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Enhancing Thematic Learning Outcomes and Reducing Maladaptive Behaviors in Autistic Students Through the Busy Web Media

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Abstract: This study aims to develop Busy Web Media as a tool for thematic learning, designed to reduce maladaptive behaviours in autistic students in grade VI at Sekolah Matahari Bunda. Using the Research and Development (R&D) method in conjunction with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation), the study involved expert evaluations at various stages. Media experts, content specialists, and autism experts provided their assessments, with all evaluations indicating high feasibility. Specifically, the media expert rated the product positively, emphasising its design and usability. The subject matter expert found the content highly appropriate for the curriculum, and the autism expert commended the media's alignment with the sensory and cognitive needs of autistic students. Further formative evaluation included one-to-one assessments with three autistic students, during which the media received strong approval from both the students and their teacher. Notably, students participated more actively in the learning process, showing less frustration and fewer signs of maladaptive behaviour during lessons. This evaluation demonstrated that Busy Web is a highly effective tool for both enhancing thematic learning and addressing behavioural challenges. Based on these findings, we conclude that the Busy Web media is an excellent resource for reducing maladaptive behaviours in autistic students while improving their learning outcomes.

Keywords: Autism; Maladaptive Behavior; Web-based Learning Media; Thematic Learning; Busy Web.

INTRODUCTION

Autism Spectrum Disorder (ASD) presents significant educational challenges due to deficits in social communication, repetitive behaviours, and varied sensory processing needs (American Psychiatric Association, 2013). These challenges often impede students' ability to thrive in conventional classrooms, where traditional teaching methods fail to address their unique sensory or cognitive needs. Among the most pervasive obstacles for students with autism are maladaptive behaviours, such as aggression, self-injury, and tantrums, often triggered by frustration, anxiety, or sensory overload (McDougal et al., 2020). These behaviours not only disrupt learning but also hinder social and emotional development.

A promising solution to these challenges is thematic learning, a teaching approach that connects various subjects under a central theme, offering a more engaging and anxiety-reducing environment (Esteban et al., 2019). This approach is particularly beneficial for autistic students, as it reduces unpredictability and provides a structured learning atmosphere. However, traditional methods of thematic teaching are still insufficient for students with autism, particularly those who rely more on visual or auditory learning styles (Díaz, 2017). As a result, there is a pressing need for innovative tools that can support thematic learning and address the sensory processing issues faced by autistic learners.

Multimedia-based learning tools have been recognised for their potential to engage autistic students in a way that traditional methods cannot. Studies have shown that multimedia resources, such as videos, games, and interactive tools, help reduce anxiety and increase engagement by catering to the sensory needs of students with autism (Lorenzo et al., 2022). However, most existing tools, while beneficial, fail to fully integrate multiple sensory modes or address the specific curricular needs and behavioural challenges of autistic learners in the context of thematic learning.

To date, few web-based tools have been developed that combine thematic learning with multimodal elements specifically designed to reduce maladaptive behaviours while improving academic performance for autistic students. Moreover, such tools tailored for the Indonesian educational context, especially those that integrate local curricula and align with inclusive education policies, are sorely lacking. The development of Busy Web Media addresses these gaps by offering a web-based, multimodal learning platform designed to reduce maladaptive behaviours and enhance thematic learning outcomes for autistic students in Indonesia. Busy Web Media integrates visual, auditory, and interactive elements to create a sensory-enriched learning experience, designed to foster both academic success and emotional regulation.

This study seeks to fill a crucial gap in current educational technology by developing and evaluating Busy Web Media as a tool for supporting thematic learning in autistic students. Specifically, it aims to provide an accessible, curriculum-aligned resource for enhancing the learning experience of grade VI students at Sekolah Matahari Bunda, a school for students with autism in Indonesia. Through expert reviews and one-to-one evaluations, the study will assess the tool's feasibility and effectiveness in reducing maladaptive behaviours and enhancing learning engagement, providing valuable insights into the potential of multimedia tools in supporting autism education in inclusive settings.

In Indonesia, the education system has made significant strides toward integrating students with special needs into regular classrooms, yet many challenges remain. The existing educational materials and strategies are often ill-equipped to address the diverse needs of autistic students. While the government has made efforts to promote inclusive education, the actual implementation of this policy faces significant hurdles. One such challenge is the limited availability of resources specifically tailored to autistic students in inclusive classrooms, where the general curriculum often does not adequately accommodate the sensory processing or learning styles of these students. Furthermore, while some digital learning tools exist, they are frequently not aligned with local curricula or designed with the cultural and linguistic needs of Indonesian students in mind.

Despite the growing recognition of the importance of digital learning tools for special education, many existing multimedia resources either lack local relevance or fail to address the intersection of academic learning and behavioural regulation. Busy Web Media aims to bridge this gap by combining thematic learning with targeted interventions for maladaptive behaviours, making it a unique approach in the context of Indonesian special education. By addressing both academic engagement and behavioural challenges, Busy Web Media presents a holistic solution that is not only educational but also therapeutic. It is designed to help autistic students regulate their emotions, stay engaged in the learning process, and enhance their academic performance within a structured and predictable environment.

This study is particularly significant because it evaluates Busy Web Media within the context of Indonesian classrooms, where few tools exist that integrate multimodal learning with an emphasis on both academic success and emotional regulation. In doing so, the study aims not only to demonstrate the effectiveness of Busy Web Media in reducing maladaptive behaviours but also to provide insights into how multimedia tools can be adapted for local educational contexts. The findings of this research will contribute to the growing body of knowledge on how digital tools can support inclusive education and enhance the learning experiences of students with autism, particularly in regions where such resources are limited.

Ultimately, the development and evaluation of Busy Web Media serve as a response to the urgent need for culturally relevant, inclusive, and effective educational tools that can support the learning and development of autistic students in Indonesia. By integrating local curriculum needs, sensory processing considerations, and behavioural management strategies, Busy Web Media has the potential to transform the way autistic students engage with education, making learning more accessible, enjoyable, and impactful.

Busy Web is an innovative strategy to meet the needs of autistic students in a brick-and-mortar classroom setting. As this study is trying to find out, using multimedia learning tools, for example, Busy Web media, would challenge the traditional teaching and learning process by providing a more interactive and supportive environment. This is promising for enhancing thematic learning but also for ameliorating maladaptive behaviors through targeting the sensory and cognitive processing demands of autistic learners. By incorporating interactive and visual features in the content, Busy Web media enables students to interact with content, receive instant feedback, and gain practice in new skills in a non-threatening, non-fearful atmosphere. This research is conducted to evaluate the effectiveness of the Busy Web media in achieving the two objectives based on its ability to decrease maladaptive behaviors and increase thematic learning achievement for grade VI students of Sekolah Matahari Bunda.

The research approach adopted in this study is based on the Research and Development (R&D) principles, namely the ADDIE model (Analysis, Design, Develop, Implement, and Evaluate). This framework facilitates a systematic and organized manner of developing educational materials with the guarantee that reported media are not only successful for use with students and that the presented content meets the needs of autistic students. Featuring expert evaluations, including ones from Media Experts, Content Experts, and Autism Professionals, this proposal seeks to produce an all-encompassing and functional learning tool that can be used in Special Education. The research also comprises formative assessment and one-to-one testing working with autistic students to determine the feasibility and effectiveness of Busy Web media in authentic educational situations.

Recent studies indicate the growing significance of multimedia technologies in special education, particularly for children with autism. Research by McPeake et al. (2023) emphasized the benefits of incorporating multimedia learning strategies to enhance the educational experience for autistic children, noting that these tools contribute to reducing behavioral issues and enhancing engagement. Similarly, research by Brede et al. (2022) emphasizes the efficacy of digital technologies in improving the social and emotional well-being of autistic students by providing an engaging and dynamic learning environment. The results substantiate the idea that digital tools, such as Busy Web media, are significant in transforming the educational experience for children with autism, as they provide essential support for academic and social development. Excel academically and socially while cultivating more profound relationships with classmates and educators. As educators investigate creative approaches, the incorporation of digital tools may be crucial for establishing inclusive classrooms that address the varied needs of all children. Students with autism frequently gain from individualized learning experiences facilitated by digital resources, enabling them to interact at their speed and in manners that align with their distinct learning preferences. By integrating technology in the classroom, educators can guarantee that every child can excel and flourish.

Incorporating multimedia learning media such as media busy Web in themed learning is one of the solutions to overcome the specific problems of hearing learning is easily distracted and often leads to uncontrolled anger to complicate the teaching and learning process of autistic students. Busy Web media may decrease maladaptive behaviors, facilitate learning, and provide a more positive, sensory-friendly learning environment for students with autism. The research aims to add to the relevant academic literature on digital tools and special educational needs and explore the appropriacy of Busy Web media as a tool for teaching autistic students.

METHOD

This study employed the Research and Development (R&D) method, specifically the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation), to create and test Busy Web Media, a resource designed to help sixth-grade autistic students at Sekolah Matahari Bunda learn more about themes and refrain from acting in ways that are not helpful.Research and development (R&D) is an approach to generating products that meet specific needs and real practical problems in educational settings. Research and development is a step-by-step process of acquiring initial data and product development to solve issues found. In the present study, R&D developed the Busy Web media as a web-based learning medium, particularly for grade VI autistic students at Sekolah Matahari Bunda.

The R&D in this research is divided into the research and development stages. Information about students' needs and teachers' difficulties in instructing autistic children is gathered at the research stage. During development, the Busy Web media are produced, refined, and tested using expert reviews and field testing in real classrooms.

ADDIE Development Model

The ADDIE model is a generic procedure widely read about in instructional design and has five stages: Analyse, Design, Develop, Implement, and Evaluate. The product development process results are expected to work product according to the needs of grade VI applied students (autism). Each stage has an important role in providing the best results so that the product produced is useful and by the users, grade VI students with autism.

Analysis Phase

The foundation of the whole project is the Analysis phase, which includes defining the problem, the project goals, and the audience. These steps can be broken down to account for this phase:

1. Understanding The Problem: This study opens by describing the condition of autistic students at Sekolah Matahari Bunda. Specifically, teachers report that several students display maladaptive behaviors, including self-injury, aggression, and tantrums, that inhibit their learning ability. The nature of these issues is explored through needs analysis: interviewing teachers, observing classroom practices, and finding out what support is needed.
2. Objectives Definite: One of the current project's objectives is to develop an intelligent digital learning tool to decrease maladaptive behaviors and enhance thematic learning in students with intellectual disability, including autism. Media design also attempts to provide a multimodal learning environment in which learners can engage visual, auditory, and interactive components that have been identified as effective in reaching autistic learners (Rosas-Pérez et al., 2023).

Evaluating Learner Characteristics: Understanding the nature of autistic students' profiles of learning is key to creating media that is appropriate for their learners. Differences in sensory processing, visual and auditory modalities, structure, and predictability are examined. This study underpins the creation of the Busy Web media to ensure that the specific learning requirements of these learners are met.

Resource and Constraints Mapping: The research process also includes examining the available resources for media development technology infrastructure, software tools, and content, as well as mapping the constraints. Furthermore, possible framework limitations, including time, budget, and the limited number of sample autistic students of Sekolah Matahari Bunda, are considered to make the project practical.

The data analysis involved both qualitative and quantitative methods:

1. Expert Reviews: Experts in media design, content, and autism evaluated the Busy Web Media using structured questionnaires. The scores from these evaluations were analyzed to determine the feasibility of the tool.
2. One-to-One Testing: Direct evaluations were conducted with three autistic students. Teachers completed evaluation forms assessing the tool's effectiveness in reducing maladaptive behaviors and enhancing learning. The scores were analyzed using a Likert scale to measure feasibility.

For data processing, the formula used was:

$$\text{Result} = \left(\frac{\text{score obtained}}{\text{maximum possible score}} \right) \times 100\%$$

Design Phase

The Design Phase is where much of the planning and preparation for the Busy Web media is carried out. Activities in this stage include:

1. Instructional Design: A specific instruction plan is created from the objectives labelled in the analysis phase. The Busy Web media design includes thematic learning objects embedded in the curriculum of primary school grade level VI, especially for natural landscape, geography, and environmental science. Platform Selection We choose a platform for hosting the media on Busy Web. The Busy Web is created as a web app, which means it is available for any device with internet access, which can help to make media readily accessible to students both at school and away from the school day.
2. Storyboarding and Prototype Development: A storyboard depicting the structure and interaction of the Busy Web media is generated. These include interactive quizzes, educational games, video lessons, and visual representations of complex concepts. A prototype to illustrate the main characteristics and interactivity of the media is designed. Teachers test the prototype to check its usability and verify that the educational objectives are achieved.

Testing Approach: A formative usability plan is prepared that consists of an expert review with media experts, experts in the area, and autism content experts, as well as individual student testing to determine the functional and interesting qualities of the Busy Web media.

Development Phase

The Busy Web media is produced and modified based on the designs and feedback in the prior section. The following are the activities involved in this phase:

1. Production: The Busy Web media is a web-based resource, with accompanying multimedia such as infographics, educational videos, quizzes, and games. Each module of the Busy Web media is sensory-friendly and has been designed with visual appeal, sound cues, and interactive elements to capture student interest.
2. User Manuals: As media is being developed, user manuals for students and teachers are produced to ensure that media is appropriately utilized in the classroom. The manuals give an orientation and navigation around the web platform, use of the different learning modules, and means for engagement.
3. Formative Evaluation: Experts also evaluate the media in the expert review stage. Feedback is collected on its user-friendliness, design, and educational content, with revisions wherever necessary. The experts evaluate the media according to standards such as match content, ease of use, and effectiveness in decreasing maladaptive behaviors.

Implementation Phase

The Busy Web media is tried out in real classrooms at the implementation level. The activities include:

1. Integration: The Busy Web media is implanted in the grade VI autistic children at Sekolah Matahari Bunda. Teachers are taught to use media in the classroom, and students are given step-by-step instructions on going through modules, complete with videos, quizzes, and interactives. The aim is to consider how effectively the media fits into the pedagogical context and aids thematic learning. One-to-One Testing. In the implementation round, we carry out a one-to-one test of three ASD children to evaluate their wearing of the media and interaction with the media. Evaluation forms completed by instructors address the effectiveness of the media in reducing maladaptive behaviors and increasing learning thematic learning objectives. This assessment delivers invaluable information about media operations in situ.
2. Documentation: Also included in the implementation is a documentation of the learning and a documentation of students' response. It also becomes clear to what extent the students participate in the media and act differently in lessons. These findings contribute to the further optimization of the media.

Evaluation Phase

The evaluating stage measures the effectiveness of the Busy Web media. This phase includes:

1. Expert review: Busy web media are reviewed by media experts, content experts, and autism-specific experts to assess the general quality and effectiveness of the busy web. Feedback from these experts is applied to make final revisions before the media is prepared for use in subsequent classrooms.
2. Analysis: Information gleaned from the one-on-one reviews, expert evaluations, and classroom observations is analyzed to see whether we have accomplished our goals with the media. The outcome of the evaluation is used to judge how practical and feasible the Busy Web is in curbing maladaptive behavior and enhancing the thematic learning outcomes of autistic children.

3. Final Revision: The media is refined, and any editing adjustments required to make it effective are made according to the evaluation. These can involve a better user interface design, more content, or modifications to the multimedia to fit the lectures better for the students.

The ADDIE model-based R&D theme provides a systematic and structured way to develop the Busy Web media for theme learning and behavioral support for autistic learners. Through all the processes of the ADDIE model, the research ensures that the newly developed media fits the learning requirements of autistic students with media that are well-tested for effectiveness. This study is expected to significantly contribute to the literature on applying digital tools to the educational context for children with autism, specifically on theme-based learning.

Evaluate (Evaluation Stage)

At this stage, the researcher evaluates the instructional quality of the product through analysis of formative evaluation results at each step. Formative evaluation includes:

1. Expert Review,
2. One-to-One Evaluation,
3. Small Group Evaluation,
4. Field Test Evaluation (Tessmer, 1993).

However, due to the limited number of autistic students at Sekolah Matahari Bunda and time constraints nearing the semester break, only Expert Review and One-to-One evaluations were conducted.

The data collection technique involved distributing questionnaires to media experts, content experts, and autism specialists during the expert review stage, and question instruments during the one-to-one evaluation. Data analysis came from expert assessments and class teacher evaluations of the media trial with autistic students. A structured questionnaire using a Likert scale (5 = very good, 4 = good, 3 = less good, 2 = not good, 1 = very poor) was used to assess the feasibility of the media (Sugiyono, 2017). The data were analyzed using the following formula:

Result = (score obtained / maximum possible score) × 100%

Table 1. Score Interpretation Criteria

Percentage	Category
0% - 20%	Not Feasible
21% - 40%	Less Feasible
41% - 60%	Fairly Feasible
61% - 80%	Feasible
81% - 100%	Very Feasible

FINDING AND DISCUSSION

Finding(s)

This research will present several results, including the prototype of the Busy Web media, presentation of expert review evaluation data, product development revisions, one-to-one evaluation data, and discussion of the product.

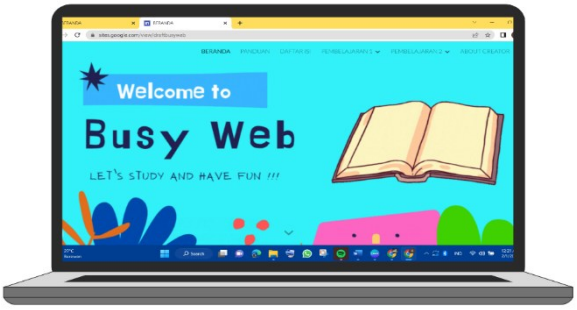

Figure 2. Prototype of the Media

Presentation of Expert Review Evaluation Data

In this stage, the Busy Web product was evaluated by media experts, content experts, and autism specialists. The evaluation questionnaire indicators for media experts included 3 variables: 1) media design, 2) media platform usage, and 3) media efficiency, which were then detailed into 30 specific statements, assessed by Dr. Lalan Erlani, M.Ed, a lecturer in Special Education with experience in media development research for children with special needs.

The indicators for the content expert included 3 variables: 1) curriculum aspects, 2) material evaluation, and 3) language usage, which were then detailed into 13 specific statements, assessed by Agus Triharyanto, S.Pd, a teacher at Yayasan Sayap Ibu and an assessor at Sekolah Matahari Bunda.

The autism expert's evaluation included 3 variables: 1) media aspects, 2) learning aspects, and 3) material aspects, which were then detailed into 15 specific statements, assessed by Dr. Indra Jaya, M.Ed, a lecturer in Special Education with expertise in autism learning theories. The results of the first evaluation stage are presented below with the breakdown of scores:

Table 2. Stage 1 Evaluation Results

Expert	Score	Max Score	Result	Category
Media	107	150	71%	Feasible
Content	53	65	81%	Very Feasible
Autism	75	75	100%	Very Feasible

Product Development Revision

In this stage, the researcher revised the Busy Web media. Revisions were based on suggestions from the media and content experts. Based on the evaluation from the autism expert, the product received an excellent qualification with no revision notes, so no revisions were needed regarding the media's alignment with autism characteristics. The suggestions from the media expert were:

1. Adjust the layout of images and text on the media cover,
2. Adjust the background color to make it less cluttered,
3. Adjust the use of the Google Form platform for uploading drawing assignments so that it can work statically/offline in certain conditions,
4. Allow easier access to pages with scene jumps.

The suggestions from the content expert were:

1. Correct Game 1, as there were questions with dual answers, "mountain" and "Mount Bromo",
2. In Game 3, change the question to "Choose the image of a highland, lowland, or beach",
3. The question in the SBdP game doesn't match the indicators, it can be changed in Game 3,
4. The drawing project task collection was fine, but the process was too complicated; it would be better to simply print the task.

After the researcher made improvements based on these suggestions, the media and content experts assessed the revised Busy Web product. The results of the second stage evaluation are as follows:

Table 3. Stage 2 Evaluation Results

Expert	Score	Max Score	Result	Category
Media	147	150	98%	Very Feasible
Content	553	61	93%	Very Feasible

Presentation of One-to-One Evaluation Data

Based on the previous expert review evaluation, the researcher continued to the media feasibility test using one-to-one evaluation, where the researcher conducted lessons using the Busy Web media. To assess the feasibility of the media when tested directly on autistic students, the researcher provided the one-to-one evaluation instrument to the classroom teacher to evaluate the Busy Web media. The evaluation instrument for the one-to-one evaluation included 3 variables: 1) display quality, 2) material presentation, 3) media feasibility, which were broken down into 20 specific statements. The results of the one-to-one evaluation are presented below:

Table 4. Stage 2 Evaluation Results

Score Obtained	Max Score	Result	Category
96	100	96%	Very Feasible

Suggestions for Improvement:
1. The game size is too small; it would be better to enlarge the template.
2. Add page numbers to each page.

Additionally, from the learning process, the autistic students were quite enthusiastic, engaged, and active during the learning process. Although they protested at first, it did not escalate into severe maladaptive behavior. Based on the evaluation data, the Busy Web media is very feasible to reduce maladaptive behavior in autistic children.

This research shows important information about how effective Busy Web media can be as a teaching tool to help reduce bad behaviors and enhance learning for autistic students. The research relies on a systematic assessment procedure that incorporates expert judgments and empirical testing via individual assessments in the classroom. This section looks at the detailed results from expert evaluations, changes made to the product, and data from individual assessments, highlighting how well the medium meets the goals of the research.

Prototype of Busy Web Media

We developed the Busy Web media prototype as a web-based educational resource to facilitate thematic learning for sixth-grade autistic students at Sekolah Matahari Bunda. The Busy Web integrates several interactive components, such as visual assistance, aural elements, quizzes, educational games, and video classes. These components were meticulously designed to address the sensory processing requirements of students with autism, facilitating an engaging and sensory-appropriate educational setting. The prototype had modules pertaining to natural landscapes, geography, and environmental science, consistent with the thematic learning curriculum for sixth-grade students.

The prototype's design and development underwent multiple iterations informed by comments from media professionals, content specialists, and autism experts. The iterative procedure guaranteed that the final product was both functionally efficient and customized to the distinct requirements of autistic learners. The prototype was tested in multiple classroom environments to evaluate its usability and the degree of involvement it may elicit from students.

Results of Expert Review Evaluation

Media professionals, content specialists, and autism experts performed the initial comprehensive assessment of the Busy Web media. The evaluations concentrated on three primary aspects: the media's design, the content's relevancy, and the extent to which the media met the learning requirements of autistic students

1. Dr. Lalan Erlani, M.Ed., conducted an evaluation of the comprehensive design, platform utilization, and media efficacy of the Busy Web. The assessment comprised 30 distinct comments pertaining to the usefulness and aesthetics of the media. The media expert evaluated the prototype at 71% of a maximum of 150 points, categorizing the media as "feasible." This suggests that although the medium was considered functional, there

remained opportunities for enhancement, particularly with the visual design and user interface.

2. Content Expert Evaluation: The content expert, Agus Triharyanto, S.Pd, concentrated on evaluating the curriculum components, material assessment, and linguistic application inside the Busy Web media. The expert evaluated 13 statements, assessing the congruence of the content with the curriculum and the lucidity of the language employed in the media. The content expert evaluated the media at 81% out of a possible 65 points, designating it as "very feasible." The elevated score indicates the structured and pertinent curricular content offered by the media, assuring compliance with the educational objectives for sixth-grade autistic students.
3. Autism Specialist Evaluation: Dr. Indra Jaya, M.Ed., an autism expert, assessed the media, learning, and material components concerning the distinct requirements of students with autism. Fifteen statements were evaluated, and the media achieved a flawless score of 100%, categorizing it as "very feasible." This outstanding rating indicates the congruence of the medium with the sensory processing needs and cognitive demands of autistic students. The expert determined that Busy Web Media effectively mitigated maladaptive tendencies while promoting theme learning.

Revision of Product Development

After the expert assessments, the research team implemented multiple modifications to the Busy Web media in accordance with the feedback from the media and content specialists. The changes emphasized aesthetic and practical enhancements.

1. Recommendations from Media Specialist: We implemented modifications to the arrangement of photos and text on the media cover to enhance its visual attractiveness. The design was streamlined to eliminate clutter, and components were placed more efficiently.
2. The background color was adjusted to reduce visual intensity for students, maintaining visual engagement without inducing sensory overload.
3. We modified the use of Google Forms for assignment submissions to provide a more flexible approach, enabling the media to function offline in certain scenarios. This modification guarantees that students can persist in their tasks without dependence on a stable internet connection, enhancing accessibility across various locations.
4. We updated the navigation system to include scene jumps for improved access to various media pages, thereby enhancing the overall user experience.

Recommendations from Subject Matter Expert:

1. We amended Game 1 to address the presence of multiple correct answers that could potentially confuse students. The question in this game was modified to elucidate the correct response options, guaranteeing alignment with the educational objectives.
2. We modified the inquiry in Game 3 to highlight the educational objectives. The initial query, which required students to decide between Mount Bromo and other geographical features, was streamlined to facilitate comprehension and accurate decision-making.

3. The SBdP game, pertaining to arts and culture, was modified to more accurately align with the learning markers. The game's content was aligned with curricular objectives, and several questions were adjusted to maintain their pertinence to the subject matter.
4. The tasks for the drawing project were streamlined. The procedure for submitting drawing tasks was deemed excessively complex. The job submission mechanism was optimized to enable students to finish and submit their drawings with simplicity and efficiency, devoid of superfluous complication.
5. After the implementation of these improvements, Busy Web Media underwent a second review phase.

Results of the Second Expert Review Evaluation

During the second round of evaluations, the amended Busy Web material was re-evaluated by media and content specialists. The findings indicated substantial enhancements:

1. Media Expert Assessment: Following the changes, the media expert assigned a score of 98% out of a possible 150 points, reflecting an enhancement from the prior evaluation. This categorized the medium as "very feasible," indicating improvements in its design and use.
2. The content expert assigned a high rating of 93% to the amended media, out of a maximum of 100 points. This signifies that the medium successfully achieved the instructional objectives, featuring clear and pertinent content that connects effectively with the theme curriculum.

Individual Evaluation Data

We assessed the Busy Web medium in a classroom environment with three autistic students during the one-to-one evaluation phase. The aim was to evaluate the practical applicability of the media by examining student interactions and its effects on their behavior and learning results.

A one-to-one evaluation was performed by supplying the classroom teacher with an assessment tool that concentrated on three primary variables: display quality, material presentation, and medium feasibility. The educator was requested to evaluate the media according to 20 specific statements intended to assess the medium's effectiveness in engaging students and facilitating their learning.

The one-to-one evaluation findings indicated that the media received a score of 96 out of a possible 100 points, classifying it as "very feasible." The elevated rating signifies that students perceived the media as engaging and that it effectively facilitated their theme-learning endeavors. Furthermore, the teacher observed that while the students first exhibited rigidity, typical in children with autism, these behaviors did not develop into severe maladaptive activities. The students demonstrated enthusiasm, engagement, and activity during the class, underscoring the efficacy of the Busy Web media in fostering a conducive learning environment.

Reiteration of Results Instead of Critical Reflection

The discussion section tends to repeat the results, which undermines its goal of critical analysis. To enhance the quality of the discussion, we need to shift the focus from simply restating the findings to interpreting and comparing them within the context of the existing literature. Here is how we can improve it:

1. Simplify Prototype Descriptions: The detailed list of all the modules and features after prototype revision is too descriptive for the discussion section. It would be more effective to streamline this by summarising the key features and their purposes. For example, rather than listing each module (like the quiz, educational games, or video lessons), we can focus on the overarching themes: "The Busy Web Media integrates multimodal learning approaches, such as interactive games and video lessons, to cater to the sensory processing needs of autistic students."
2. Compare with Previous Studies: The discussion should analyse how the results align with or differ from existing studies on digital tools and autism. For instance:
   - McPeake et al. (2023) highlight the advantages of interactive learning tools for reducing anxiety and behavioural issues in children with autism. This study found that Busy Web Media similarly mitigated maladaptive behaviours, supporting the findings of McPeake et al.
   - Lorenzo et al. (2022) discuss how multimodal resources engage autistic students more effectively. The results from this study also show how Busy Web Media's sensory-enriched modules enhance engagement and learning.

By integrating these comparisons, we deepen the discussion and provide a broader context for interpreting our findings.

Recommendations for Enhancement

Despite the high grades, we identified several areas that needed improvement:

1. The dimensions of specific game modules were considered inadequate, hindering effective interaction for some students. The suggestion was to expand the game templates to enhance their accessibility and visual clarity.
2. The proposal to include page numbers aims to facilitate students' navigation of the learning material and maintain their orientation within the media.

The evaluation results demonstrate that Busy Web media is highly beneficial in diminishing maladaptive behaviors and improving thematic learning outcomes for autistic students. The medium garnered positive reception from both experts and students, and the iterative modifications informed by expert feedback markedly enhanced its usability and congruence with instructional objectives. The affirmative one-to-one assessment further substantiates that the media effectively engages autistic kids and offers them an organized, sensory-friendly educational setting. These findings indicate that Busy Web media is a highly viable and successful resource for enhancing the education of autistic students.

Discussion(s)

In this research and development, the result was a learning media called Busy Web, which is a website-based learning tool that refers to the curriculum for grade VI autism students. The material aligns with the THEMA 2 book titled "Earth", Subtheme 1 "Land" for lessons 1 and 2. The details of the materials and activities are as follows:

1. Infographic text on natural landscapes,
2. Video and quiz on natural landscapes,
3. Story text about Mount Bromo,
4. Literacy quiz,
5. Let's draw a mountain,
6. Let's play as an evaluation for lesson 1,
7. Story text about a playground,
8. Literacy quiz,
9. Infographic text on the properties of matter,
10. Puzzle quiz,
11. Let's draw a beach,
12. Let's play as an evaluation for lesson 2.

After receiving evaluations from formative expert reviews and one-to-one assessments, the Busy Web media achieved a final rating of very good or highly feasible to reduce maladaptive behavior in autistic students, after the researcher made all revisions based on the experts' and respondents' suggestions. Below is the final product of the Busy Web media:

Figure 3. Homepage Display

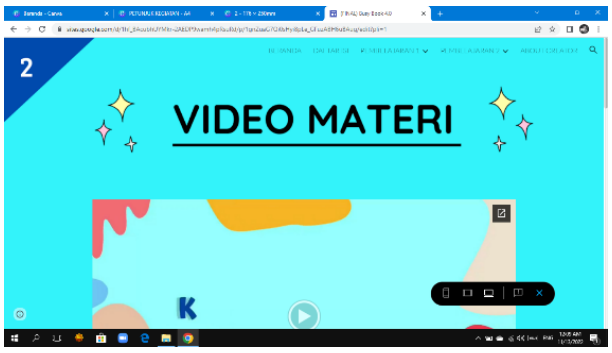

Figure 4. Video Page Display

Figure 5. Material Page Display

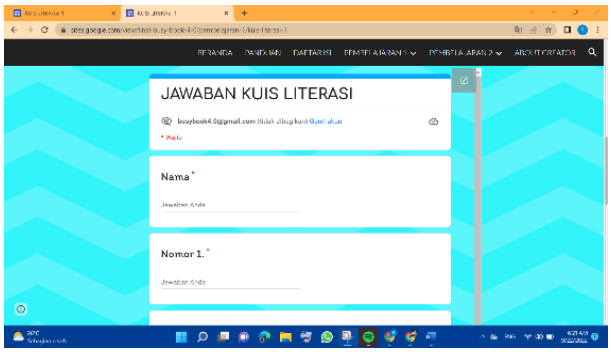

Figure 6. Quiz Page Display

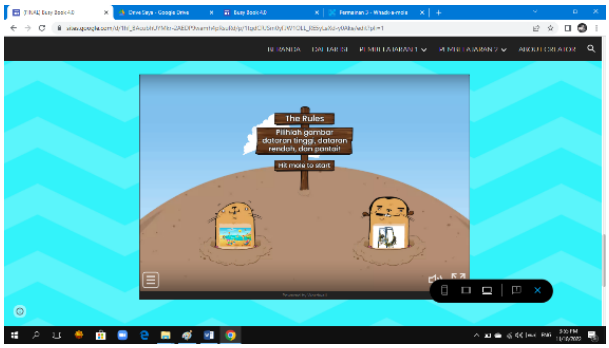

Figure 7. Games Page Display

This section is about the media's impact, not a module-by-module review. Simplify Prototype Descriptions: Instead of revisiting each module (e.g., "quiz on natural landscapes" or "story text about Mount Bromo"), summarise them into broader categories, such as "The Busy Web Media incorporates interactive learning activities (e.g., quizzes, games, and visual stories) that engage students through multiple sensory modalities." This approach will make the discussion more concise and focused on the analysis of the results rather than a list of features.

Research has shown that Busy Web media can enhance theme learning and reduce maladaptive behaviors in autistic kids. The research utilized a Research and Development (R&D) methodology, namely the ADDIE model (Analysis, Design, Develop, Implement, and Evaluate), to create web-based learning media tailored to the requirements of autistic children at Sekolah Matahari Bunda. Outcomes According to expert evaluations, individual assessments, and modifications reported in the media, the findings indicate that Busy Web

is a highly effective option for enhancing the behavior and academic outcomes of CSEs with autism.

Autism Spectrum Disorder (ASD) is characterized by persistent and widespread challenges in social interaction, along with repetitive and restricted activities (American Psychiatric Association, 2013). The learning issues faced by students on the autism spectrum are intricate, since many individuals with autism struggle to learn in the high-stress typical classroom setting due to difficulty with change, transition, and diverse sensory requirements. A significant factor hindering their academic advancement is maladaptive behavior, including tantrums, self-injury, and violence, which are often exacerbated by sensory overload or frustration (McDougal et al., 2020). According to the literature referenced by Hurtado (2020), children with ASD exhibit heightened sensitivity to environmental stimuli, including loud noises and bright lights, which they perceive as stressful and overwhelming in conventional classroom environments. In this setting, the significance of developing educational tools tailored to the unique characteristics of these kids, particularly those that address maladaptive behaviors and foster academic engagement, is underscored.

This study's primary finding is that multimedia learning resources, such as Busy Web media, create a more autism-friendly and engaging educational environment for autistic students. The Busy Web media, which incorporates visual, aural, and interactive elements, aligns with the findings of Lorenzo et al. (2022) concerning the advantages of multimodal learning resources in enhancing engagement and comprehension for individuals with autism. The multimodal characteristics of Busy Web media facilitate the presentation of information visually, vocally, and in written form, catering to students' sensory processing requirements, which is essential for maintaining engagement and mitigating anxiety-driven behaviors.

Thematic learning, as articulated by Esteban et al. (2019), is a teaching approach that integrates interdisciplinary content centered around a particular theme. The latter is particularly beneficial for autistic students, as it provides a structured open online learning environment that, once initiated, can alleviate anxiety and enhance engagement. The Busy Web media exemplifies an organized thematic structure that adheres to the curriculum guidelines for sixth-grade students at Sekolah Matahari Bunda, specifically focusing on the study of the Earth's natural landscapes, geography, and environmental science. The study demonstrates that these interactive elements effectively engage learners in theme-based activities (quizzes, educational games, and video lessons) that promote not only the acquisition of new knowledge but also enhance understanding and engagement with the subjects to be learned.

Díaz's (2017) research emphasizes the significance of engaging students with pertinent knowledge and fostering curiosity, revealing that individuals on the autism spectrum excel in activities that are both structured and conducive to interaction and tactile sensations. The subject nature of Busy Web media also enabled student engagement with themes through various interactive formats (e.g., infographics, quizzes, drawing exercises). This engagement with the media facilitated students in establishing connections among various elements of the content, which is foundational to the notion of theme learning. These findings align with those of Lorenzo et al. (2022), who underscore the efficacy of multimedia tools in delivering an engaging and structured learning experience for students on the autism spectrum.

The primary aim of Busy Web Media was to improve academic performance while simultaneously reducing maladaptive behaviors in children with autism. Mitigating detrimental behaviors such as self-injury and oppositional defiance As previously stated, negative and maladaptive behaviors are substantial impediments to the learning of children with autism. The research by McDougal et al. (2020) emphasized the significance of

environmental stimuli in this behavior and how a reduction in sensory overload can mitigate these concerns. The multimodal features of the Busy Web media address this by offering a structured yet sensory-appropriate environment. Students engage with media and get instantaneous feedback, thereby reaping the advantages of self-paced learning, which renders the experience less irritating and stressful compared to traditional media.

The results from the repeated measures validate the impact of the quantity of Busy Web media on diminishing maladaptive behaviors. Initially, children exhibited evidence of rigid arm movements, indicative of autistic behavior; however, they did not escalate into severe maladaptive behaviors. The teacher's remark indicated that students exhibited more work engagement and less antagonistic behavior during classes incorporating Busy Web material. This outcome aligns with the findings of Rambe & Aisyah (2023), which indicated that digital learning tools providing real-time interactive touch and feedback help mitigate the harmful behaviors of autistic children.

Moreover, formative evaluations conducted by autism specialists validate that the Busy Web media effectively facilitated students' sensory processing, which is crucial for reducing the precursors of maladaptive behavior. The autism specialist's feedback highlighted that the medium's multi-sensory design was beneficial for the learning style of autistic youngsters, therefore promoting a more positive and less anxiety-inducing educational experience. This outcome aligns with the research conducted by Rosas-Pérez et al. (2023), which supports the implementation of multimodal instructional aids for autistic students that integrate visual, aural, and interactive elements to mitigate sensory overload and enhance engagement.

Despite the favorable outcomes, Busy Web media can be enhanced further. Certain students perceived that the dimensions of one or more game templates were inadequate, adversely impacting their engagement with the subject. This is a drawback that numerous digital learning tools encounter, especially when the sensory and motor needs of children with autism are not thoroughly addressed in the tool's design. The prospective augmentation of game templates (and page counts) to enhance navigation of activities highlights a fundamental holistic challenge in the design of educational media for autistic learners: facilitating accessibility and engagement without overwhelming users through excessive complexity in appearance and cognitive processing demands. According to McPeake et al. (2023), it is essential to build digital learning resources that address these concerns to enhance their effectiveness.

Furthermore, while one-on-one experiments have indicated that Busy Web media effectively reduced problem behavior and enhanced learning, future large-scale trials over time would be beneficial to comprehensively assess its potential long-term impacts. Tomaszewski et al. (2025) emphasize the necessity for additional research on the long-term effects of multimedia-assisted learning aids on adaptive behaviors and overall academic achievement in individuals with autism. Additionally, analyzing a greater cohort of students across various educational environments would be beneficial to have a comprehensive understanding of the effectiveness of the Busy Web medium.

The discussion would benefit from a deeper engagement with the existing literature. Instead of simply stating that the media was successful, we can draw connections between our results and previous studies.

1. Comparative Analysis: You could compare your findings with previous research on multimedia tools for autism. For instance, compare how Busy Web Media reduced maladaptive behaviours in students, and discuss how this finding aligns with previous studies on the use of technology in autism education (e.g., McDougal et al., 2020, or Lorenzo et al., 2022).

2. Thematic Learning: The effectiveness of thematic learning in reducing anxiety and improving engagement for autistic students has been widely discussed in studies by Esteban et al. (2019). You can highlight how Busy Web's thematic approach helped mitigate anxiety and increase focus similarly.

In this study, BusyWeb Media demonstrated its potential to reduce maladaptive behaviours and enhance thematic learning for autistic students. This aligns with the findings of McPeake et al. (2023), who emphasise the importance of interactive and engaging digital tools in autism education. Unlike traditional classroom methods, Busy Web Media utilises a multimodal approach, combining visual, auditory, and interactive components, which is effective in increasing engagement and reducing anxiety in children with autism (Lorenzo et al., 2022). The results of this study align with these findings, showing that students exhibit increased enthusiasm and reduced signs of frustration during learning sessions.

However, while the findings are promising, the study also reveals areas for improvement. For instance, some students perceived the small game templates as inadequate, indicating the need for further refinement in the media's interactive components. The result is consistent with Rambe & Aisyah's (2023) assertion that digital learning tools must cater to the sensory and motor needs of autistic learners, which can sometimes be overlooked in the design process.

This study also contributes to the growing body of literature on thematic learning for students with Autism Spectrum Disorder. As Esteban et al. (2019) note, thematic learning creates a structured yet flexible environment that reduces anxiety and promotes engagement. This approach was evident in the positive response to Busy Web Media.

The findings from this study reveal that Busy Web Media effectively reduces maladaptive behaviours and enhances thematic learning for autistic students, supporting previous research by McPeake et al. (2023) and Lorenzo et al. (2022) on the efficacy of interactive digital tools in special education. The multimodal approach, incorporating visual, auditory, and interactive elements, proved to be an effective way to engage students and foster a more positive learning environment. However, while the positive outcomes are promising, the study also highlights areas for improvement, such as optimising game templates for better accessibility and refining navigation features. These findings suggest that digital learning tools can be highly effective in autism education, but further refinement and broader trials are needed to assess their long-term impact.

To summarise, the discussion section needs to shift from listing results to critically analysing them by comparing them with existing literature. This will enable a deeper understanding of the study's implications and its contribution to the field. Simplifying descriptive sentences and avoiding excessive module listing will make the discussion more concise, while drawing comparisons with prior research will deepen the critical analysis.

The present study has demonstrated the effectiveness of Busy Web media in enhancing thematic comprehension and mitigating maladaptive behaviors in autistic students. The students deemed multimedia-based instruction enriching and engaging, valuing its visual, aural, and interactive characteristics that provide a structured and sensory-friendly experience for the learner. Findings from expert evaluation and paired testing indicate that the media is exceptionally suitable for educational settings, effectively addressing the sensory and cognitive requirements of kids with autism while promoting academic engagement. Nonetheless, further refining is necessary to enhance the media's access and utilization, particularly with pictures and navigation. The Busy Web media demonstrates significant potential for improving the educational experience of autistic children and

augmenting the growing body of literature advocating for the use of digital media in special education.

CONCLUSION

This study demonstrates the effectiveness of Busy Web Media in reducing maladaptive behaviours and enhancing thematic learning outcomes for autistic students at Sekolah Matahari Bunda. The study demonstrated that utilising the ADDIE model to develop and evaluate the media, combined with expert reviews and individual testing, effectively showed that the media is efficient and beneficial for maintaining student engagement, reducing frustration, and enhancing academic success among grade VI students with autism.

The findings align with existing research on the effectiveness of multimedia tools in autism education, particularly those that cater to the sensory and cognitive needs of individuals with autism. However, while the results are promising, the study is limited by a small sample size and the lack of long-term evaluation. Therefore, further research is needed to assess the broader applicability and long-term impact of Busy Web Media in autism education across different settings and cohorts.

For future research, it is recommended that the study be scaled up with a larger and more diverse group of autistic students to evaluate the effectiveness of Busy Web Media in a broader context. Additionally, exploring the incorporation of more individualised learning features and testing the media in various educational environments could further enhance its impact. Researchers should also investigate the long-term effects of BusyWeb on both academic and behavioural outcomes.

In conclusion, this study contributes to the growing body of knowledge advocating for the integration of digital learning tools in special education. By addressing the sensory processing and learning needs of autistic students, BusyWeb Media offers a promising solution to improve engagement, reduce maladaptive behaviours, and enhance thematic learning in inclusive classrooms.

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