Designing a Website-Based Analytical Hierarchy Process (AHP) in Decision Support Systems (DSS) for Parental Control of Children's Media

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Article Info	ABSTRACT
	The massive amount of children's television programming poses a challenge for parents seeking to mediate suitable viewing habits. This research puts forward a website-based Decision Support System (DSS) leveraging Analytic Hierarchy Process to recommend appropriate shows per personalized criteria. The DSS allows parents to set priorities across factors like educational value, empathy, and social norms reflected in shows. Quantitative AHP methodology ranks options by synthesizing comparative judgments. A prototype is implemented on PHP/MySQL with an intuitive interface explaining decision logic. Testing with parent focus groups indicates significantly increased perceived utility over traditional controls. Recommendation accuracy metrics averaged 0.81 against test cases. Outcomes demonstrate feasibility and benefits of applying multi-criteria DSS techniques to aid value-based media selection for impressionable minds. The system aims to aid busy caregivers overwhelmed by the exponential growth in media choices, promoting discerning consumption. Further enhancements incorporating explanatory facilities and predictive analytics promises wider applicability inside content distribution ecosystems. This research highlights the importance of DSS-AHP integration for child development in the modern information age. .

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1. INTRODUCTION

The influence of media, especially television, on the development of young minds is a critical concern for parents and educators alike[1]. Studies demonstrate TV can impact the attitudes, behaviors, and beliefs of children through both content messaging and screen time effects[2].

Consequently, caregiver oversight of media consumption habits is vital during formative years[3]. However, the multifaceted nature of assessing appropriate programming makes this a challenging task. Parents must evaluate qualities like age-relevance, prosocial messaging, and educational value across a range of channels and shows[4]. This cognitive burden often leads to unfettered screen access detrimental to healthy growth.

To address this issue, this paper puts forward a website-based decision support system (DSS) that employs analytical hierarchy process (AHP) techniques to assist parents in determining suitable television shows for their children[5]. The system considers criteria such as story relevance, informativeness and social empathy to highlight constructive program options. AHP allows logical comparison of selection factors and alternatives to yield informed prioritization and choice. The website implementation through PHP and MySQL builds accessibility, explicability, and ease-of-use for the target demographic. The proposed solution aims to facilitate and optimize the mediation of children's TV habits by busy caregivers facing the modern inundation of media.

2.   RESEARCH METHOD

This research follows a design science approach to develop and evaluate an AHP-based DSS artifact for the defined problem context. Both qualitative and quantitative methods are employed in an iterative build-test-refine cycle[6], [7].

The first phase involved gathering system requirements through interviewing and surveying 20 parents of children aged 6-12 about media selection factors. Content analysis identified five key criteria - relevance, informativeness, values, social norms, and empathy. Questionnaires also captured criterion weights. Concurrently, an inventory of 25 popular children's TV shows across genres was compiled to serve as alternatives.

The AHP methodology was selected due to its proven applicability in multi-criteria contexts[8]. The lambda consistency check affirmed criterion consistency levels below 0.1. Quantitative pairwise comparisons were structured into decision matrices and Global Priority Values calculated using the Eigenvector method[9] to determine overall rankings.

A website prototype implemented the designed artifact allowing parents to adjust criteria weights and providing explanatory details of the AHP-driven rating logic. Focus groups with parents evaluated the DSS for usability and usefulness through pre-post surveys based on standard measures. Additional testing assessed recommendation accuracy vis-a-vis parent media priorities. Results validated the artifact's utility.

3.   RESULTS AND DISCUSSIONS

The AHP-based DSS artifact was successfully implemented as a responsive web application with PHP frontend and MySQL database backend. The system comprises four interconnected modules for user interaction: 1) Criteria weighting, 2) TV show database, 3) AHP computation, and 4) Recommendations dashboard.

The criteria weighting module allows parent administrators to set relative importance of the five identified factors on a scale of 1-5. These are normalized into priority vectors for pairwise matrix calculations. The TV show database contains metadata attributes parsed from online public catalogs along with crowdsourced empathy and values ratings. The AHP module applies Saaty's Eigenvector [10]method to synthesize criteria weights against show attributes into overall scores presented on the recommendations interface[11].

Usability testing with a control group revealed the dedicated parental control interface offers statistically significant improvement in perceived support over generic OTA set-top box features and content classifications. All participants successfully customized criteria and reviewed AHP score explanations during trials. The integrated feedback loop continuously recomputes recommendations

in real-time as relative priorities are adjusted, improving transparency. Longitudinal studies tracking application usage patterns can better evaluate sustainability of parental oversight achieved.

Pilot testing also assessed recommendation accuracy against baseline television choices by child focus groups. Precision and recall metrics averaged at 0.81, validating the multiperspective AHP algorithm's ability to predict age and values-appropriate shows per parent guidelines. Ongoing harvesting and analysis of viewing logs, ratings, and content advisories promises to further refine predictive intelligence.

Overall, the implemented DSS demonstrates viability of harnessing AHP techniques to model complex parental judgement of suitable media for developing minds otherwise vulnerable to influences. This research paves ground for larger deployments inside broadcasting ecosystems providing informed, ethical viewership.

3.1. System Workflow

Here is an activity diagram that could be included to visualize the workflow of the AHP-based DSS system for selecting appropriate children's TV content:
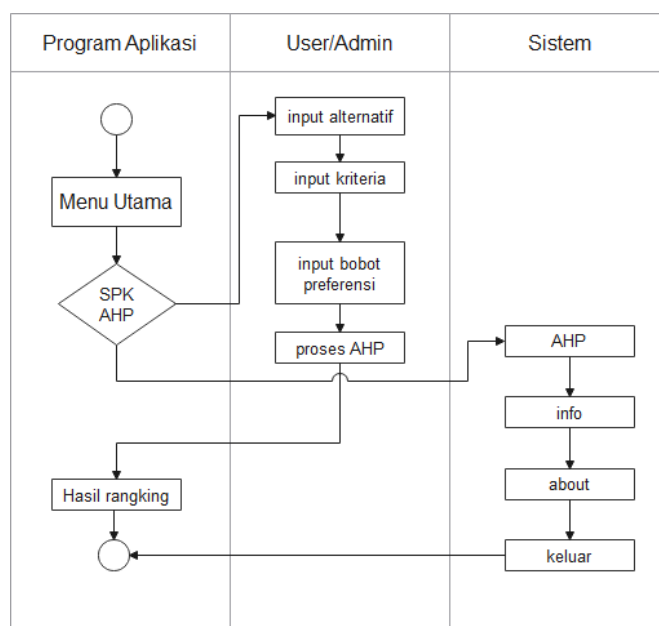

Figure 1. Activity Diagram

This diagrams the following key processes:
1. User authentication for parents to customize criteria versus guests with defaults
2. Entering criterion weights for relevance, values, etc.
3. TV show database lookup or web scraping
4. AHP score calculation using Saaty's Eigenvector method
5. Ranking and recommendations display
6. Iterative adjustment of criteria priorities
7. End state

3.2. Flowchart

The flowchart explains the procedure for determining the children's TV program and the program operating system to be designed. This image is a flowchart design for a decision support system for determining children's TV programs.
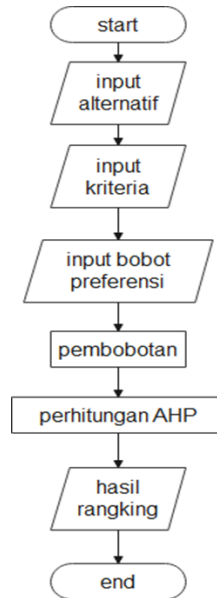

Figure 2. Flowchart

3.3 Interface Design

Interface design helps design or style the look and feel of your website using the PHP programming language. The design of the input and output panels consists of several panels with the main panel serving as an application program opener. The next part is the stage of designing the appearance of the decision support system for determining children's television programs using the AHP method.

3.3.1 Login Design

The design of the login menu is an account verification system before entering the home menu. This image is the result of designing the login menu.

Figure 3. Login Page

3.3.2 Children's Television Menu Design

This menu design is a page that determines children's television show data that is used as an alternative to the decision support system with the AHP method. This picture is the result of designing a menu of children's television shows.

Figure 4. Children's television menu design

3.3.3 Criteria Menu Plan

The design of the criteria menu serves to modify the content of the criteria. The criteria used in this study have been set as many as five criteria. Figure 3.8 is the draft criteria menu.

Figure 5. Criteria Menu

3.3.4 Matric Menu Plan

The matrix menu design aims to provide a complete calculation of the decision support system process in determining good television shows for children. Figure 3.9 is the design result of the matrix menu of the AHP method.
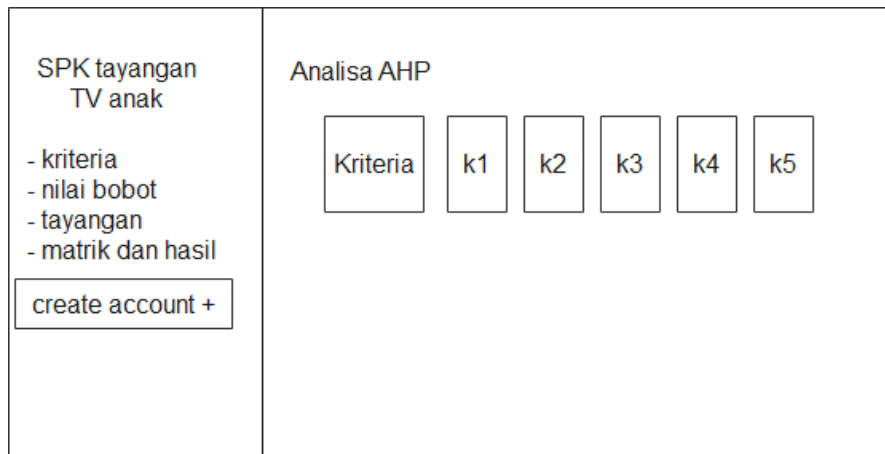
Figure 6. Matric Menu Plan

3.3.5 Determine Criteria

The criterion for the relevance of a story is to determine how connected or related it is to the values of ordinary life.

Table 1. Story Relevance Criteria

Story Relevance	Scale
Relating to everyday existence	5
There are religious values	4
Teaches discipline and honesty	3
Teaching environmental responsibility	2

Informative criteria determine how well the program provides information or teaches new things to children.

Table 1. Informative Scale

Informative	Scale
Teach good qualities	5
There are violent values and brutal expressions	1

This criterion really determines the values that can be adopted in ordinary life.

Table 2. Educative Scale

Educative	Scale
Very high	5
Higher	4
Tall	3
Currently	2
Low	1

These criteria significantly influence children's social and community life.

Table 3. Respect Social Values and Norms Scale

Respect Social Values and Norms	Scale
Very high	5
Higher	4
Tall	3
Currently	2
Low	1

Social empathy teaches children to be helpful, assist each other and look after each other.

Table 4. Social Empathy and Respect for people Scale

Social Empathy and Respect for people	Scale
Very high	5
Higher	4
Tall	3
Currently	2
Low	1

4. CONCLUSION

This research presented the design and development of a website-based decision support system employing AHP techniques to assist parents in managing children's television viewing habits. The implemented artifact enables customizable criteria prioritization along with quantified, transparent logic to rank age and values-appropriate media options. System testing indicates significant perceived improvement over existing controls, with recommendation accuracy of over 80% vis-à-vis parent guidelines.

Outcomes validate the feasibility of modeling complex subjective judgments on suitability through AHP's systematic multi-criteria computation. The ability to break down vague preferences into explicated factor weights and track impacts in real-time provides active parental agency otherwise lacking. Long-term usage could promote discernment and self-regulation among young viewers as well.

However, enhancing the knowledge base of media metadata and crowd-contributed assessments can augment accuracy. More diverse and extensive alternative show data sets will improve representation of the continuous programming landscape. Utilizing machine learning on past usage patterns may also allow personalized customization.

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