



Designing UI/UX App for Parents of ASD Children through Social Approach

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ABSTRACT

Compared to children's parents with typical conditions, parents of children with autism spectrum disorder (ASD) experience higher levels of stress. As a result, parents may become more at risk of social stigma and become apart from those who seem can't understand their situation. Parents' stress levels can be reduced by experiencing a positive response like happiness and comfortable. One of the factors that makes parents of children happy and comfort with ASD is social support. In this study, researchers developed a smartphone application that can provide social support—such as groups, information, and emotional support—to parents who have children with ASD. The design thinking approach was implemented in this study, which involved collecting data via surveys, interviews, and observations to designing the UI/UX application during the ideation phase. According to the study's findings, parents nowadays need a parenting app that can make it easier for them to find social support.

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1. Introduction

Every child will experience growth and development according to their stages. Normal and healthy child growth and development is the desire of all parents. However, there are circumstances where children are born with special needs [1], namely children who are considered to have abnormalities/deviations from the average condition of normal children in general, in terms of physical, mental and social behavioral characteristics [2]. Autism Spectrum Disorder (ASD) is one of the conditions with special needs characterized by impaired social and communication skills, along with repetitive and restrictive behavior [3]. According to an article published by the website of the Ministry of Women's Empowerment and Child Protection in 2018, it was stated that it is estimated that there are 2.4 million ASD sufferers in Indonesia with an increase of 500 new sufferers/year. With the condition of the child, the activities of caring for ASD children will be different and more complex than caring for children with normal conditions. The involvement of parents through guidance and encouragement is needed to make ASD children able to live independently and be able to socialize with the general public [4]. Many parents of ASD children experience difficult times and challenges in their lives [5]. Various life problems such as sadness, difficulty in managing children's behavior, fatigue, trauma from negative stigma in society, and lack of support from the family make parents feel stressed [6]. Parents or caregivers of children with developmental disabilities (such as Down syndrome or cerebral palsy), and autism spectrum disorder (ASD), often experience depression,

anxiety, and emotional distress [7]. High levels of stress can have a negative impact on parenting patterns carried out by parents [8].

On the other hand, high levels of happiness can reduce the level of stress felt by parents. The impact has positive effects, such as being able to regulate emotions and deal with problems well [9]. The results of a study conducted by Findler showed that higher levels of social support contributed to higher levels of happiness among mothers of children with special needs [8]. Social support in this case refers to comfort, attention, appreciation or availability of assistance to someone from another person or a group [10]. By meeting/joining parents who have the same condition, giving each other attention and care, sharing experiences about their parenting journey, and telling stories about the same interests, emotional support will be formed [11]. In the digital era like today, socializing and getting information is not difficult. From the results of a survey conducted by APJII (Association of Indonesian Internet Service Providers)[12] for the period 2019-2020 (Q2), it was stated that internet users in Indonesia reached 196.71 million people out of a total population of 266.91 million Indonesians (73.7%). It can be said that the existence of the internet and its users who are very numerous and spread throughout the regions can help in carrying out social interactions and getting information without limitations of space and time. One of the roles and advances in telecommunications and information technology in strengthening social support for parents with ASD children is the presence of social media platforms and parenting applications which are currently part of childcare practices [13].

Based on the initial survey that has been conducted, currently many parents use social media as a medium for socializing and utilize search engines to find information in the form of articles to help find social support. However, with the limited services on each of these applications, users have to move from one application to another to be able to meet their needs, making it less efficient in terms of time. In addition, the fear of negative stigma in society makes parents of ASD children less free to share on general social media platforms. In this case, a mobile application design is needed that can facilitate user needs in getting happiness from social support. The purpose of this study is to identify factors that can provide happiness for parents of ASD children and UI/UX designers of mobile applications that can provide solutions for parents with ASD children in getting social support and happiness.

2. Research Method

1. Social Support Needs Questionnaire Data for Parents of Children with ASD

In this study, the questionnaire was conducted as part of the empathize stage to determine the attitudes and responses of respondents regarding the need for social support for parents who have children with ASD. The questionnaire was conducted to determine respondents' preferences for mobile applications in dealing with these problems. The distribution of the questionnaire was carried out online using the Google Form application with a specific aim in the community of parents of children with ASD. The questions asked in the questionnaire include:

1. As a parent who is currently caring for a child with ASD, do you need social support for yourself?
2. What form of social support do you need the most right now?
3. What media is most convenient for you to use to obtain social support?
4. Are you a smartphone user?
5. What type of operating system is used on your smartphone?
6. Is there a special application installed on your smartphone that helps you obtain social support? If your answer is "Yes", state the name of the application
7. If there is an application that can help you obtain social support, what features do you hope will appear in the application?

The questionnaire data that was created involved 41 respondents, with their respective backgrounds, namely 7.3% were under 25 years old, 31.7% were 25-30 years old, 31.7% were 30-35 years old, while 12.2% were 35-40 years old, and the remaining 17.1% were over 40 years old.

Table 1. Respondents Data

No.	Type	Amount
1	Total Respondents	41
2	Male Respondents	7 people (17,1%)
3	Female Respondents	34 people (82,9%)
4	Last education	High School/Vocational School 18 people (43,9%)

5	Employment Status	Diploma 3 people (7,3%)
		S1 15 people (36,6%)
		S2 5 people (12,2%)
		Employed by 29 people (70,7%)
		Not Working 12 people (29,3%)

The results of the questionnaire are then described one by one as follows:

1. Data on respondents' need for social support

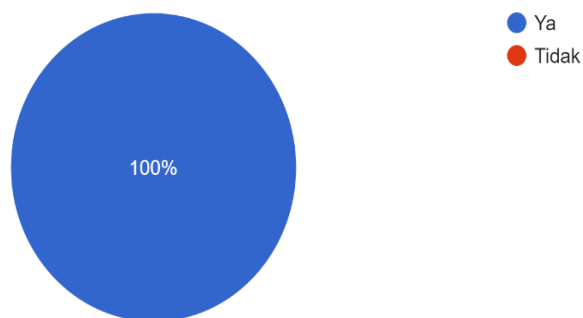


Figure 1. Diagram of social support needs for parents of children with ASD

The following questions relate to the need for social support for parents who are caring for children with ASD, the results are:

- As many as 100% or 41 people stated that they needed social support for themselves, so it can be concluded that all respondents really need social support in caring for their children with ASD.

2. Data on the form of social support needs required by respondents

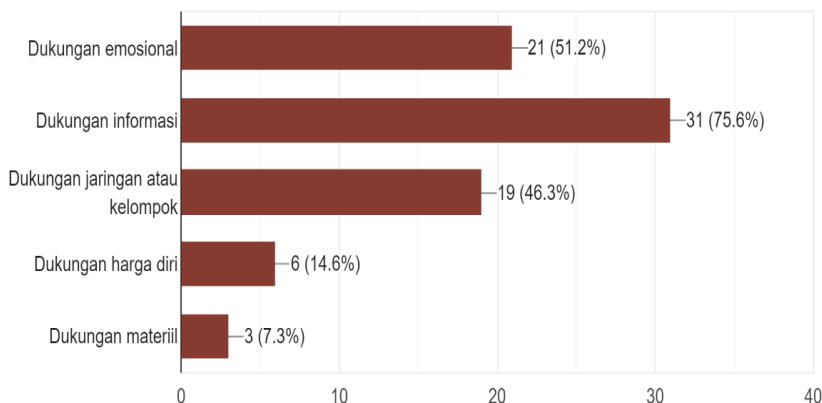


Figure 2. Graph of the forms of social support most needed by parents of children with ASD today

The next question is the form of social support that is currently most needed by parents by choosing two options, the results are:

- 51.2% or 21 people chose emotional support.
- 75.6% or 31 people chose information support.
- 46.3% or 19 people chose network or group support.
- 14.6% or 6 people chose self-esteem support.
- 7.3% or 3 people chose material support.

From these results, it can be concluded that information support is the most popular choice while material support is the least popular choice for respondents.

3. Data on the most convenient media to use to obtain social support.

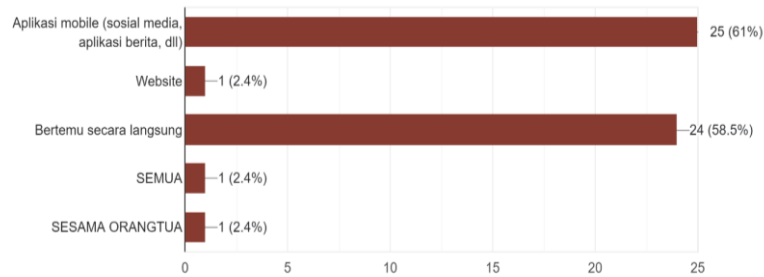


Figure 3. The most convenient media graphics to use to gain social support for parents who have children with ASD

The next question was about the most comfortable media to use in obtaining social support, the results were:

- 61% or 25 people chose mobile applications (social media, news applications, etc.).
- 2.4% or 1 person chose the website.
- 58.5% or 24 people chose to meet in person.
- 2.4% or 1 person chose fellow parents.
- 2.4% or 1 person chose all options, namely mobile applications (social media, news applications, etc.), websites, meeting in person, and fellow parents.

4. Data regarding smartphone use

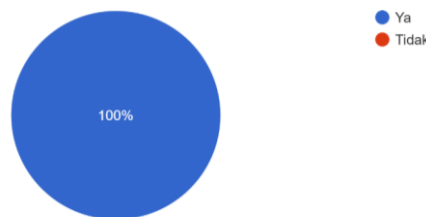


Figure 4. Graph of the number of smartphone users from respondents' choices

The next question is related to how many respondents are smartphone users, the results are 100% or 41 people are smartphone users, so it can be concluded that all respondents are smartphone users.

5. Data regarding the operating system used on the respondent's smartphone

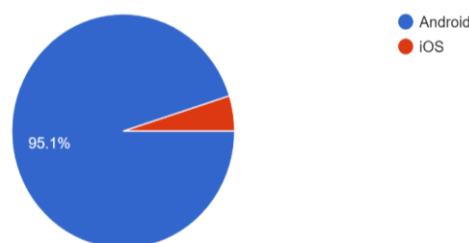


Figure 5. Graphics of operating systems used by respondents as smartphone users

The next question is the type of operating system used on the respondent's smartphone, the results:

- As many as 95.1% or 39 respondents use the Android operating system.
- Only 4.9% or 2 people were respondents who used the iOS operating system.
- It can be concluded that the Android operating system is the smartphone operating system most widely used by respondents.

6. Data on the availability of specific applications used by respondents to obtain social support.

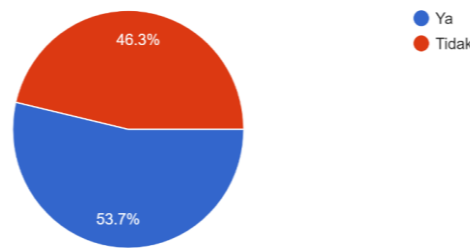


Figure 6. Graph showing whether or not there are special applications on respondents' smartphones that help in obtaining social support.

The next question is related to whether or not there is a special application on the respondent's smartphone that helps in obtaining social support, the results are:

- As many as 53.7% or 22 respondents have a special application to help in obtaining social support.
- While 46.3% or 19 respondents do not have a special application to help in obtaining social support.
- It can be concluded that although the difference is not very significant, there are more respondents who have a special application to help in obtaining social support.

The above is then supported by detailed data regarding the names of applications used by respondents who have special applications to help in obtaining social support as follows.

Table 2. Name of Specific Application Used by 27 Respondents to Help Obtain Social Support

No.	Application Name	Number of Respondents	Presentation
1	Instagram (IG)	10	45,5%
2	Riliv	1	4,5%
3	WhatsApp (WA)	10	45,5%
4	Making Authentic Friendship	1	4,5%
5	Halodoc	3	13,6%
6	Facebook (FB)	1	4,5%
7	Kaskus	1	4,5%

In relation to this question, the following are the expectations of all 41 respondents regarding the application features that are expected to help in obtaining social support, as follows:

Table 3. Respondents' Expectations Regarding the Features in the Application

No.	Feature	Number of Respondents	Presentation
1	Information about caring for children with ASD	12	29%
2	A forum/community specifically for parents of children with ASD	17	42%
3	Consultation or Q&A online with experts	10	24%
4	Information about caring for children with ASD	12	29%
5	Mental health therapy for caregivers and children	1	2,5%

6	with ASD Peer search for children with ASD	1	2,5%
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From the questionnaire data obtained, it can be concluded that in this study, most respondents were aged 25-35 years, with a high school to postgraduate education background and were busy working. In carrying out parenting for ASD children, these parents need social support. The types of social support that are most needed are emotional support, information, and networks or groups. Then, the media they use to find social support is through mobile applications and meeting in person. It is known that all respondents have smartphones with the majority using the Android operating system. Currently, respondents who have special applications that help them in obtaining social support are relatively more, with the majority using social media applications, such as Instagram, WhatsApp, Facebook, Kaskus, Making Authentic Friendship and some others using counseling applications, such as Riliv and Halodoc. In general, it can be said that most respondents are familiar with the use of mobile applications. Regarding the features expected to appear in special applications for parents of ASD children, most respondents answered the need for a forum/community, information about parenting ASD children, and counseling or Q&A with experts, a number of respondents also expect mental health therapy features and peer search for ASD children.

2. Interview Data

The qualitative method was conducted through interviews with target users, who were parents of ASD children who had tested the Parentime application and experts. The informants who were the target users in this study were obtained through sampling from 5 questionnaire respondents who had filled out the interview consent form when filling out the questionnaire. Expert interviews were conducted with a family psychologist in Bandung. Interviews with target users were conducted using the Zoom Meeting application, while interviews with experts were conducted face-to-face. The purpose of this interview was to find out more about the psychographics of target users, the forms of social support needed, pain points, and goals that target users want to achieve regarding research problems, to later be used as a basis for designing the application.

The conclusion of the interview results conducted with target users and experts can be summarized through the following affinity map chart:



Figure 7. Affinity map interview results

3. User Target (persona)

In designing a mobile application, the first thing to know is the user's needs and the main purpose of the design. To find out the user characteristics and preferences needed in the design, a persona is needed. A

persona is a representation of a real user that describes the user's goals, skills, and interests [14]. Based on the results of the analysis of data collection, the following personas were obtained:

Table 4. Persona Characteristics Table

	Persona 1	Persona 2
Target	Parents who have just received a diagnosis of ASD for their child.	Parents who have had a child with ASD for quite some time.
Aktivitas	Daily activities are busy taking care of children, delivering therapy, and visiting child development specialists.	Daily activities of taking care of children with a stable daily schedule, doing other work outside of taking care of the family (working, freelancing, being active in social activities)
Characteristics	<ul style="list-style-type: none"> - Sad - Worried - Confused - Feeling guilty 	<ul style="list-style-type: none"> - Can accept and get used to the child's condition - Likes to share experiences - Active in social activities related to autism - Share experiences with fellow parents of children with ASD. - Make real moves to help fellow parents of children with ASD.
Need	<ul style="list-style-type: none"> - Get information from valid sources. - Get friends with the same condition to share stories and experiences of raising children with ASD. - Consult with experts regarding child growth and development. 	<ul style="list-style-type: none"> - Need new ideas for home therapy games for children, diet recipes, and updated information about autism.

4. Summary of Data Collection

The media used by parents to find social support is mostly chosen as digital media like mobile applications, followed by the next most popular choice is meeting in person. This is related to the convenience of users (parents), from interviews it is known that since the pandemic, the convenience of interacting with other people is felt to be sufficient through digital media. Because with digital media everything can be done anytime and anywhere, without having to leave the activities being done [15]. In addition, digital media can also make it easier to get access to information [16]. Then, with the character of parents of ASD children who tend to be closed to other people who do not understand them, media is needed that can provide personal space to parents and ease of communication with other parents who have the same condition, so that the purpose of social support can be met properly. Based on these reasons, mobile applications can be an alternative media used to get social support for parents of ASD children.

From the interviews and questionnaires, it is known that the applications that are widely used by parents to obtain social support are social media (WhatsApp, Instagram, Facebook, Telegram, Kaskus) and online consultations (Halodoc and Riliv). Emotional support, information, and groups are obtained by joining an online community with fellow parents of children with ASD. However, due to the limited features of the existing applications, parents often move from one application to another when trying to find information. An interview with a user stated that if they had consulted an expert, then felt dissatisfied with the expert's answer, then they would ask in the forum (WhatsApp Group). There was another case when searching for information like articles on Instagram, parents felt dissatisfied with the information received, then sought validation by asking in the forum (WhatsApp Group), if they were still dissatisfied with the answer given, then they would ask an expert. Things like this will be more effective if the information search system can be integrated into one platform, so that it can be more effective and efficient in terms of time.

The need to get emotional support, information, and groups is obtained by parents through their participation in a community/forum [17]. By sharing stories, experiences, and complaints, emotional support will emerge. By sharing experiences of parenting, sharing information about matters related to parenting children with ASD, information support will emerge. Therefore, in designing this application, it will be designed based on a community with a wider member reach than in previous social media applications. From

the description above, it can be concluded that social support is needed by parents of ASD children, the use of digital media is needed to make it easier for parents to access information effectively and efficiently. Through a comparative study of similar products [18], it can be a reference for researchers in designing digital media that is in accordance with the goals of the user.

3. Result and Discussion

3.1. Empathize and Define

The data collection process carried out through literature review, questionnaires, and interviews that have been carried out are included in the empathize stage found in the design thinking method. Based on the empathize stage that has been carried out, the main focus of this study can be formulated as follows:

1. Various life problems such as sadness, helplessness to manage and regulate abnormal child behavior, fatigue, trauma from negative stigma from society, and lack of support from family make parents of ASD children feel stressed. This is what makes parents more sensitive to stigma from society and closed off from people who do not understand their condition.
2. Based on theoretical studies, parents need social support to foster happiness and minimize feelings of guilt. Social support creates space for acceptance and comfort, and provides a sense of belonging.
3. Virtual communities can be a solution for parents to find social support from: 1) Fellow parents of ASD children; 2) Experts, such as doctors and psychologists. As well as a source of information about parenting specifically for ASD children.
4. The form of social support most needed by parents of ASD children is in the form of emotional support, information, and groups.
5. The use of digital products widely used by parents in obtaining social support is social media (WhatsApp, Instagram, Facebook, Telegram, Kaskus) and online consultation (Halodoc and Riliv). It is also known that the presence of an online community, information exchange, and counseling with experts are the most recommended recommendations for parents of children with ASD in a digital product.
6. Virtual communities can be an alternative to offline communities. The presence of virtual communities can meet the need for social support for parents who have children with ASD from an emotional and informational perspective. By joining a virtual community, social support can be obtained without being constrained by distance and time, and can be accessed more easily using digital products.
7. Parents use more parenting applications and social media to find information about parenting because children are represented as something valuable and vulnerable to risk and danger, so parents feel fully responsible for continuously seeking the best information and care for their children. However, outside of parenting, parents also use these applications to connect with other parents and the world outside of parenting, such as a way to eliminate feelings of alienation, boredom, loneliness, and anxiety.
8. Limited features in existing applications make parents often move from one application to another when trying to find information. This kind of thing will be more effective if the information search system can be integrated into one platform, so that it can be more effective and efficient in terms of time.
9. The more information obtained, often makes parents feel confused about which information is right or wrong. Therefore, validation of the information provided is also the focus of parents in sorting all the information received, so that it does not have a negative impact on the application of the information. In addition, organizing information is also needed, so that parents can more easily find the information they need.
10. For parents of children with ASD who are already adults, the availability of new information and knowledge about parenting is still very much needed, but they need something more than just sharing information and experiences, namely taking real action in helping fellow parents of children with ASD. This is still rarely found in online communities today.

The empathize stage aims to explore the problem, and then map the problem [19]. The next stage based on the design thinking method is the define stage. The define stage functions to identify the main problems and define the needs that can be a solution to the problems that occur in the research specifically [20]. In accordance with the user persona that has been determined, the define stage can be described as follows.

- A. Problems faced by parents who have just received an ASD diagnosis for their child
 - Need information related to ASD and parenting of ASD children. The large amount of information circulating makes parents confused in finding the truth of the information obtained.
 - Fear of negative stigma from other people makes parents reluctant to share stories with people who do not understand their condition.

- Limited features in existing applications make parents often move from one application to another when trying to find information.

B. Problems faced by parents who have had a child with ASD for a long time

- From previous experiences, the absence of strict selection for community members makes the discussions in the community too diverse, and can even lead to misunderstandings when the person delivering the story/information is not a parent of a child diagnosed with ASD.
- In an online community, parents not only need information in the form of theory, but also want a real movement to help fellow parents of children with ASD, which is still rarely found in existing communities.

The most widely used digital product by parents of ASD children in finding social support is a mobile application. Mobile applications are selected based on user convenience in interacting. With mobile applications, users can easily access information, because it can be done anytime and anywhere. Then, with the character of parents of ASD children who tend to be closed to others who do not understand them, media is needed that can provide personal space to parents and ease of communication with other parents who have the same condition, so that the purpose of social support can be met properly.

3.2. Ideate Stage

Ideate is a stage in design thinking after the focus of the problem has been defined [21]. This stage contains the initial design concept of the mobile application. These concepts can be described as follows. The basic concept taken in designing this application is as a "friend". The philosophy of friendship is taken from the meaning of a friend who is able to fulfill social needs in the form of emotional support and information, and can create space for acceptance and comfort. This concept of "friend" is reflected in the UI/UX concept of the application with the aim of providing a sense of comfort and calm for users. The form of experience in the form of comfort offered to users is in the implementation of an easy and simple application flow so that users can easily find their goals in using the application. Then the choice of language used seems relaxed and familiar to users, such as the greeting when the user first enters the application with a greeting of hello, and the call of father and mother to the user. In addition, the selection of features is adjusted to the needs of users that can facilitate users in obtaining comfort from communicating, exchanging information, and consulting.

From the data analysis conducted in the previous chapter, the solution to the user's problem can be explained through the following description:

1. One of the factors that influences the happiness of parents of children with ASD is through social support. This social support is in the form of emotional support (sharing experience, reinforcement, empathy, and building hope), information support (medical and psychosocial treatment), and groups. This will be applied to the features in the application.
2. By designing a mobile application specifically for parents of children with ASD, the fulfillment of social support needs can be realized in one application platform, so that parents have the freedom to get social support online anytime and anywhere.
3. To fulfill the need for social support in one application, the main features are provided in the form of Community, Activities, Articles, and Ask the Expert.

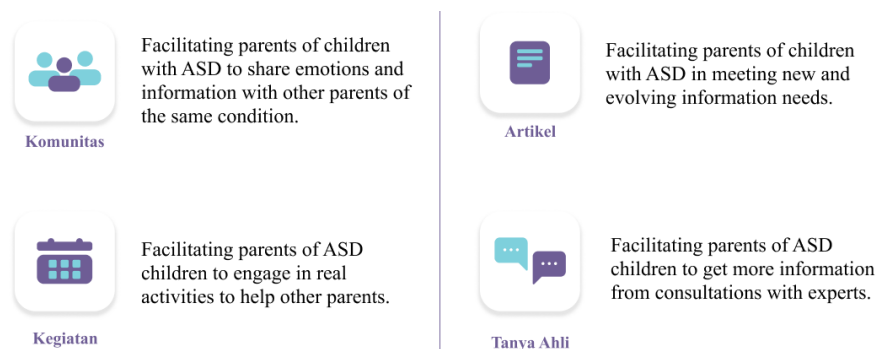


Figure 8. Main features of the application

4. To avoid negative content that can harm users, user account verification is implemented as well as clear regulations and admins in each community.

The target user's needs will be implemented into features, which can be described according to the persona as follows:

A. For Parents Who Have Just Received a Diagnosis for Their Child

Table 5. Feature Implementation and Requirements

Need	Feature Implementation
Get easy access to information on one platform	Articles about updated information about parenting and ASD, Q&A features with experts, ask fellow parents through the community feature.
Get valid information	Enforcing strict rules and regulations in each community, having admins as moderators in each community.
Meet parents who have the same condition	Social interactions in the community feature can be selected according to the category of interest.
Consult an expert	Open Q&A feature with experts, so that information can be shared with other accounts.

B. For Parents Who Have Had a Child with ASD for a Long Time

Table 6. Feature Implementation and Requirements

Need	Feature Implementation
Real movement from the community	The existence of activity features that facilitate the emergence of real movements, such as holding offline or online events and volunteers at an ASD event.
Gaining comfort in interacting with fellow ASD parents in the community.	The existence of verification by the admin before being able to enter the community is supported by the regulations enforced by each admin in the community.
Share experiences with other accounts that have the same interests.	Community category selection feature based on each parent's interests.

C. Supporting Features

1. The reinforcement aspect is realized through the “My Emotions” feature to find out the emotions felt today, which will then be integrated with community recommendations and articles according to the emotions being experienced, as well as the emergence of motivational word notifications according to the emotions felt.
2. The voice note feature (with recording) in the community chat room, is used as an alternative to sending messages when parents do not have much time to type messages.
3. The privacy selection feature in the article comment column and ask the expert, is used as user privacy control over the comments posted.

3.3. User Journey Maps

To find out the series of events when users use the Parentime application, a user journey map is used [22]. The user journey is divided into four main features. The following is an explanation of the user journey in each feature.

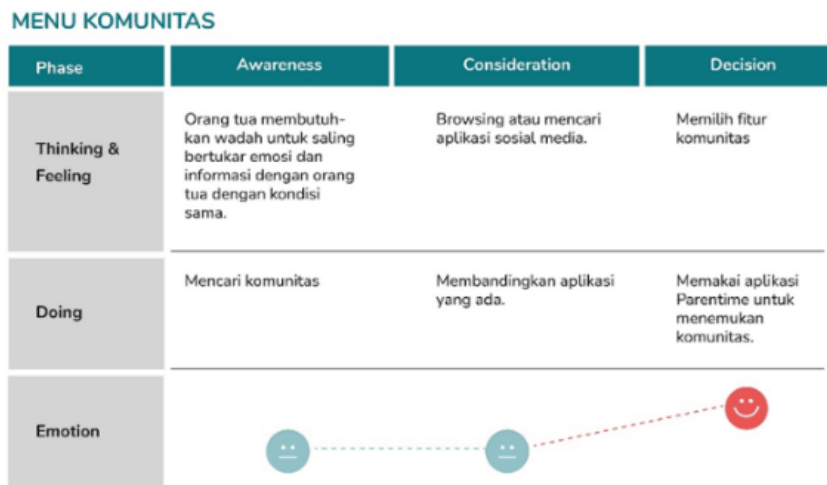


Figure 9. User journey on the Community menu

The user journey in the Community menu explains the user journey from parents thinking when they need a place to exchange emotions and information with the same parents, then what they do is look for a community, then browse on social media and then compare existing applications to make a decision to choose the community feature.

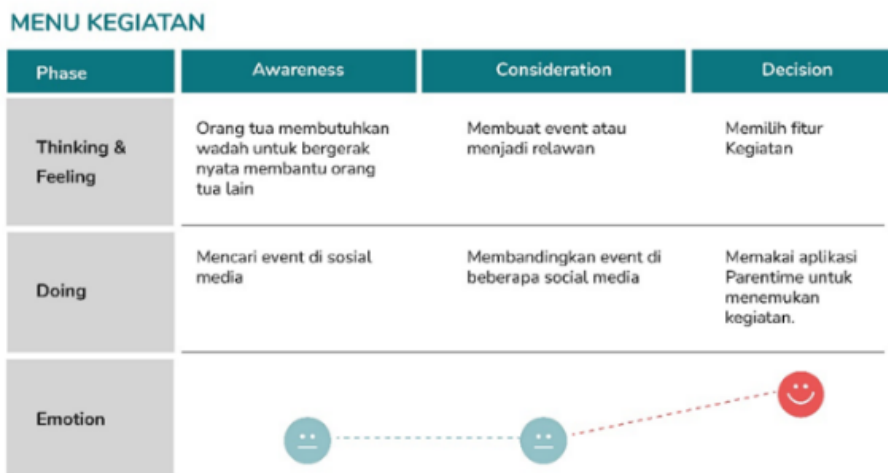


Figure 10. User journey on the Activities menu

The user journey on the activity menu explains parents who need a place to really help other parents, then they looking for events on social media. When parents are increasingly moved and want to create events

or become volunteers, then parents will search on online platforms, when they find the Parentime application, parents will feel happy because they find the features they want.

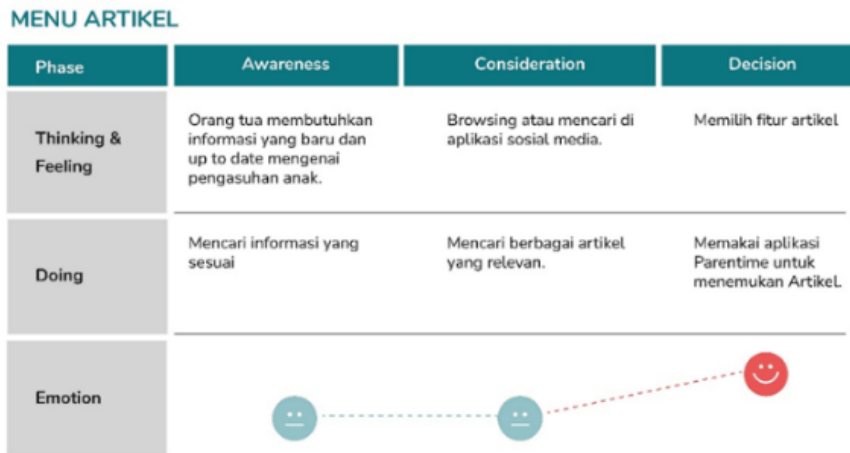


Figure 11. User journey on the Articles menu

The user journey in the article menu explains the journey from parents who need new information about parenting, then they are looking for appropriate information, then parents search for many articles on the internet and are confused about finding relevant articles. Finally parents will go to the Parentime application which provides an article menu according to the theme of parenting children with ASD.

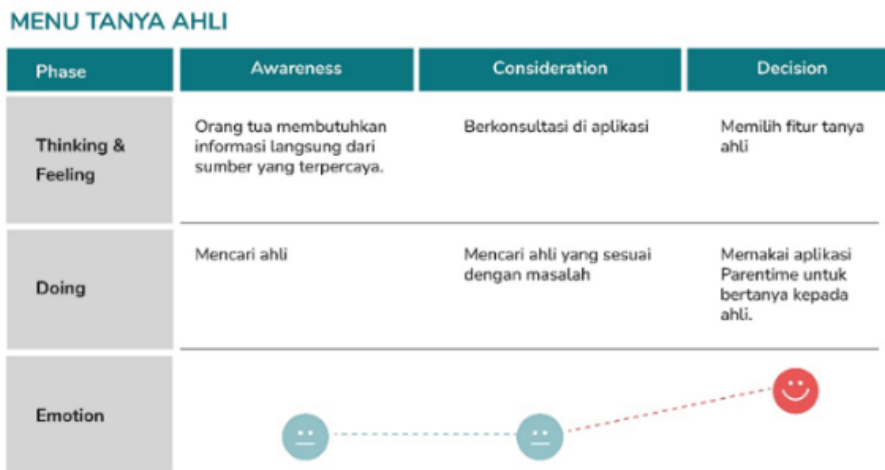


Figure 12. User journey on the Ask an Expert menu

The user journey on the ask an expert menu explains the journey from parents who need direct information from trusted sources by looking for experts. To be more effective, they seek online consultation through the application, but are still confused about finding an expert who really understands their problems, so parents can use the ask an expert feature in the Parentime application. From the description of the journey in each of these features, it can be seen how the user's journey is so that they can use the Parentime application. It can also be seen the experience felt by users when using the Parentime application.

3.3.1. Wireframe

Wireframe design is a framework of the mobile application design model that will be designed [23]. Wireframe describes the layout without any visual elements with the aim of focusing first on the function of the application to be designed [24]. The Parentime application wireframe can be described as follows.

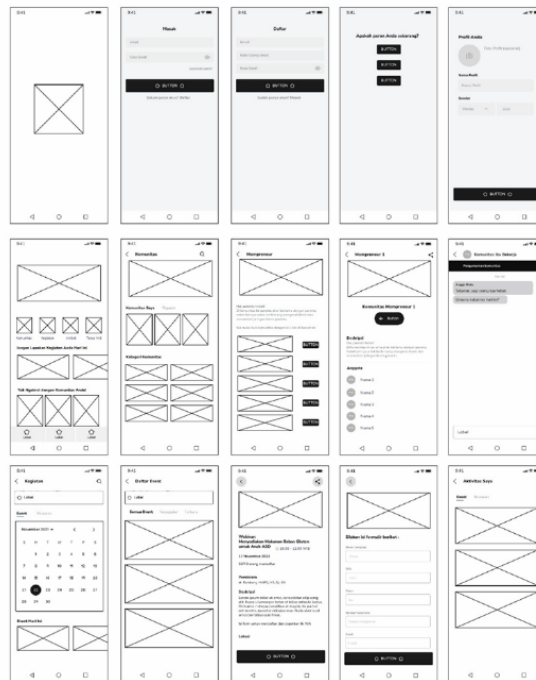


Figure 13. Parentime app wireframe concept

The wireframe explains the initial sketch of creating the Parentime application layout. This wireframe emphasizes the success of the user experience, before being applied to the user interface design. From this wireframe, user testing will be carried out to assess the success of the UX design [25]. Then later the results of the user testing will be used as a guide in creating the UI design.

4. Conclusion

The stress level of parents of ASD children is known to affect parenting patterns. Positive responses in the form of happiness can minimize the level of stress experienced by parents. From the results of a literature study reinforced by questionnaire and interview analysis, it is known that social support is one of the factors that causes happiness in parents of ASD children. The form of social support that is most needed by parents of ASD children is in the form of emotional support, information, and groups. Advances in the digital world make it easier for parents of ASD children to get social support. The design of the Parentime mobile application can be an alternative solution in helping parents get social support and happiness. The emotional approach of the user experience such as sharing, strengthening, empathy, and building hope is built into the content of the Parentime application features and menus. This research needs to be developed towards the prototype stage [26] and application testing.

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