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Environmental Education Book Using Plant Classification in TAHURA Ir. H. Juanda for Autistic Children with Emotion Recognition Challenges.

Nisrina Meta Gamanik, S.Pd[1], Fara Emilia Zeni[2], Azra Berlyanessha[3], Zarin Nurul Izzati Fauziah[4], Anak Agung, S.M. Mahadewi Devara P[5]

Islam Cendekia Junior High School, Cianjur, Indonesia[1,2,3]

Islam Cendekia Junior High School, Sukabumi, Indonesia[4]

Islam Cendekia Junior High School, Bandung, Indonesia[5]

Email : nisrina_gamanik@cendekia.sch.id, fara_zeni@cendekia.sch.id, azra_berlyanessha@cendekia.sch.id, zarin_fauziah@cendekia.sch.id, anak_putri@cendekia.sch.id

Abstract

Environmental education is crucial for fostering ecosystem awareness, especially for autistic children who struggle with recognizing and managing emotions. Autistic children often interpret emotional and social cues differently, making it difficult to understand and control their own emotions, as well as those of others. This study aims to develop an environmental education book that combines plant classification in Taman Hutan Raya (TAHURA) Ir. H. Juanda with methods to help autistic children recognize and manage emotions. The book uses the natural environment as a living laboratory, encouraging children to observe and classify plants while providing tools to enhance emotional and social skills through simple language and engaging illustrations. This structured approach aligns with the comfort autistic children find in predictability, offering a meaningful and supportive learning experience. The research involves qualitative methods, including in-depth observations, expert interviews, and tests with a small group of autistic children. Preliminary findings indicate significant improvements in learning interest, environmental understanding, and emotional expression. Thus, the book serves as an effective tool not only for environmental education but also for supporting the social and emotional development of autistic children, potentially reducing anxiety and undesirable behavior.

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book, autism, emotion, recognition, environmental

Abstrak

Pendidikan lingkungan sangat penting untuk meningkatkan kesadaran akan ekosistem, terutama bagi anak-anak autistik yang kesulitan dalam mengenali dan mengelola emosi. Anak-anak autis sering kali menafsirkan isyarat emosional dan sosial secara berbeda, sehingga sulit bagi mereka untuk memahami dan mengontrol emosi mereka sendiri maupun emosi orang lain. Penelitian ini bertujuan untuk mengembangkan sebuah buku pendidikan lingkungan yang menggabungkan klasifikasi tumbuhan di Taman Hutan Raya (TAHURA) Ir. H. Juanda dengan metode untuk membantu anak-anak autis mengenali dan mengelola emosi. Buku ini memanfaatkan lingkungan alam sebagai laboratorium hidup, mendorong anak-anak untuk mengamati dan mengklasifikasikan tumbuhan, sekaligus menyediakan alat untuk meningkatkan keterampilan emosional dan sosial melalui bahasa yang sederhana dan ilustrasi yang menarik. Pendekatan terstruktur ini sejalan dengan kenyamanan yang dirasakan anak-anak autistik dalam hal prediktabilitas, sehingga menawarkan pengalaman belajar yang bermakna dan mendukung. Penelitian ini menggunakan metode kualitatif, termasuk observasi mendalam, wawancara dengan para ahli, serta uji coba pada kelompok kecil anak-anak autistik. Temuan awal menunjukkan peningkatan yang signifikan dalam minat belajar, pemahaman tentang lingkungan, dan ekspresi

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emosional. Dengan demikian, buku ini menjadi alat yang efektif tidak hanya untuk pendidikan lingkungan, tetapi juga untuk mendukung perkembangan sosial dan emosional anak-anak autistik, yang berpotensi mengurangi kecemasan dan perilaku yang tidak diinginkan.

Introduction

Children with autism spectrum disorder (ASD) often face significant challenges in recognizing, understanding, and expressing emotions, which can impact their social interactions and overall development (American Psychiatric Association, 2013). This difficulty in emotion recognition can lead to increased anxiety, frustration, and behavioral issues, making it essential to find effective educational tools that support both cognitive and emotional growth. Environmental education, with its focus on real-world, hands-on learning, offers a unique opportunity to engage autistic children in a meaningful way (Eriksson, 2012). By incorporating natural elements into the learning process, children can develop a deeper connection with the environment while simultaneously working on their emotional and social skills.

This study focuses on the creation of an environmental education book designed specifically for autistic children with emotion recognition challenges. The book uses plant classification in Taman Hutan Raya (TAHURA) Ir. H. Juanda as the central theme, providing a structured and visually engaging medium through which children can learn about the natural world. Research shows that structured learning environments, where predictability is emphasized, can be highly beneficial for children with autism (Mesibov & Shea, 2010). The process of observing, identifying, and classifying plants not only enhances their environmental awareness but also serves as a tool to facilitate emotional recognition and expression (Baron-Cohen, 2009). By integrating these two aspects—environmental education and emotion recognition—this book aims to create a holistic learning experience that supports the unique needs of autistic children.

The following sections will outline the development process of the book, the educational strategies employed, and the potential benefits for the target audience.

Methods and Experimental Details

Autistic children often struggle to recognize emotions, which can cause social challenges. This study creates a nature-based learning book to help them. By learning about plants in Taman Hutan Raya, children can connect with nature while improving their emotional and social skills. The book combines environmental education with emotion recognition, offering a fun and helpful tool designed for autistic children. The research is conducted in three primary phases: development, implementation, and evaluation.

a. Development Phase

During this phase, the environmental education book was designed with input from special education experts, psychologists, and environmental educators. The book focuses on plant classification within Taman Hutan Raya (TAHURA) Ir. H. Juanda, integrating visually engaging content and simple language tailored to the needs of autistic children. The book also includes interactive activities aimed at improving emotion recognition, such as matching plants with corresponding emotional expressions.

b. Implementation Phase

A small sample group of autistic children aged 7-12 years old was selected from a special needs education center. The children were divided into two groups: the intervention group, which used the environmental education book, and the control group, which continued

with their standard educational activities. Over a four-week period, the intervention group engaged with the book twice a week under the supervision of trained facilitators.

c. Evaluation Phase

To assess the impact of the book, both qualitative and quantitative data were collected: **Pre- and Post-Intervention Questionnaires:** A set of questionnaires was administered to both the children and their caregivers before and after the intervention. The children's questionnaire was designed to measure their interest in learning, understanding of emotions, and awareness of plants. It included simple questions such as "How do you feel when you see this plant?" and "Can you match this plant to a face showing happiness, sadness, or surprise?"

- Caregiver and Facilitator Feedback**:** Caregivers and facilitators were asked to provide feedback on the children's behavior, emotional responses, and engagement with the book. This qualitative data was collected through structured interviews and open-ended questions.
- Observation and Interaction Analysis**:** Throughout the intervention, children's interactions with the book were observed and documented. Special attention was given to their ability to recognize and express emotions during the activities, as well as their understanding of plant classification.

Data Analysis

Quantitative data from the questionnaires were analyzed using paired t-tests to compare pre- and post-intervention scores, determining the statistical significance of any changes in emotional recognition and environmental awareness. Qualitative data from interviews and observations were analyzed thematically, identifying patterns and key themes that emerged regarding the book's impact on the children's learning experiences.

We included characters and a simple plot in this book to help it be more approachable and engaging for kids with autism. Taking into account the disinterest that children with autism often have in reading, each page will have eye-catching graphics to complement the sparse text on it. Some pages will have interactive features that let kids engage with the book directly in an effort to draw in more attention. In addition to doing our research, we will distribute this book through outreach to one of the special schools.

Results and Discussion

The results of this study indicate a positive impact of the environmental education book on both environmental awareness and emotional recognition in autistic children. The pre- and post-intervention questionnaire data reveal significant improvements in all four measured areas:

1. Interest in learning about plants: The average score increased from 3.2 to 4.0, demonstrating that the children became more engaged and interested in environmental education after interacting with the book.
2. Ability to recognize emotions in others: The average score rose from 2.5 to 3.5, indicating an enhanced ability to understand and identify emotions in others. This suggests that the book's content and activities effectively supported the children's emotional development.
3. Ability to express their own emotions: The average score improved from 2.8 to 3.8, reflecting better emotional expression among the children. The book's interactive activities, which required children to associate plants with emotions, likely contributed to this improvement.

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4. Understanding of plant classification: The average score increased from 3.0 to 4.2, showing that the children gained a better understanding of plant classification concepts. The use of visual aids and structured learning within the book helped reinforce these concepts.

Tabel 1 The average pre-intervention and post-intervention scores

Question	Pre-Intervention. (Mean=25)	Post-Intervention(Mean=25)	Mean Difference
Interest learning about plants	3.2	4.0	0.8
Ability to recognize emotions in others	2.5	3.5	1.0
Ability to express own emotions	2.8	3.8	1.0
Understanding of plant classification	3.0	4.3	1.2

This table shows the average pre-intervention and post-intervention scores for each question, along with the mean difference, reflecting the improvements observed after the intervention.

The significant improvements observed in the study highlight the effectiveness of integrating environmental education with emotion recognition training for autistic children. The structured and predictable format of the book, along with its visually engaging content, provided an ideal learning environment for the children, who often thrive in situations where routine and clarity are emphasized (Mesibov & Shea, 2010).

The increase in environmental awareness and understanding of plant classification suggests that the natural environment can serve as a powerful tool in educational interventions for autistic children. By using TAHURA Ir. H. Juanda as a living laboratory, the children were able to connect abstract concepts to real-world experiences, making learning both meaningful and enjoyable.

Moreover, the enhanced ability to recognize and express emotions indicates that the book successfully addressed the emotional challenges faced by autistic children. Associating plants with specific emotions, along with the use of simple language and clear illustrations, allowed the children to make connections between the natural world and their own emotional experiences. This approach not only helped in developing emotional recognition but also contributed to reducing anxiety and improving social interactions.

The findings of this study support the idea that multidisciplinary approaches, which combine environmental education with emotional and social skill development, can be highly beneficial for children with autism. Future research could explore the long-term effects of such interventions and investigate how similar educational tools could be adapted for other developmental challenges.

Overall, the environmental education book developed in this study proves to be a valuable resource for autistic children, enhancing both their environmental understanding and emotional recognition abilities, thereby contributing positively to their overall development.

Conclusion

This study demonstrates that the use of an environmental education book focused on plant classification at TAHURA Ir. H. Juanda has a positive impact on autistic children with challenges in emotion recognition. The results show significant improvements in the children's interest in learning about plants, their ability to recognize and express emotions, and their understanding of plant classification.

The increase in post-intervention scores across all measured areas suggests that the integration of environmental education with emotional development can be an effective approach for enhancing both cognitive and emotional skills in autistic children. The structured and visually engaging content of the book, combined with its real-world applications, helped the children to better connect with both the natural environment and their own emotional experiences.

This research underscores the potential of multidisciplinary educational tools in addressing the unique needs of autistic children. By providing a framework that supports both environmental learning and emotional development, the book serves as a valuable resource for educators and caregivers working with children on the autism spectrum.

Future studies could explore the long-term effects of this intervention and investigate how similar educational materials can be adapted for other learning and developmental challenges. Overall, the findings of this study contribute to the growing body of evidence supporting the use of tailored educational resources to improve the quality of life for autistic children.

Acvknowledgements

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