Research Article

Analysis of Parental Assessment of the Usefulness of Expert Systems in Detecting Child Behavioral Disorders

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Abstract: This study discusses the analysis of parental assessment and the usefulness of expert systems in detecting child behavioral disorders using the system usability method scales (SUS). This system is designed to help parents identify behavioral disorders in children efficiently and accurately. The research method includes compiling a questionnaire, collecting data, processing SUS scores, interpreting results, and recommending improvements. The results of this study indicate that this system gets an average SUS score of 82.84, which is included in the Grade A category. This shows a high level of acceptance and good user experience, where users do not experience difficulty in operating the system. In addition, this system managed to maintain its search performance, but improvements are needed in some of its services according to suggestions from respondents.

Keywords: Analysis; Assessment; Expert System; Parents; System Usability Scales.

1. Introduction

Behavioral disorders in children are serious problems that can affect the development and quality of life of children (Mayatopani, 2024)(Daulay, 2021). Early detection and appropriate intervention are essential to effectively manage these disorders (Devi & Susetyo, 2024). There are still conditions where parents may not have the knowledge or access to adequate tools to detect behavioral disorders early. One of the accesses to the use of technology that helps in early detection is an expert system.

An expert system is a computer program designed to mimic the knowledge and skills of a human expert in one or more specific fields (Nugroho et al., 2022). Expert systems powered by artificial intelligence offer a potential solution by providing tools that can help detect diseases and health disorders (Ajisari & Prasetyaningrum, 2024). One of the uses of expert systems is to detect behavioral disorders in children, which allows for early intervention and more effective handling to support optimal child development(Amna et al., 2023). he success of implementing this expert system is highly dependent on the usability and effectiveness of the technology. Use of the System Usability Method Scale (SUS) aims to measure the usefulness and effectiveness of the expert system from the perspective of parents as users (Adiyarta et al., 2019).

System Usability Scale (SUS) is a simple yet powerful tool for evaluating the level of usability of various technology systems and products (Adijaya et al., 2024) Using SUS provides in-depth insight into parents' experiences in using expert systems to detect child behavioral disorders. The results of parents' assessments through SUS not only provide an overview of the efficiency and ease of use but also the potential for improvements needed to increase the acceptance and effectiveness of this system.

The purpose of this study is to determine how parents accept the Expert System for Detecting Child Behavioral Disorders by examining the usefulness of the system which includes the usefulness of the system and public acceptance of the system. The results of this study can be used by system makers to improve the features and functions of the system, as well as develop effective strategies to increase the use of expert systems. This study also provides guidance for developers in creating a more intuitive system that is by user needs to support early detection and intervention of child behavioral disorders.

2. Literature Review

An expert system is an artificial intelligence-based application designed to imitate the ability of an expert in diagnosing or providing solutions to certain problems (Septian et al., 2023). In the context of child behavioral disorders, expert systems can help parents to detect early symptoms of disorders such as ADHD, autism, or anxiety disorders. Methods such as Certainty Factors are often used to provide a level of confidence in a diagnosis (Sukiakhy et al., 2022).

Parents have an important role in utilizing expert systems to detect behavioral disorders in children. Research shows that web-based systems or mobile applications can increase parental awareness of symptoms of behavioral disorders in children and provide initial guidance before consulting an expert (Alkaff et al., 2019).

Expert systems include ease of access, time efficiency, and the ability to provide a rapid initial diagnosis. However, challenges include the accuracy of the data used, the need for periodic system updates, and the possibility of bias in the algorithm (Arwan, 2021).

Several recent studies have shown the success of expert systems in helping parents. For example, a website-based system for detecting mental disorders in children showed an accuracy rate of up to 90% in diagnosis. This shows the great potential of expert systems in supporting children's mental health (Mayatopani, 2024). The developed web-based expert system can provide valuable information and solutions for parents regarding autism disorders in early childhood, based on the symptoms entered. This shows that this system is designed to help parents understand and diagnose autism, which has the potential to lead to increased awareness and early intervention for their children (Fuad et al., 2022).

The acceptance of expert systems by users can be measured effectively using System Usability Scale (SUS), is a tool that evaluates the subjective usability of a system. SUS is widely recognized for its reliability and validity in assessing user satisfaction and system usability in various domains, including expert systems (Courtois et al. , 2025) . Acceptance of expert systems is influenced by several factors, including perceived usefulness, ease of use, and user trust in the system's suggestions (Asnawi et al. , 2024) .

3. Method

This research is a quantitative descriptive research . Descriptive research is a type of research that aims to describe the characteristics of a phenomenon or population without making causal conclusions (Yuliani & Supriatna, 2023) . Researchers want to know the description of parents' assessment of the usefulness of the child behavioral disorder expert system using the System Usability Scale (SUS) method. SUS assesses the dimensions of simplicity, validity and reliability, industry standards, flexibility and ease of interpretation (Blattgerste et al., 2022). SUS is suitable for use in this context because this tool can measure and describe the level of usability of a product or system based on user responses (Barnum, 2020).

This study consists of five stages, namely questionnaire preparation, data collection, SUS score processing, interpretation of results and recommendations for improvement. The first stage is the preparation of the questionnaire , the questions in the questionnaire are adopted from the Kosim research (Kosim et al., 2022). Each item is assessed using a Likert scale from 1 to 5, where: 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree. The questionnaire consists of 10 questions to assess *usability* from the system presented in table 1.

Table 1. Questionnaire Question Items

| No	Question
1	I think will use this system Again
2	I feel the system is complicated For used
3	I feel the system is easily used
4	I need help from other people or technician in use the system
5	I feel the Features system is running as it should
6	I feel the system not consistent and not harmonious
7	I feel that others will quickly understand how to use this system
8	I feel the system confusing
9	I feel that there are no obstacles in using this system

No	Question
10	I need to familiarize myself first before using this system

The second stage is data collection by distributing questionnaires. Respondents in this study were parents with children aged 0-10 years, who had experience in operating expert systems for child behavioral disorders, 22 respondents participated. The third stage is the processing of SUS scores. Each answer to the questionnaire item question will be converted using a 5-point Likert scale ranging from strongly agree to strongly disagree. The SUS score is calculated using the formula. For odd statements: Score = (respondent value - 1). While even statements: Score = (5 - respondent value). The total score of all statements is then multiplied by 2.5 to produce a SUS value with a range of 0–100. (Karista Kafka & Badrul, 2024). After the score from each respondent has been known, the next step is to find the average score by adding up all the score results and dividing by the number of respondents (Adijaya et al., 2024).

The fourth stage is the interpretation of the results. The determination of the results is divided into SUS scores percentile rank and user acceptance rate (Ardhana, 2022). SUS percentile score measures how good or bad a product is by dividing the scores into percentiles, dividing the data into 100 equal parts (Brooke, 1996). SUS score percentile rank is in table 2 and the percentile assessment graph The rank against the SUS score is in Figure 1.

Table 2. SUS Score Percentile Rank (Sauro & Lewis, 2016)

| Letter Grade	Numerical Score Range
A+	84.1-100
A	80.8-84.0
A-	78.9-80.7
B+	77.2-78.8
B	74.1-77.1
B-	72.6 – 74.0
C+	71.1-72.5
C	65.0-71.0
C+	62.7-64.9
D	51.7 – 62.6
F	0-51.6
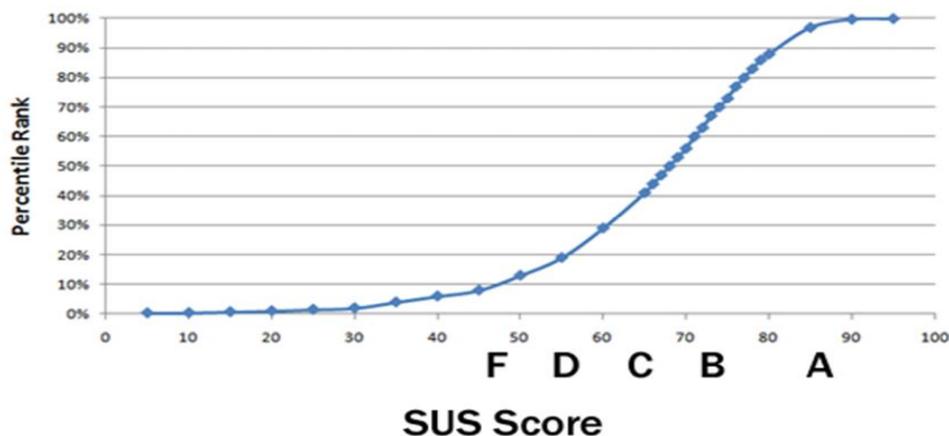
Figure 1. Percentile Assessment Graph Rank Against SUS Score (Sauro, 2010)

Table 3 shows the interpretation of user acceptance of the application, Figure 2 shows the SUS assessment scale into several other interpretations to make it easier for other professionals to understand.

Table 3. User Acceptance Level (Ardhana, 2022)

SUS Score	Information
0-50.9	Not Acceptable
51-70.9	Marginal
71-100	Acceptable
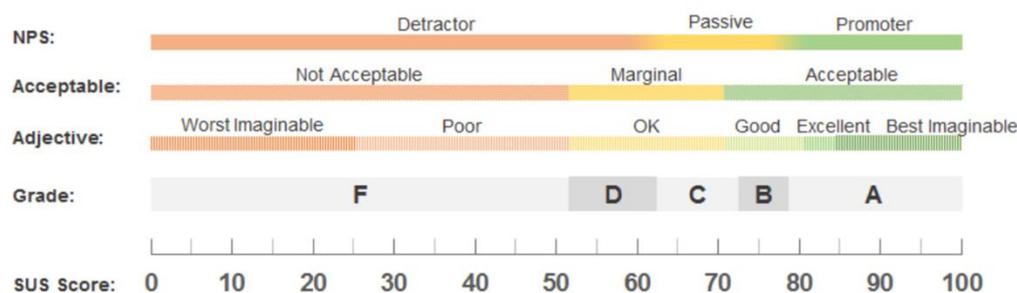
Figure 2. SUS Assessment Scale (Sauro, 2010)

The fifth stage is the recommendation for improvements suggested by respondents after operating the child behavioral disorder expert system, to be used as evaluation material by application developers.

4. Results

In this study, the author collected data through a questionnaire. A total of 22 respondents consisting of parents with children aged 0-10 years who had used the child behavioral disorder expert system participated. This study was conducted from September to October 2024. Details of the respondents can be seen in table 4.

Table 4. Distribution of Respondents Based on Gender

No	Respondents	Amount
1	All Respondents	22
2	Man	4
3	Woman	18

The results of the questionnaires filled out by respondents are processed to obtain a total score. Table 5 shows the results of the System Usability score calculation. Scale by respondents.

Table 5. SUS Score Calculation

Respondents	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Amount	Mark (Amount x 2.5)
Respondent 1	4	4	4	4	4	4	4	4	4	0	36	90
Respondent 2	4	4	4	4	4	4	4	4	4	0	36	90
Respondent 3	4	3	4	4	3	3	3	4	4	3	35	87.5
Respondent 4	4	4	4	3	4	3	4	3	4	3	36	90
Respondent 5	3	3	3	3	4	4	4	4	4	4	36	90
Respondent 6	3	3	3	3	4	4	4	4	4	4	36	90
Respondent 7	3	3	3	3	4	4	4	4	4	4	36	90
Respondent 8	3	3	4	4	4	3	3	3	4	3	34	85
Respondent 9	4	3	4	1	3	4	4	3	3	0	29	72.5
Respondent 10	4	3	4	4	3	3	3	4	4	3	35	87.5
Respondent 11	4	3	4	4	3	3	3	4	4	3	35	87.5
Respondent 12	3	3	4	4	4	3	3	3	4	3	34	85
Respondent 13	3	3	3	3	3	3	3	3	3	3	30	75
Respondent 14	3	3	3	3	3	3	3	3	3	3	30	75
Respondent 15	3	3	3	3	3	3	3	3	3	3	30	75
Respondent 16	4	3	4	4	4	4	4	3	4	1	35	87.5
Respondent 17	3	4	3	1	4	4	3	3	3	0	28	70
Respondent 18	3	3	3	3	3	3	4	3	3	2	30	75
Respondent 19	4	4	4	3	4	3	3	3	4	3	35	87.5
Respondent 20	3	3	3	3	3	3	4	4	3	2	31	77.5
Respondent 21	3	2	3	3	3	3	3	3	3	1	27	67.5
Respondent 22	4	4	4	3	4	3	3	3	4	3	35	87.5
Average Score (Final Result)												82.84

The list of recommendations from users is as shown in table 6.

Table 6. List of Recommendations for Improvement

No	Recommendation
1	The system is divided into categories: infants, toddlers, preschoolers, and elementary school age (grades 1-6) to make the behavior of each age group more specific
2	Additional features should be added
3	Symptoms should be further specified according to the age range

4	Add information about how long consultation results will take
5	Enhance information related to child development
6	Need added menu must how many times meeting in every therapy on every child in 1 week .

5. Discussion

Percentage of Respondents' Gender

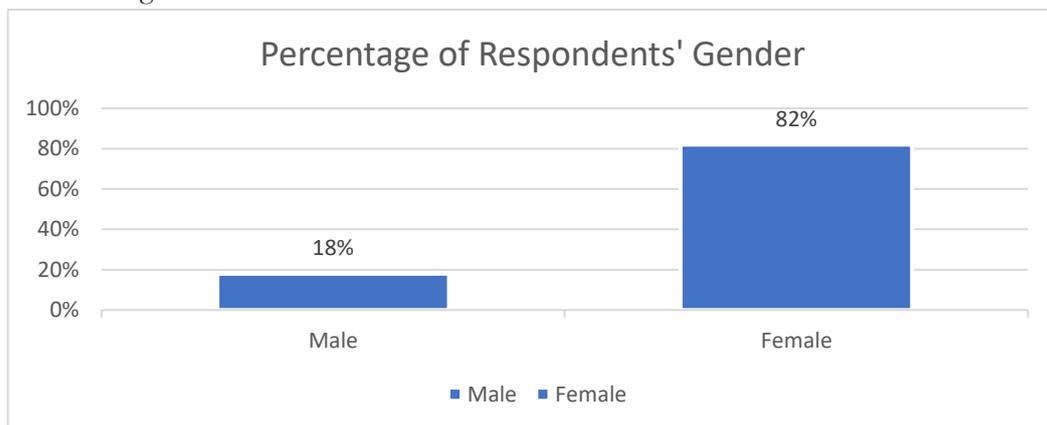The data collected was 22 respondents with the percentage of respondents' gender as shown in Figure 3:

Figure 3. Percentage of Respondents' Gender

SUS Value

From Table 5, it can be seen that the total column is obtained from columns Q1 - Q10, while in the value column it is obtained from the total multiplied by 2.5; so that the final result is obtained from the average of all values, namely 82.84. From the results of the SUS score of 82.84, it will be interpreted into 5 assessment scales to make it easier to read the results presented in Figure 4.
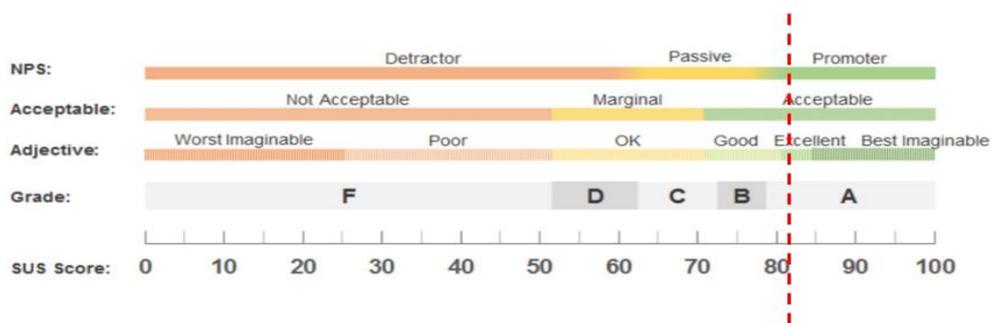

Figure 4. SUS Assessment Scale of Child Behavior Disorder Expert System
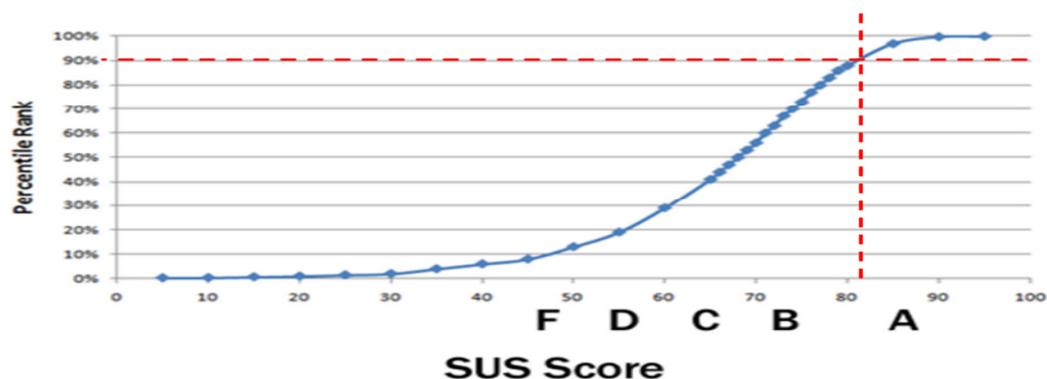
Percentiles Assessment

Figure 5. Percentile Chart SUS Assessment Rank of Child Behavior Disorder Expert System

The calculation results in table 5 are translated into a percentile graph rank in figure 5. From figure 5, the percentile level of the expert system application for child behavioral disorders is 90%, which means very good.

Grades Assessment

The calculation results in table 5 are interpreted into Grading Scale as in table 6.

Table 6. Grading Child Behavior Disorder Expert System Scale

Letter Grade	Numerical Score Range
A+	84.1-100
A	*80.8-84.0*
A-	78.9-80.7
B+	77.2-78.8
B	74.1-77.1
B-	72.6-74.0
C+	71.1-72.5
C	65.0-71.0
C-	62.7-64.9
D	51.7-62.6
F	0.51.6

Based on the grading scale level, the expert system application for child behavior disorders is categorized as grade A.

Adjective assessment

The results of the calculations in Table 5 are interpreted into the adjective rating assessment, placing the expert system for child behavior disorders in the very good category (A). This means that the system is very easy to use and requires little or no improvement.

Acceptability Assessment

The results of the calculations in Table 5 show that the acceptability level of the expert system for child behavior disorders is categorized as acceptable, easily accepted by users in general

6. Conclusions

Based on the results that have been explained and discussed in the previous section, the results can be used to draw conclusions about the assessment of parents on the child behavioral disorder expert system as easy to use. This is based on the total average SUS value of 82.84 which is included in the Grade A category with a high level of acceptance and is good so that users do not find it difficult to operate the child behavioral disorder expert system. In addition, the child behavioral disorder expert system can also maintain its search performance but it is necessary to improve some of its services according to suggestions from respondents.

7. Limitation

This study has several limitations that need to be considered. First, although the system managed to maintain its search performance, some of the services offered still need improvement based on feedback from respondents. These limitations include the potential lack of additional features that may be relevant to user needs and the lack of personalization in tailoring services to different situations. In addition, this study has not explored users outside the elderly group, so the generalization of the findings to other user groups is still limited. Therefore, further development is needed to address these limitations and improve the overall user experience. This research was also carried out with funding from Internal Applied Research of Universitas Duta Bangsa Surakarta Funding Year 2024.

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