Inclusive Education for Early-Age Blind Children

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Abstract. Indonesia is not yet a friendly country for people with disabilities. One of the services needed by persons with disabilities is education. The proper education needs to be applied in special schools are implemented in inclusive schools. Inclusive schools need help with supporting infrastructure that is not yet suitable for early childhood learning. Therefore, we need an accurate picture of developing good facilities and infrastructure. One of them is the concept of "Disability Friendly Schools," where schools are schools that are friendly to people with disabilities. The method of writing this article is a literature study. This paper aims to explain the concept of inclusive education ideal for blind children in terms of facilities and infrastructure. The result of this discussion is to explain the concept of inclusive education for blind children seen from proper facilities and infrastructure ranging from assessment tools, orientation and mobility, learning/academic aids, visual aids, auditive aids, and physical exercise tools.

1 Introduction

Indonesia is not yet a disability-friendly country. One of the eligibility services needed by people with disabilities is education. Education is essential for every human being to accompany every development, and those with disabilities are no exception. The government has made policies related to the obligation to facilitate education for persons with disabilities in various channels, formal, non-formal, and informal, as stated in Law No. 8 of 2016.
Persons with disabilities have the right to pursue education through any channel, whether in formal special schools such as great schools or inclusive education in formal and non-formal regular schools. Inclusive education is one of the options to provide educational rights to children with special needs. Children with special needs will learn with normal children by adjusting the conditions or requirements of children with special needs while pursuing education.

The need for educational eligibility, in addition to being implemented in exceptional schools, is also implemented in inclusive schools. Inclusion schools currently need help with supporting infrastructure suitable for early childhood learning. Supporting facilities and infrastructure, students, and curricula that still need to be qualified are issues in implementing

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inclusive education in early childhood education institutions [1]. Inclusion schools from various aspects are still being improved, but for children with special needs or not, inclusion schools are an ideal school model [2].

Inclusive education at an early age can improve children's socialization, learning, and development. In early childhood education, children with disabilities become a group that is often excluded and isolated [3]. A blind child is also the same as an average child; they have a future that must be prepared early. They have the right to education and stimulation so that children with special needs can intensify their strengths and limitations [4].

Children can get stimulation through education. Therefore, for blind children, education from an early age is very important. Providing stimulation from an early age is very important for the development of children at a later age [5]. Parents with visual impairments can choose the path of education for their children, both formal such as TKLB (*Taman Kanak-Kanak Luar Biasa*, Kindergarden for Special Needs), and non-formal such as similar Early Childhood Education Program (ECEP), namely non-formal ECEP Inclusion. Blind children in ECEP institutions that provide inclusive education have not received adequate services and facilities. Therefore, it is important to have inclusive education at the ECEP level, which is ideal for blind children.

Sanggar Kegiatan Belajar (SKB) is one of the technical implementation units of the office that handles educational affairs in districts/cities in the form of similar non-formal education units. Based on Permendikbud No. 4 of 2016 concerning the transfer of the function of the SKB as an education unit, the SKB has the right and is legitimate to organize the ECEP program.

Inclusive ECEP for blind children in SKB can help the government provide educational services for blind children. SKB can also carry out inclusion education in the ECEP, one of which is for blind children. Thus, this study aims to collect and analyze various literature related to the issues raised, explaining the concept of inclusive education for visually impaired children seen from the means.

2 Method

The writing of this article uses literature studies or literature studies by collecting theoretical references that are relevant to the problem or topic raised. Literature study itself according to Mestika Zed, literature study or literature study is a flow of activity that is related to the method of accumulating data through libraries, reading, and recording and processing various materials or sources of research [6].

The data obtained were compiled, analyzed, and concluded to get conclusions about inclusive education, both in theory and research results related to the implementation of inclusive education for blind children that can be implemented for blind children at an early age.

3 Discussion

Facilities in the form of equipment and media for education, furniture, books, and other resources that can optimize the implementation of learning so that it is structured and can be continued are an obligation for all academic units [7]. The 2018 Ministry of Education and Culture stated that facilities and infrastructure for inclusive ECEP require at least six principles, namely equal opportunity, accessibility, development, security, comfort, and specificity.

3.1 Assessment Tools

Assessment tools are needed to determine visual abnormalities in visually impaired children, so they can measure vision ability in knowing colors, geometric shapes, and visual acuity in children. A tool that can measure the ability to recognize colors is the Ishihara test. Meanwhile, to measure visual acuity, you can use a Snellen chart and a trial lens set to determine the eyeglass lens type.

Snellen chart or Snellen card is one of the media that is very often used in medical practice to measure visual acuity [8]. Comparing the results of a sharp examination of the strong vision of acuity software applications is more effective than the Snellen chart [9].
The use of assessment tools is best with experts who understand the service, assessment, and determination of guidance-related decisions.

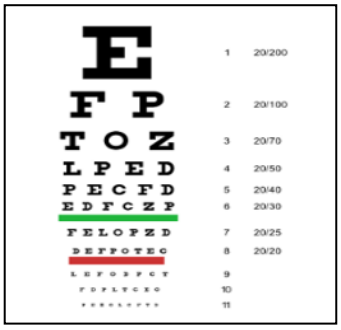

Fig. 1.1. Snellen Chart [10]

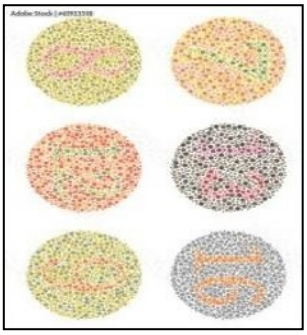

Fig. 1.2. Ishihara Test [11]

Fig. 1.3. SVR (Trial Lens Set) [12]

3.2 Orientation and Mobility

The technology that is developing today contributes a lot to the ease of access to education for those who experience physical limitations, one of which is visually impaired. Braille letters are used to learn to read even today, and we can use computer assistance. However, for mobility, the visually impaired still need the help of mobility tools in the form of canes and the guidance of people around them [13]. The cane is among the most straightforward and affordable orientation and mobility tools. There are three types of sticks to choose from long sticks, folding sticks, and electric sticks. Technology-based electric canes that give more value to the function of the cane can also be an option to facilitate the mobility of visually impaired children further.

Fig. 2.1. Folding Stick [14]

Fig. 2.2. Electric Stick [15]

3.3 Academic Learning Aids

Learning tools in the form of objects or conditions through optimal principles or by the actual situation, original things that have gone through the preservation process, and also imitation objects that are made the same as the original objects, either two-dimensional or three-dimensional in shape, can be used in teaching and learning activities in visually impaired children [16]. For example, geometric shapes that can be imitated are made of blocks (wood) or other materials so that geometric shapes can be palpable to visually impaired children. In addition, recognizing shapes can use miniatures and actual figures for visually impaired children.

Fig. 3.1. Geometry Block [17]

Braille is one of the most important and primary means of literacy for the blind. Braille is a tactile system for writing and reading in which letters and numbers, as well as other systems, are made up of raised dots so they can be touched [18]. Many learning aids (academic) are braille-based, and braille technology or labeled with Braille to make learning easier for blind children. A simple learning aid to teach counting to blind children is the abacus/braille abacus.

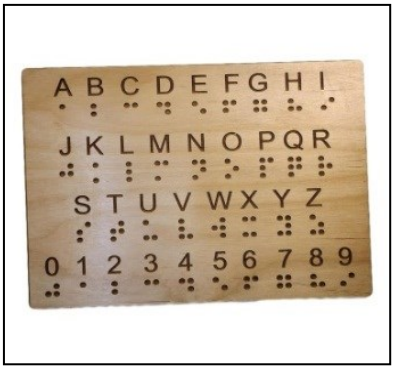

Fig. 3.2. Braille [19]

Visual Aids (Vision Aids)

Vision aids are needed for children with low vision blindness to take advantage of the remnants of their vision in learning. The simple tool that can be used is a loop (magnifying glass), and it can also use the current technological aid, namely a digital handheld magnifier (electronic magnifying glass in the form of a tablet).

However, visual aids in the form of lumps are ineffective because the distance between the laying of lupus and ordinary writing is arranged by the child so that he can read the script. The use of the Digital Handheld Magnifier is more effective in learning because it has advantages over the loupe (magnifying glass) so that children only focus their eyes on the writing they want to see or read. In contrast, the paper size can be adjusted via the (+) button to enlarge and the (-) button to reduce what is on the digital hand magnifier [20].

Fig. 4.1. Magnifying Glass (Lup) [21]

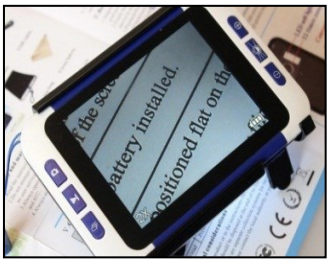

Fig. 4.2. Digital Hand Magnifier [21]

3.4 Auditive Aids (Hearing Aids)

Visually impaired children who experience visual impairments or who have lost their vision function can take advantage of auditive tools in the form of audio media. Audio media is appropriate for visually impaired children, as they have good hearing if continuously guided [22]. The hearing aid for blind children is an audiobook or digital talking book that can convey information through readings in texts. In addition, a voice recording device is also needed so that visually impaired children can listen and recall information through voice recordings, for example, using recorders and MP3 players or the like that are young to find and affordable today.

Fig. 5.1. Audio book

3.5 Physical Exercise Tools

Visually impaired children have physical barriers to activities, thus affecting their health due to untrained physical strength [23]. Therefore, schools should provide facilities in the form

of physical training tools for blind children to exercise their physical power and not be susceptible to disease. The physical training tool is simple and safe for the visually impaired, namely static bicycle (static bicycle). Children can use stationary bikes indoors, reducing teacher participants' concerns for students compared to exercising outdoors, and it is appropriate for blind children with body balance.

Fig. 6.1. Static Bicycle [24] (Source: https://bit.ly/3rjcYw3)

The beeping ball used in football games can also physically train an early visually impaired child. Through this game, the educator can stimulate the visually impaired child to move his body, and the child will try to do several movements such as running, flapping, jumping, picking, dribbling, and trying to find the position of the ball through the sound on the ball [25]. However, the existing beeping ball cannot always make a sound, so it requires audible ball media (a ball that uses electronic audio), where the ball can still make a sound even if it does not move.

Fig. 6.2. Ball Sounds [26]

This review will strengthen research results that state that facilities and infrastructure for blind children must be, by standards, appropriate and safe in the learning process.

Table 1. Educational Facilities and Infrastructure for the Blind

Ref	Educational Facilities and Infrastructure for the Blind
[18]	Braille, braille technological aids, tactile aids, and manipulatives technological aids for reading print, computer access, and keyboarding. As for low vision, optical devices are in the form of glasses, contact lenses, small handheld telescopes, and magnifying glasses.
[25]	Learning/academic aids: Reading boards (Knobs), Reglette and Stylus (pens), i.e., manual stationery, Machined Braille (Perkins Braille), Cassettes. Braille writing aids (Reglette, Pen, and Braille typewriters); Braille reading aids (Letterboard and Optacon); numeracy aids (Cubarithma, Abacus/Abacus, Speech Calculator), as well as audio aids such as tape-recorders.
[27]	Assessment tools: SVR (Trial Lens Set), Ishihara Test, Snellen Chart Electronic, Snellen Chart. Orientation and Mobility Tools: Long stick, Folding stick, Blindfold, Sound ball, Headgear Academic aids: Embossed Maps, Embossed Globes, Abacus, Bookies, Puzzle Balls, Reading Boards, Braille Rulers, Anatomical Models of the Eyes, Fruit Puzzles, Braille Meters, Animal Puzzles, Talking Watches, Braille Compasses, Flavored Glasses, Aroma Bottles, Collor Sorting Boxes, Geometric Shapes, Braille Kits, Ordinary Typewriters, Reglets & Stylish, Braille Typewriters, Speech compasses, Speech dictionaries, Computers and Braille Printers. Visual Aids: View Scan, Magnifier Lens Set, CCTV Microscope, Television Auditive aids: Wind Instruments, Hit Musical Instruments, Double Deck Tape Recorders. Physical training tools: Blind Bridge, Blind Chess, Static Bicycle, Balance Board, Football with Beeping Ball, Power Raider.
[28]	Learning facilities for the visually impaired are Reading Boards, Sticks, Reglets, Embossed Learning Equipment, Audio, And Visual Equipment in the Form of Tape Walkmans, Recorders, Radio, MP3s, Digital Talking books (Talking Books), CCTV (Closed Circuit Television), and Talking Computers.
[29]	Academic aids for the visually impaired: Braille Letters, Talking Computer Braille Protractor, Talking Hours, Digital Talking Book, Braille Printer, Digital Accessible System (DAISY) Player, Thermoform, Telesensory, Folding Stick, Indonesian Map Made of Relief, Sound Foot Ball. Academic aids for low vision: Reading Stand, Light (study lamp), prescription glasses, magnification (Magnifier).
[30]	Assessment tools: Snellen Chart, Ishihara Test, SVR (Trial Lens Set), Snellen Chart Electronic. Orientation and Mobility Tools: Long stick, Folding stick, Sound ball, Head protector Academic aids: Braille Ruler, Braille Meter, Braille Compass, Braille Kit, Braille Typewriter, Braille Watch, Braille Watch, Braille Computer and Printer, Abacus, Bookies, Reading Board, Talking Watch, Flavored Glass, Collor Sorting Box, Aroma Bottle, Compass talk, Talking dictionary, Puzzle Ball, Fruit Puzzle, Eye Anatomy Model, Globe Embossed, Shape, Reglet & Stylus. Visual Aids: Monocular Prism, Magnifier Lens Set, View Scan, CCTV. Television, Auditive aids: Hit Musical Instruments, Wind Instruments, Double Deck Tape Recorders. Physical training tools: Blind Bridge, Blind Chess, Balance Board, Football with Beeping Ball, Static Bicycle, Power Raider.
[7]	Assessment tools: Snellen Chart, Snellen Chart Electronic, SVR (Trial Lens Set), Ishihara Test. Orientation and Mobility Tools: Sound ball, Head protector, Long stick, Folding stick. Academic aids: Braille Ruler, Braille Meter, Braille Compass, Braille typewriter, Braille watches, Braille Kit, Embossed map, Abacus, Block, Reading Board, Talking Watch, Flavor Glass, Aroma Bottle, Collor Sorting Box, Speech dictionary, Puzzle Ball, Anatomical Model, Globe Embossed, geometric shapes. Visual Aids: Magnifier Lens Set, CCTV, View Scan, Television, Monocular Prism Auditive aids: Double Deck Tape Recorder, Beat Musical Instrument, Wind Instrument Physical training tools: Football with Beeping Ball, Balance Board, Blind Chess, Blind Bridge, Static Bicycle, Power Raider.

4 Conclusion

Appropriate means can optimize the role of inclusive education for children with early visual impairments. Inclusion education providers should strive to procure facilities in the form of assessment tools, orientation and mobility, academic learning aids, visual aids, auditive aids, and physical training tools, following sound principles and feasibility standards, namely equality of opportunity, accessibility, development, safety, comfort, and specificity.
Many inclusive education facilities for early visually impaired children are increasingly developing and sophisticated. So that schools can choose the most effective facilities based on trials/implementations and research studies that have been carried out, are affordable, and can be pursued by education/school providers.

References

1. S. Anggita Sakti, J. Golden Age, **4,** 2, 238–249 (2020)
2. I.P. Darma, B. Rusyidi, Pros. Penelit. dan Pengabdi. Kpd. Masy., **2**, 2, 223–227 (2015)
3. F.R. Ackah-Jnr, European Journal of Education Studies, 203–220 (2018)
4. D. Ashari, J. Obs. J. Pendidik. Anak Usia Dini,, **6**, 2, 1095–1110 (2022)
5. M.M. Rena, M. Zara, Alasma; Jurnal Media Informasi dan Komunikasi Ilmiah, **3**,1, 46–56 (2021)
6. N.P. Fajrin, L.A. Purwastuti, J. Obs. J. Pendidik. Anak Usia Dini, **6**, 4, 2725–2734 (2022)
7. Amka, *Manajemen Sarana Sekolah Penyelenggara Inklusi*. 2020. [Online]. Available: www.nizamiacenter.com
8. A. Bastawrous, H. Rono, I. A. T. Livingstone, H. A. Weiss, H. Kuper, and M. Burton, JAMA Ophthalmol, **133**, 8, 930–937 (2017)
9. D. S. Laras, D.A. Sukma, J. Sehat Masada, **XVI**, 118–126 (2022)
10. https://bit.ly/3xTx4k4
11. https://bit.ly/3LICEvb
12. https://bit.ly/3r5CPaD
13. A. Suwandhi, T. Chandra, J. Ilm. Core It, **8**, 5, 1978–1520 (2020)
14. N. Milati, Nur, Jurnal Edukasi Elektro **3**,1 (2019)
15. .https://bit.ly/3dV9JaO
16. R.D. Martuti, *Pelaksanaan Pembelajaran Model Modifikasi Bahan Ajar Pendidikan Inklusi Siswa Tuna Netra di SMP Negeri 4 Wonogiri,* Tesis, (2011)
17. https://bit.ly/3C4KdrA
18. H. William L, *Exceptional children: an introduction to special education*. 2013. [Online]. Available: http://www.cec.sped.org
19. https://pin.it/6kf54hF
20. I. Khaeroh, F. Advelia, A. Rosyid, A. Supena, *JPI (Jurnal Pendidik. Inklusi)*, **4**, 1, 11-21 (2020)
21. https://bit.ly/3SKBq4T
22. A. Praptaningrum, J. Teknol. Pendidik. J. Penelit. dan Pengemb. Pembelajaran, **5,** 1 (2020)
23. M.A. Avivudin, S.J. Andajani, and Murtadlo, GRAB KIDS: J. Spec. Edu. Need. **1**, 1–8, (2021.
24. https://bit.ly/3rjcYw3
25. I. Kurniawan, J. Pendidik. Islam, **4**, 1044–1060 (2015)
26. https://bit.ly/3CoG17s
27. Irdamurni, Angew. Chemie Int. Ed. **6**, 11, (2015)

28. Kementrian Pendidikan dan Kebudayaan, Prosedur Operasi Standar Pendidikan Anak Usia Dini Inklusif Sarana dan Prasarana, 21, 1–19 (2018)
29. N. Utomo & Muniroh, *Pendidikan Anak dengan Hambatan Penglihatan*. (Prodi. PJ JPOK FKIP ULM Press, 2019)
30. Sukardari, *Model Pendidikan Inklusi Dalam Pembelajaran Anak Berkebutuhan Khusus*. (Thesis, Universitas PGRI Yogyakarta, 2019)