

The development of an android-based SDQ application as an instrument to detect students' psychological and behavioral problems

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Abstract: This study aims to determine the description of needs, produce a prototype, examine the validity, reliability, and practicality of an Android-based SDQ application as an instrument to detect students' psychological and behavioral problems. This is an R&D study utilizing the Borg and Gall development model. Data was collected through observations, interviews, and questionnaires. Qualitative data was analyzed using content analysis, while quantitative data was analyzed using descriptive analysis. The results of the study showed that: 1) the development of an Android-based SDQ application to detect students' psychological and behavioral problems is strongly needed by both school counselors and students; 2) the Android-based SDQ application prototype features menu items, school counselor profile, student profile, information on the objectives and advantages of SDQ, filling out SDQ, SDQ results, an application guidebook, SDQ statistical results, and an application management administrator; and 3) the Android-based SDQ application developed has been found to have high levels of validity, reliability, and practicality. Therefore, the Android-based SDQ application is considered a valid and reliable tool to detect students' psychological and behavioral problems.

Keywords: R&D; application; android; SDQ; problem detection.

Abstrak: Penelitian ini bertujuan untuk mengetahui gambaran kebutuhan, menghasilkan prototipe, mengetahui validitas dan reliabilitas dan kepraktisan pengembangan Aplikasi SDQ berbasis android sebagai instrumen deteksi masalah psikologi dan tingkah laku siswa. Jenis penelitian adalah R&D dengan menggunakan model pengembangan Borg and Gall. Instrumen penelitian yang digunakan, yaitu observasi, wawancara dan angket. Teknik analisis data yang digunakan yaitu analisis data kualitatif dilakukan melalui metode analisis isi dan analisis data kuantitatif dilakukan menggunakan metode analisis deskriptif. Hasil penelitian ini menunjukkan bahwa: 1) Gambaran kebutuhan terhadap Aplikasi SDQ berbasis android sebagai instrumen deteksi masalah psikologi dan tingkah laku siswa sangat dibutuhkan dan perlu mengembangkan Aplikasi SDQ berbasis android, baik bagi guru bimbingan dan konseling maupun siswa. 2) Prototipe Aplikasi SDQ berbasis android memiliki item menu dalam aplikasi; profil guru bimbingan dan konseling, profil siswa, tujuan dan manfaat SDQ, pengisian instrumen SDQ, hasil SDQ, buku panduan aplikasi, statistik hasil SDQ dan admin untuk mengelola aplikasi. 3) Aplikasi SDQ berbasis android yang telah dikembangkan menunjukkan tingkat validitas dan reliabilitas serta tingkat kepraktisan yang tinggi. Dengan demikian, Aplikasi SDQ berbasis android dapat dianggap sah dan dapat diandalkan sebagai alat untuk mendeteksi masalah psikologi dan tingkah laku siswa.

Kata kunci: R&D; aplikasi; android; SDQ; deteksi masalah.

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INTRODUCTION

Psychological and behavioral problems among students often occur due to psychological changes during adolescent development, encompassing physical, emotional, moral, and social development (Whittenburg et al., 2022). Consequently, the adjustment process can often be extremely challenging for adolescents (Mudak & S. Manafe, 2023).

Studies have shown that the most common psychological disorder among Indonesian adolescents is anxiety, including social phobia and generalized anxiety disorder (GAD), with a prevalence rate of 3.7%. This is followed by major depressive disorder (MDD) and behavioral disorders with prevalence rates of 1% and 0.9% respectively. In addition, Post-Traumatic Stress Disorder (PTSD) and Attention-Deficit/Hyperactivity Disorder is also prevalent with a rate of 0.5% (Wilopo, 2023).

Andriyani (2019) These psychological and behavioral problems can stem from various factors, including parenting style, family issues, lack of affection, chronic illness or injury, and feelings of loss or separation. Mental health disorders can inhibit students' ability to concentrate, alleviate a somber mood, and regulate emotions, potentially leading to undesirable behaviors (Mudak & S. Manafe, 2023).

Studies have also indicated that psychological and behavioral problems among students are closely link to various risk factors, such as lack of independence (36%), irritability (31%), lack of affection (32%), worry (29%), low appetite (18%), and tiredness (16%) (Jain et al., 2020). In general, mental health disorders can affect individuals across the lifespan, from children to adults.

Strength and Difficulties Questionnaire (SDQ) is a brief questionnaire to assess the psychological well-being of children and adolescents. It is comprised of 15 negative and 10 positive items that address five different dimensions (Kankaanpää et al., 2023). It is a brief screening questionnaire concerning children's behaviors (Banzon & Elklit, 2023).

SDQ is an instrument to detect psychological and behavioral problems of junior high school students (Aryani & Latif, 2022). SDQ covers five dimensions: emotional symptoms,

conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behavior (Goodman, 1997).

SDQ is commonly used by school counselors to assess their students and detect problems they have. According to Wibowo (2021), in educational context, an assessment is crucial to identify unique characteristics and personalities of each student. According to Wahidah, Cuntini, & Fatimah (2019), an assessment is a helpful tool for school counselors to investigate the dynamics and factors that contribute to problems.

The results of interviews with the school counselors in the preliminary research showed 1) the absence of an IT-based instrument, 2) the school counselors' difficulties in describing students' problems, 3) challenges to handle students exhibiting unusual behaviors, such as hitting friends, failing to concentrate, speaking out of context, and resisting when controlled, 4) manual implementation of guidance and counseling assessment, and 5) poor utilization of technology for guidance and counseling services.

Manually distributing instruments to tens or hundreds of students will require a significant investment of time, energy, and funds. According to Imawanty & Fransiska (2019), conducting a manual assessment using the SDQ takes a greater amount of time, from inputting data to interpreting it.

To overcome the complexity of assessments using SDQ to detect problems, the development of an online application for more convenient, efficient, affordable, and rapid assessments is deemed necessary. An application is a computer software created to provide convenience for humans in completing tasks (Rohmah et al., 2023). Technology-based applications are a breakthrough that can assist teachers in assessing their students (Hamdani et al., 2023).

An Android-based SDQ application provides convenience for school counselors to detect students' psychological and behavioral problems. Its advantages include the elimination of manual distribution of assessment papers by school counselors, automated calculation of question item points, automated identification and interpretation of students' problems, as well as guidance for designing counseling programs to address students' needs.

The SDQ application was developed in an Excel document on Microsoft Office. Similarly, the SDQ application has also been

developed by Rizkiah et al., (2020) in a study aimed at creating an early detection system for emotional health among participants aged 4 to 17 by adopting a forward chaining method.

The application developed in this study offers three classifications of emotional health: normal, borderline, and abnormal without any accompanying interpretation of these classifications. The novelty of the Android-based SDQ application lies in the addition of interpretations and recommendations of the test results, along with a guidebook for school counselors to process the test results.

Based on the explanations above, the researchers developed an application aimed at assisting school counselors in early detection of students' psychological and behavioral problems. With the use of a digital SDQ questionnaire, data collection and analysis can be performed efficiently, allowing prompt problem identification.

METHOD

1. Research Design

This study adopted a Research and Development (R&D) model. The development process using the Borg and Gall model was refined by modifying the development steps (Sugiyono, 2021)) as follows: a) conducting needs analysis and information gathering, b) planning product development, c) conducting initial development, d) conducting expert validation, e) conducting Revision I, f) conducting small group testing, and g) conducting Revision II.

2. Location and Subjects of the Study

The study was conducted at MTs Pesantren GUPPI Samata located at HM. Yasin Limpo Street No. 42, Romang Polong Village, Somba Opu Sub-District, Gowa Regency, South Sulawesi, and SMPN 3 Bontonompo. The subjects of the study were two school counselors and 60 students.

3. Data Collection

Data collection was performed through observations, interviews, and questionnaires.

4. Data Analysis

a. Qualitative data analysis

Qualitative data was analyzed using content analysis. The needs assessment was conducted by grouping qualitative data obtained from the interviews with the school counselors and students.

b. Quantitative data analysis

1) Expert Validation

Validation was performed by content expert and media expert using a 4 Likert scale analysis in the form of a checklist. The formula used to calculate the percentages was:

$$P = \frac{\sum x}{SMI} \times 100\%$$

Description:

P : Percentage

$\sum x$: Total Score

SMI : Ideal Maximum Score

(Source: Tegeh, 2014)

The process of making decisions and assigning meaning involved utilizing the guidelines for converting achievement levels into scales. The guidelines used a 5-point scale as shown in the table below.

Table 1. Conversion of Achievement Levels Using a 5-Point Scale

Achievement Level	Qualification
85%-100%	Very Good
70%-84%	Good
55%-69%	Fairly Good
40%-54%	Slightly poor
0%-39%	Very Poor

Source: Sugiyono (2021)

2) Field Validation

Field validation aimed at examining the validity or the appropriateness of the SDQ application in measuring and obtaining data from the respondents. The effectiveness of a research instrument is indicated by its validity and reliability (Tugiman et al., 2022).

The basis for making decisions on the

validity test was deduced from r-calculation with r-table. If the r-count value is below the r-table, the instrument is valid. However, if the r-count value is above the r-table, the instrument is invalid. With a sample size of 20 and a significance level of 5%, the r-value from the statistical r-table is 0.227. Regarding the significance value (Sig.), the instrument is

considered valid if the significance value is below 0.05 and invalid if the significance value is above 0.05.

3) Reliability Test

The SDQ application would be considered reliable if the SDQ application generated a consistent or reasonably comparable score from a participant. According to Ghazali (Sugiyono, 2021), a construct or a variable is considered reliable if the *Cronbach's Alpha value* is above 0.60. According to Sahir (2022), using the SPSS 24.00 application for Windows for reliability test, the reliability coefficient (r) value can be interpreted using the following categories.

$0.80 < r \leq 1.00$: Very Strong

$0.60 < r \leq 0.799$: Strong

$0.40 < r \leq 0.599$: Moderate

$0.20 < r \leq 0.399$: Low

$r \leq 0.20$: Very Low

RESULTS AND DISCUSSION

1. Description of the Needs for an Android-based SDQ Application

The results of the needs assessment are used to identify the needs for a development (Mudhar & Hasiana, 2022). An instrument to detect students' psychological and behavioral problems was unavailable at MTs Pesantren GUPPI Samata. As a result, the identification of students' problems posed challenges. Furthermore, the school counselors faced difficulties in managing problematic students with behaviors such as hitting other students, difficulty concentrating, speaking irrelevantly, resisting, and being uncontrollable. According to Napisa & Syamsidar (2022), emotional and behavioral problems are common among students. Guidance and counseling services were inadequately provided due to the absence of technology.

The results of the needs assessment demonstrated that the school counselors needed an instrument to detect students' psychological and behavioral problems. This enables them to

address students' problems and to design guidance and counseling programs.

2. Prototype of the Development of an Android-based SDQ Application

The prototype of the SDQ application is as follows: A login page is for users to control the identification process using username and password provided by the administrator.

In the main menu, several icons are available, consisting of: 1) a school counselor profile menu featuring the personal information of the school counselor, 2) a student profile menu providing details on students, including their parents or guardians, 3) a menu providing information regarding the benefits and objectives of completing the SDQ, 4) a menu for completing the SDQ, 5) a results room menu for viewing SDQ test results, and 6) an application guidebook designed as a reference to comprehensively understand each feature within the application.

Besides, there is an additional menu called a statistical menu, showing students' SDQ scores, encompassing five dimensions: 1) emotional problems, 2) behavioral problems, 3) hyperactivity problems, 4) peer relationship problems, and 5) prosocial behavior problems.

3. Levels of Validity, Reliability, and Practicality of the Android-based SDQ Application

a. Expert Validation

At this stage, the experts evaluated the application and offered valuable feedback, indicating that it met the required standard and had good quality before being introduced to end-users.

1) Results of Validity Test by the Material Expert

The validity test aimed at examining the suitability of the product being developed for student growth, field conditions, and current requirements. It also determined the validity of the content and the material utilized in the SDQ application. As a result, an in-depth evaluation of the effectiveness of the SDQ application could be conducted before it was introduced to end-users.

Table 2. Results of Validity Test by the Material Expert

No	Aspect	Item	Score	%	Qualification
1.	Relevance	Relevance to current conditions	4	100	Very Good
		Relevance to the curriculum	4	100	Very Good
2.	Presentation	Availability of the application guidebook	4	100	Very Good
		Content Accuracy	4	100	Very Good

3.	Content/ Material	User-friendliness	3	75	Good
		Clarity and appropriateness of the language used	4	100	Very Good
		The use of communicative language	3	75	Good
		The use of appropriate pictures	3	75	Good
		Clarity of the counselor profile	3	75	Good
		Clarity of the student profile	3	75	Good
		Clarity of the SDQ’s objectives and benefits	4	100	Very Good
		Clarity of the SDQ completion instructions	4	100	Very Good
		Clarity of the SDQ questions	4	100	Very Good
		Clarity of the SDQ’s results and interpretations	4	100	Very Good
		Clarity of the guidebook's content	4	100	Very Good
		Clarity of each navigation button	4	100	Very Good
Total Score		59			
Percentage		92.18 %			
Qualification		Very Good			

Based on the results of the material expert validation with a score of 92.18%, it can be determined that the material of the SDQ application is highly valid. This indicates that the SDQ application is worthy of further testing.

2) Results of Validity Test by the Media Expert

The media expert conducted the validity test on the aspects of graphics, presentation, and content. This test aimed to evaluate the quality of the application and the suitability of the application with student development, field conditions, and current requirements.

Table 3 . Results of Validity Test by the Media Expert

No	Aspect	Item	Score	%	Qualification
1.	Graphics	Interface	4	100	Very Good
		Quality of the SDQ App	4	100	Very Good
		Attractiveness of the SDQ App	4	100	Very Good
		Color Selection of the SDQ App	4	100	Very Good
2.	Presentation	Content accuracy	4	100	Very Good
		Content completeness	3	75	Good
		Content attractiveness	4	100	Very Good
		Navigation button visibility	3	75	Good
		User-friendliness	4	100	Very Good
3.	Content	Clear instructions for use	3	75	Good
		Content/material structure	3	75	Good
		Application attractiveness	4	100	Very Good
		Picture selection	4	100	Very Good
		Application appropriateness with student characteristics	3	75	Good
		Application appropriateness with the SDQ's objectives	4	100	Very Good
		Total Score		55	
Percentage		91.66 %			
Qualification		Very Good			

Based on the results of the media expert validation with a score of 91.66%, it can be inferred that the application is very good or

highly valid with minimal revision. It means that from the aspect of UI, the SDQ application is feasible to tested on students.

b. Design Revision

This revision was performed based on valuable feedback from the experts. As the SDQ application was declared very good by both the media and material experts, this study continued to the next stage.

c. Small Group Testing

Small group testing was conducted

through field validation, reliability test, and practicality test, at MTs Pesantren GUPPI Samata and SMPN 3 Bontonompo

1) Field Validation

Field validation was applied to ensure that the SDQ application functions as intended. It adopted the Product Moment Pearson correlation method and involved 20 students.

Table 4. Results of Field Validation

No	Question	Correlation	Desc.
1	Question 1	Pearson Correlation .692	Valid
2	Question 2	Pearson Correlation .729	Valid
3	Question 3	Pearson Correlation .754	Valid
4	Question 4	Pearson Correlation .552	Valid
5	Question 5	Pearson Correlation .704	Valid
6	Question 6	Pearson Correlation .671	Valid
	Question 7	Sig. (2-tailed) .015	
8	Question 8	Pearson Correlation .572	Valid
9	Question 9	Pearson Correlation .744	Valid
10	Question 10	Pearson Correlation .626	Valid
11	Question 11	Pearson Correlation .664	Valid
12	Question 12	Pearson Correlation .658	Valid
13	Question 13	Pearson Correlation .531	Valid
14	Question 14	Pearson Correlation .904	Valid
15	Question 15	Pearson Correlation .563	Valid
16	Question 16	Pearson Correlation .788	Valid
17	Question 17	Pearson Correlation .669	Valid
18	Question 18	Pearson Correlation .635	Valid
19	Question 19	Pearson Correlation .608	Valid
20	Question 20	Pearson Correlation .825	Valid
21	Question 21	Pearson Correlation .678	Valid
22	Question 22	Pearson Correlation .702	Valid
23	Question 23	Pearson Correlation .687	Valid
24	Question 24	Pearson Correlation .628	Valid
25	Question 25	Pearson Correlation .693	Valid

Table 3 above shows that a total of 25 SDQ question items were declared valid because the r-count value for each question item was higher than the r-table value, which is 0.227 and its significance value (Sig.) was above 0.05.

2) Reliability Test

The reliability of the Android-based SDQ application was tested at two schools: MTs Pesantren GUPPI Samata and SMPN 3 Bontonompo.

Based on the SPSS output, the Cronbach's Alpha value was 0.883. Because the Cronbach's Alpha value exceeded 0.60, it can be inferred that this application demonstrates good or very strong reliability. The reliability test at SMPN 3 Bontonompo yielded similar results.

The Cronbach's Alpha value was 0.881 for a total of 10 question items, exceeding 0.60. This suggests that the application demonstrates good or very strong reliability.

Based on these results, it is evident that the Android-based SDQ application is reliable for use in schools.

3) Practicality Test

The practicality of the application was assessed by two school counselors through the use of an acceptability questionnaire. The results of this assessment are presented in the table below.

Table. 5. Results of the Acceptability Assessment

No	Assessment	School Counselor 1	School Counselor 2	Total	Percentage	Qualification
1	Utility Testing	15	14	29	90.62%	Very Practical
2	Feasibility Testing	34	33	67	93.5%	Very Practical
3	Accuracy Testing	15	14	29	90.62%	Very Practical
Results				125	91.91%	Very Practical

The table above shows that with an acceptability rate of 91.91%, the application is considered very practical. Thus, these results indicate that the SDQ application is useful, feasible, and accurate.

In addition to the assessment by the school counselors, reviews were also collected from students as the SDQ application users. The average score was 93.12%, indicating that the SDQ application demonstrates high feasibility and acceptability for students.

d. Revision II

This revision was performed on the Android-based SDQ application based on the evaluation results obtained from the field validation and reliability test. The results indicate that the Android-based SDQ application is a valid, reliable, and practical instrument to detect students' psychological and behavioral problems. The development phase was successful in producing the final product.

CONCLUSION AND SUGGESTIONS

Some conclusions that can be drawn based on the results of the study include:

1. There is a strong need for the development of an Android-based SDQ application for the purpose of identifying students' psychological and behavioral problems, both by the school counselors and students themselves, at MTs Pesantren GUPPI Samata.
2. The prototype of the Android-based SDQ application features menu items, school counselor profile, student profile, information on the objectives and advantages of SDQ, filling out SDQ, SDQ results, an application guidebook, SDQ statistical results, and an administrator for managing the application.
3. The Android-based SDQ application developed in this study demonstrates high levels of validity, reliability, and practicality. Therefore, the Android-based SDQ application can be considered a valid and reliable tool to detect psychological and behavioral problems in students.

Based on the aforementioned conclusions, some suggestions are presented.

1. In the future, it will be important to test the SDQ application on a larger group to derive comprehensive insights on its validity and reliability.
2. The Android-based SDQ application can be a valuable instrument for identifying psychological and behavioral problems in students. It is suitable for use not only within the GUPPI Samata MTs scope, but also in junior high schools or other similar environments.
3. Further studies need to advance this research to the next phase by employing the Borg and Gall model.

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