students' writing skills with an average score (mean) in the Baseline (A1) phase of 29.25%, Intervention (B) phase of 61%, and Baseline (A2) phase of 83%.

The results of the summative evaluation carried out by students and teachers are to correct voice output errors that do not come out when the answer has been entered and eliminate excess Braille writing that comes out in the output of lay writing. The rest, students feel happy, motivated, enthusiastic and helped by this website.

CONCLUSION

The website developed is a website for learning the basics of Mandarin Braille writing to writing simple conversational texts used in everyday life such as greeting, asking questions and introducing names and regions of origin. The features of this website are the home feature which is the initial page to introduce the website as a whole, the academy feature which contains lessons or lessons equipped with questions and correct and incorrect voice feedback, and the translation feature which can be used by writing directly the modified Mandarin pinyin text or copying the pinyin text that is in accordance with the writing systematics which will then be automatically translated into Mandarin Braille. This Mandarin Braille can later be copied to be moved into a Braille file on the MiBee Braille application and then printed using an embosser.

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REFERENCES

- Kartini, A., & Aprilia, I. D. (2022). Challenges and Opportunities for Regular Teachers in the Implementation of Assessments for Students with Special Needs in Inclusive Education Provider School. *Journal of Education for Sustainability and Diversity*, 1(1), 29-38. DOI: <https://doi.org/10.57142/jesd.v1i1.4>
- Alwi, H. D. (2003). *Politik Bahasa: Rumusan Seminar Politik Bahasa [Language Politics: Formulation of Language Politics Seminar]*. Jakarta: Pusat Bahasa.
- Aprilia, I. D. (2017). Flexible Model On Special Education Services. *Journal of ICSAR*, 7(1), 50-54. DOI: <http://dx.doi.org/10.17977/um005v1i12017p050>
- Arsyad, A. (2017). *Media Pembelajaran [Learning Media]*. Jakarta: Rajawali Pers.
- Cahyadi, R. A. H. (2019). Pengembangan bahan ajar berbasis ADDIE model [Development of teaching materials based on the ADDIE model]. *Halaqa: Islamic Education Journal*, 3(1), 35-42.
- Charisty, T. E., & Wijaya, L. (2016). Faktor yang Mempengaruhi Ketidaktertarikan Mahasiswa Etnis Tionghoa Universitas Kristen Petra Surabaya dalam Mempelajari Bahasa Tionghoa [Factors Affecting the Disinterest of Ethnic Chinese Students of Petra Christian University Surabaya in Learning Chinese Language]. *CENTURY - Journal of Chinese Language, Literature and Culture*, 4(1), 8-19. DOI: <https://doi.org/10.9744/century.4.1.8-19>
- Choate, J. S. (1995). *Curriculum Based Assesment and Programming*. USA: Allyn and Bacon.
- Egli, C. (2009). *Liblouis - A Universal Solution For Braille Transcription Services*. Daisy2009 Leipzig, 50-56.
- Astuti, E. Y., Ratnawulan, T., Santoso, Y. B., Pertiwi, D. E., Ridwan, P. G., & Effendi, Z. R. (2023). The Interactive Web-Based Learning in Online Learning for Blind. *Journal of ICSAR*, 7(1), 171-177. DOI: <http://dx.doi.org/10.17977/um005v7i12023p171>
- Han. (2017). *Post Lingual Chinese Language Learning*. London: The Palgrave Macmillan.
- HN, W., Al-Usrah, M., & Dewa, Y. (2023). Development of HICAH Learning Media (Count Fractions) for Blind Students in Makassar. *Journal of ICSAR*, 7(1), 10-17. <http://dx.doi.org/10.17977/um005v7i12023p10>
- Rosalin, K., Ying, Y., & Aryanti, V. (2021). Using Web-Based Games to Improve Mandarin Vocabulary Learning. *International Conference on Computing, Engineering and Design (ICCED)*, 1-5. DOI: 10.1109/ICCED53389.2021.9664837
- Liwang, J. (2013). Pembuatan E-Book Interaktif Untuk Pembelajaran Huruf Dasar Mandarin Bagi Pemula Berbasis Web [Making an Interactive E-Book for Learning Chinese Basic Letters for Beginners Based on Web]. *Jurnal Ilmiah Mahasiswa Universitas Surabaya*, 2(2), 1-19. DOI: <http://digilib.ubaya.ac.id/pustaka.php/234646>
- McCharty, N. (2020, 12 11). Languages: The World's Most Spoken Languages. Retrieved from: <https://www.statista.com/chart/12868/the-worlds-most-spoken-languages/>
- Yanggah, M. E., & Gunawan, M. (2022). Efektivitas Penggunaan Web Quizlet Terhadap Pembelajaran Kosakata Bahasa Mandarin Secara Daring di Kelas 5 SD Katolik Santo Xaverius [Effectiveness of Using Quizlet Web for Online Chinese Vocabulary Learning in Grade 5 of Santo Xaverius Catholic Elementary School]. *Journal International Lingua Mandarin*, 2 (1), 35-41. DOI: <http://dx.doi.org/10.26418/jilin.v2i1.55330>
- Pahlawaty, N., & Aprilia, I. D. (2022). MiBee Braille Application: An Alternative Accessibility Literacy for Totally Blind Students at Inclusive School. *International Conference on Special Education in South East Asia Region (ICSAR 2022)*, 1(1), 1-12. Retrieved from: <https://educationcenter.id/journal/index.php/icsar/article/view/19>
- Permendiknas. No. 70, Chapter 1, Year 2009.
- Sari A. O., et all. (2019). *Buku Web Programming I [Web Programming I Book]*. Graha Ilmu.
- Sharon E. Smaldino, et all. (2019). *Teknologi Instruksional dan Media Pembelajaran [Instructional Technology and Media for Learning]*. Jakarta: Prenadamedia Group.
- Sutami, H. (2012). Fungsi dan Kedudukan Bahasa Mandarin Di Indonesia [The Function and Position of Chinese in Indonesia]. *Paradigma, Jurnal Kajian Budaya*, 2(2), 216. DOI: <http://dx.doi.org/10.17510/paradigma.v2i2.28>