Indonesian Journal of Nursing and Health Sciences
Volume 4 Nomor 1, April 2023
p-ISSN 2746-5497; e-ISSN 2746-5500
http://jurnal.globalhealthsciencegroup.com/index.php/IJNHS

DESIGN OF EARLY CHILD GROWTH MONITORING MEDIA

Sutono[1]*, Hamdan Daalal Fauzi[2], Bety Agustina Rahayu[1]
[1]STIKES Surya Global Yogyakarta, Jln Ringroad Selatan, Baldo, Potorono, Banguntapan, Bantul, Yogyakarta 55194, Indonesia
[2]Jurusan Teknologi Informasi, Program Studi Teknik Informatika, Politeknik Negeri Malang, Jl. Soekarno Hatta No.9, Jatimulyo, Lowokwaru, Malang, Jawa Timur 65141, Indonesia
*abahtonton@gmail.com

ABSTRACT
The golden generation is the successor of the nation. Seeing this, the growth and development of children must be monitored because this monitoring has the aim of finding irregularities early so that treatment can be carried out as soon as possible. Monitoring methods that are easy to carry out with results according to the guidelines are the facilities needed by caregivers. The purpose of this study was to design media for monitoring and development of early childhood at Littlecare PAUD. The action research method is used in this study. Implementation of these solutions is made systematically which includes health services and provides additional education or information. The activity was carried out from December 2022-April 2023. Respondents in this activity consisted of 3 admin teachers and 2 students. In the Design and Development of a Website-Based Child Development Measurement Application for Early Childhood Education in Little Care Yogyakarta, namely using the Software Development Life Cycle (SDLC) method. This new system provides convenience for its users compared to manual monitoring. This application has been designed according to the needs of the school, starting from facilitating the search for student data, knowing the current age, monitoring the growth and development of fine motor, gross motor, language, and socialization according to DDST. This application has also been designed with final conclusions regarding child development. The Little Pedia application that was compiled is stated to be able to help save time, make it easier to find student data when needed, as well as save the budget spent on reporting.

Keywords: early child; growth monitoring; media

INTRODUCTION
The golden generation of children are the next generation of children who are between the ages of 0 and 5 years (Uce, 2015). QS Al Furqan: 74 mentions that besides parents must be role models and oversee education, but must also support with prayer so that the child is successful. "This verse can be used as a prayer guide, 'O our Lord, grant us our spouses and our descendants as qurrata a'yun (pleasers), and make us leaders for pious people'. Q.S. An-Nisa' [4]: 6. mentions that a person's development is fully the responsibility of parents at the beginning of their life, therefore parents have a role related to a person's development when they are still in childhood. At this age the brain and physique will experience very rapid development (ISPC, 2020).A number of studies have also stated that nutritional problems in Indonesia tend to increase. Good nutrition is an indicator of a developed and prosperous country (Par'i, Wiyono, & Harjatmo, 2017). Nutritional problems in Indonesia are prone to occur in children and adolescents. Problems range from wasting, obesity, stunting, anemia, vitamin A deficiency, to disorders caused by iodine deficiency (Rahayu, Yulidasari, Putri, & Anggraini, 2018).

According to the Indonesian Ministry of Health, nutritional problems in Indonesia cannot be resolved and can threaten public health (Laswati, 2017). Stunting is often seen in children under five. At the age of 0-5 years or toddler age, children will form a foundation for development and growth, especially in intelligence (Erik et al., 2020). At this age, children will get a lot of experience that is firmly embedded in the subconscious and will be remembered until adulthood

so that it can be said to be the stage of personality formation (Ruangmom, 2021). The situation of children in Indonesia in the SSGI states that the number of nutritional problems in Indonesia is stunting in 2021 at 24.4%, wasting problems at 7.1%, obesity is 3.8% and underweight is still at 17.7%. still continues to be a PR and program of the Indonesian government (Pusdatin, 2018). In addition to nutritional problems, growth and development disorders also occur in children in Indonesia, such as failure in physical growth with malnutrition and retardation in social or motor development (Soedjatmiko, 2016).

Some of the growth and development problems that often occur in children are cerebral palsy, speech and language disorders, autism, Down syndrome, short stature, mental retardation and others (Faizi et al., 2018). Management of monitoring nutrition and growth and development can be easily carried out by parents or caregivers. Good knowledge and motivation from parents and caregivers is highly prioritized so that children's growth and development can be monitored. Nutrition monitoring is a mandatory program and must be carried out to determine the need for prevention of children's health. The results of a preliminary study conducted at the Little Care PAUD found data that related to monitoring nutrition and growth and development of school children already had scales and height measuring devices. Related to monitoring the suitability of growth and development, schools do not yet have sufficient ability to analyze the suitability of children's growth and development at their age. Usually schools cooperate with health schools in monitoring the growth and development of their students using DDST, but this activity is not carried out consistently considering the implementation time does not match the needs of the school. Even so, the school is still trying and wants to have a nutrition and growth monitoring program that can be carried out independently by the school. Seeing the existing background, the existence of the right media is a solution to help schools deal with problems. The media needed is media that is easy to access and provides sufficient information about nutrition and child development. Based on the existing background, this research activity is aimed at designing Littlepedia as a Media for Monitoring Nutrition and Growth and Development of Early Childhood.

METHOD

The steps taken to implement solutions to specific problems faced by partners using the action research method. Implementation of these solutions is made systematically which includes health services and provides additional education or information. The selection of the action research method in this activity aims to assist in solving problems, where there is collaboration between implementers and partners in achieving goals. In this activity carried out management, research, and at the same time development. The place for the activity is at PAUD IT Littlecare. The activity was carried out from December 2022-April 2023. Respondents in this activity consisted of 3 admin teachers and 2 students. In the Design and Development of a Website-Based Child Development Measurement Application for Early Childhood Education in Yogyakarta, namely using the Software Development Life Cycle (SDLC) method.

The initial steps in the activity (1) Perform a diagnosis (diagnosing) by determining the problem and prioritizing the problem. From the results of the analysis, it was found that the diagnosis of the problem was a lack of knowledge and a lack of health service media. This lack of knowledge is determined by the target, namely teachers and students. In the second step (2) Make an action plan (action planning). In this step, it is planned to develop Little-Pedia media as monitoring media on nutrition and growth and development. In the third stage (3) Taking action, researchers and participants jointly implement an action plan in the hope of solving the problem. Furthermore, after the model is made based on the sketch and adjusts the content to be displayed based on needs, it is continued by holding an initial trial offline. The fourth stage (4) is

evaluating, after the implementation period (action taking) is considered sufficient then the researchers together with the participants carry out an evaluation of the results of the implementation earlier, in this stage it is seen how the user's acceptance of the application is marked by various activities such as counseling on nutrition and child development, and training on using Little-Pedia. The last stage (5) is learning (learning) and this stage is the final part of the cycle that has been passed by carrying out a review of the stages that have ended then this research can end.

RESULTS

In accordance with the conclusions from the partner needs analysis that the use of child growth measurement applications for early childhood teachers is the right thing. The following is a table describing the application concept in this study:

Table 1.
Application Concept Description

Application Type	A tool to make it easier for early childhood teachers to measure children's growth and development.
User	Application users are identified as admins and teachers.
Application	An application in the form of a website that calculates measurements of child growth and development.
Technology	Laravel

System planning

In the system design sub-chapter contains the design flow of the system. The following is an example of system design of a child growth measurement application as a teacher's tool to help measure child growth and development:

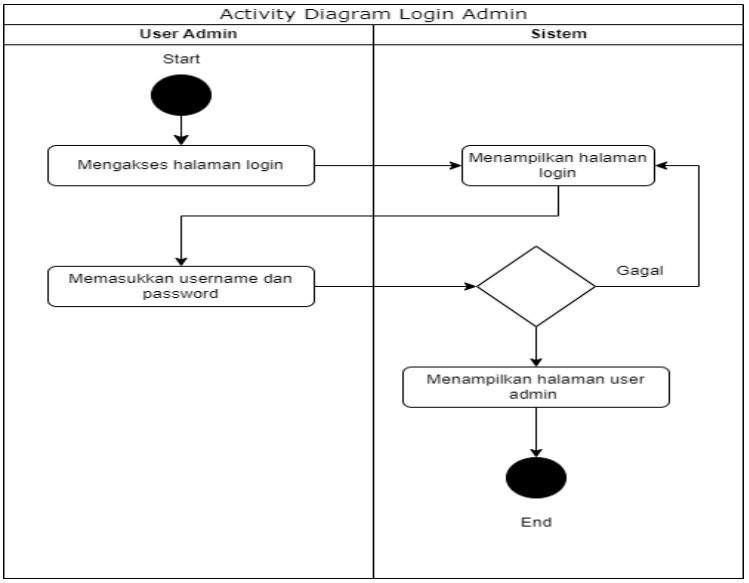


Figure 1. Admin Login Activity Diagram

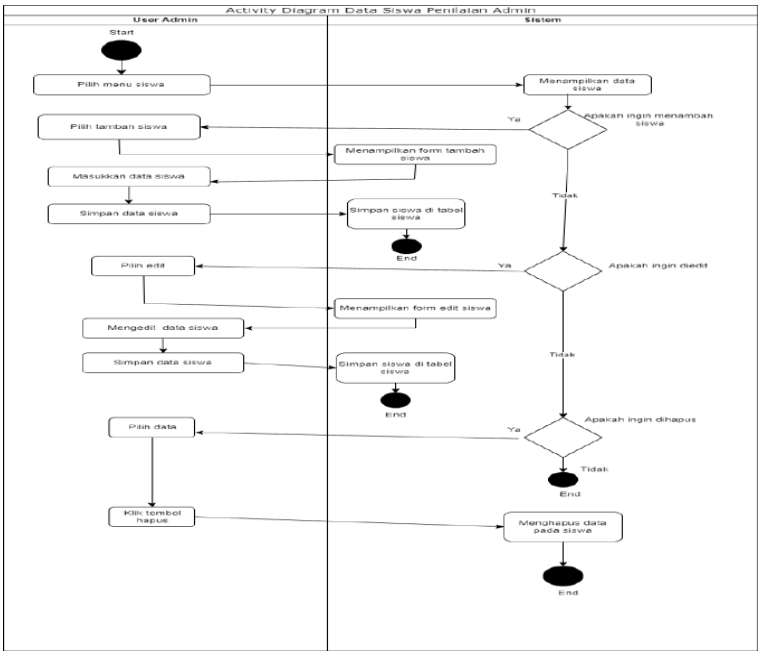


Figure 2. Admin Student Activity Diagram

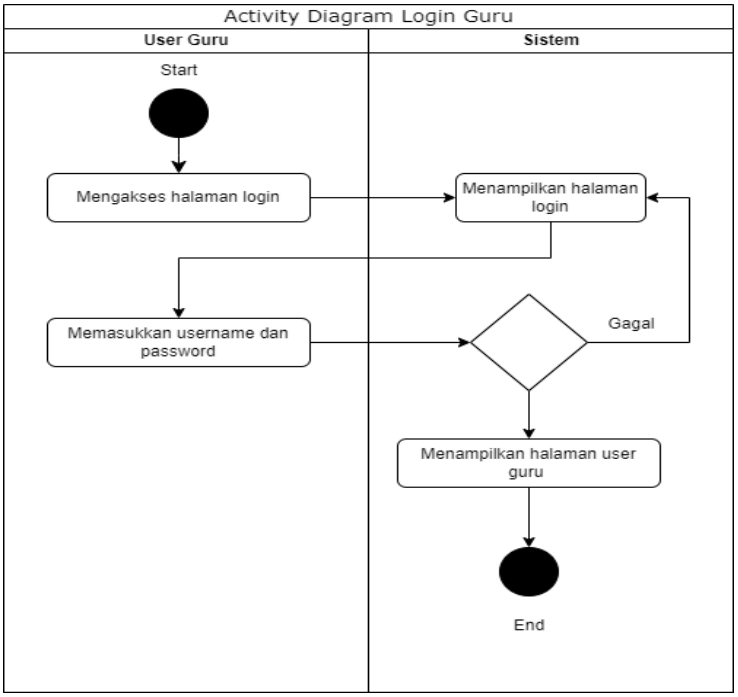


Figure 3. Teacher Login Activity Diagram

The next result shows the interface design for making the display or system design to be built. The design made includes the system menu structure design, the input design and the output design will be made.

Register Page Interface

In the image below is the result of implementing the register page interface

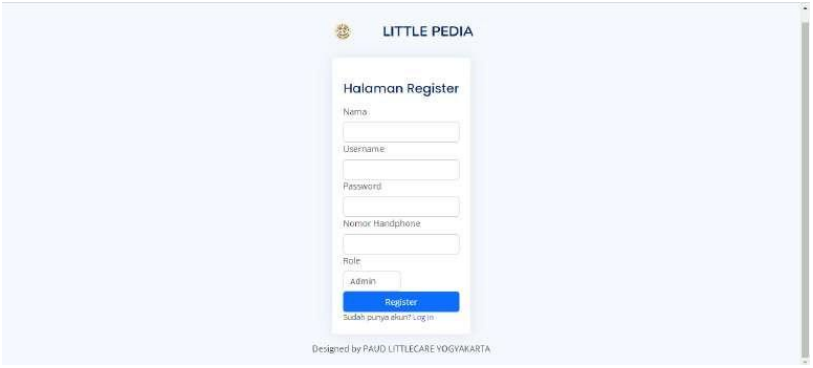


Figure 4. Implementation of the register page

The registration page is the main access to enter the web if you don't have an account yet. On this page there is a form with columns for name, username, password, cellphone number, and role. There is a register button to register and if you already have an account, you can immediately click log in at the bottom of the register button.

Admin Dashboard Page Interface

The image below is the result of implementing the admin dashboard page interface.

Figure 5. Implementation of the admin dashboard page

The admin dashboard page will display the main menu on the side.

Age Category Page Interface

The image below is the result of implementing the age category page interface

Figure 6. Implementation of the admin user age category page

The age category page will display some age data that will be used in later measurements. This page can be accessed by teachers and admins.

Developmental Aspects Page Interface

Figure 7 below is the result of implementing the age category page interface

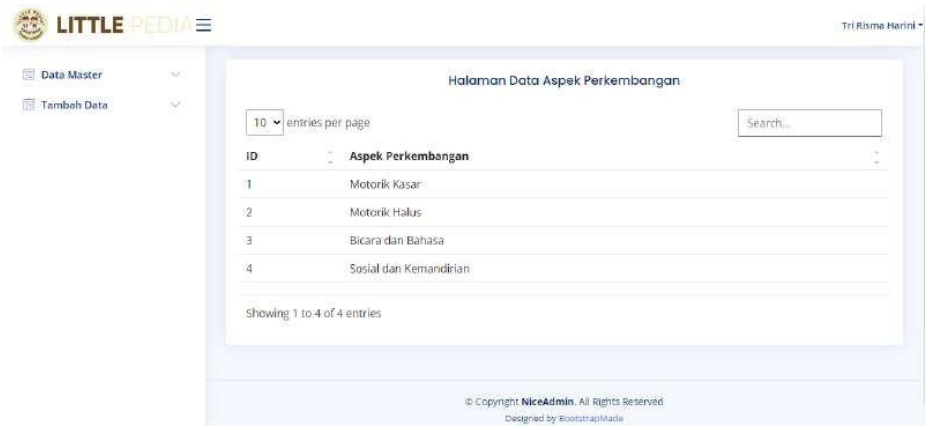


Figure 7. Implementation of the development aspect page

The development aspect page will display some development aspect data that will be used in later measurements. This page can be accessed by teachers and admins.

Command Item Page Interface

Figure 8 below is the result of implementing the command item page interface

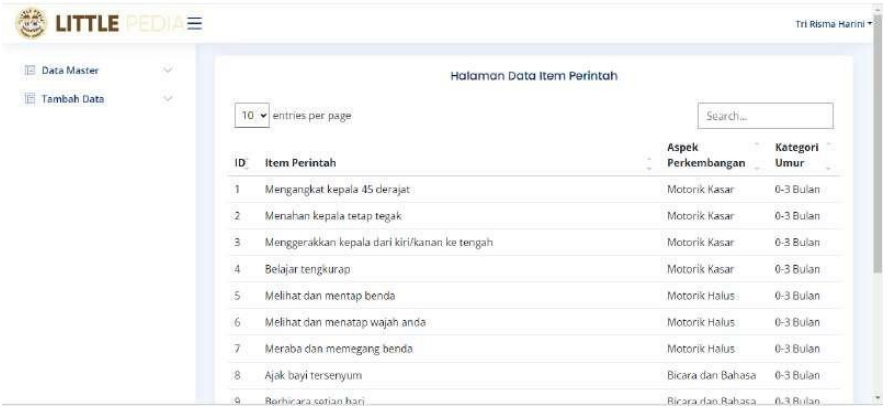


Figure 8. Implementation of the command item page

The command item page will display some command item data that will be used in future measurements. This page can be accessed by teachers and admins.

Measurement Schedule Page Interface

The image below is the result of implementing the measurement schedule page interface

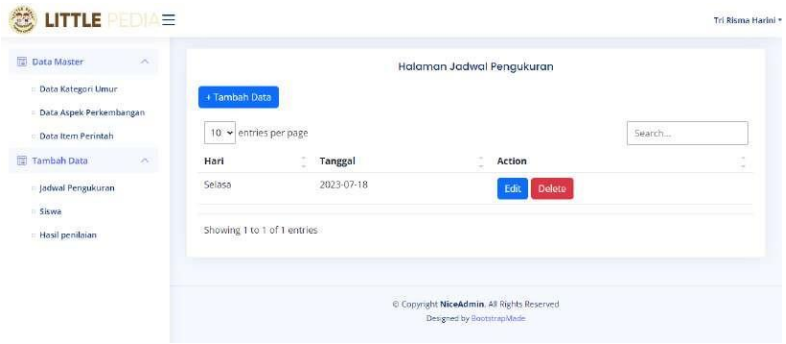
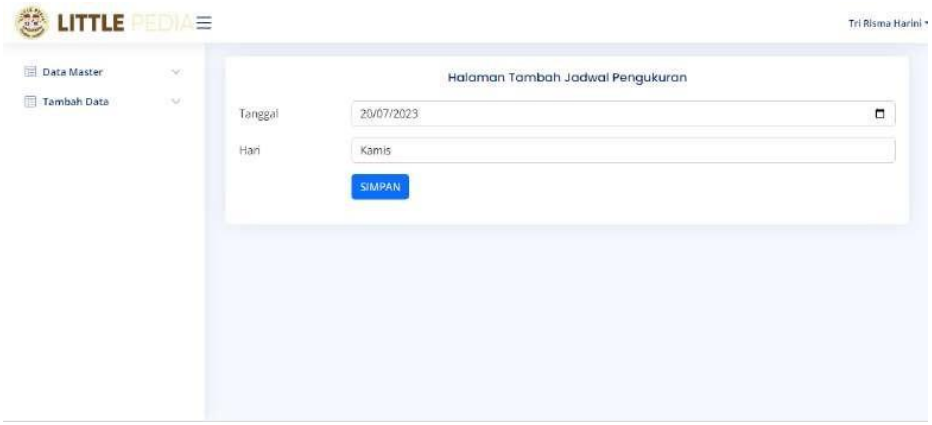


Figure 9. Implementation of the Measurement Schedule Page



Gambar 10. Implementation of Add Measurement Schedule Page

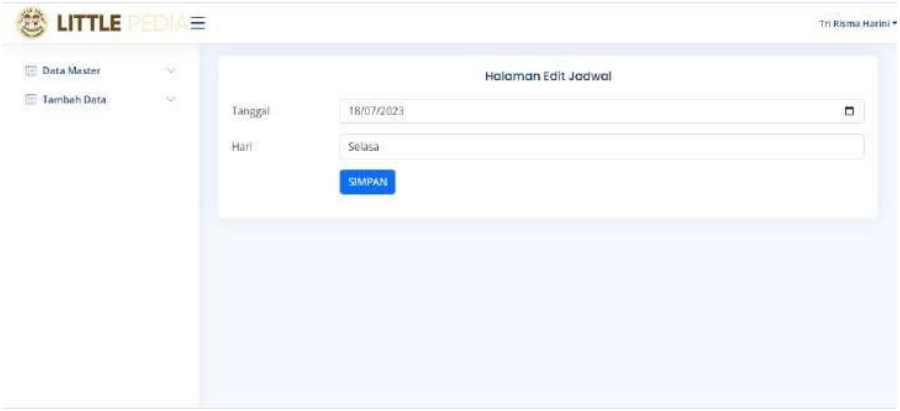


Figure 11. Implementation of Measurement Schedule Edit Page

Student Page Interface

The image below is the result of implementing the student page interface.

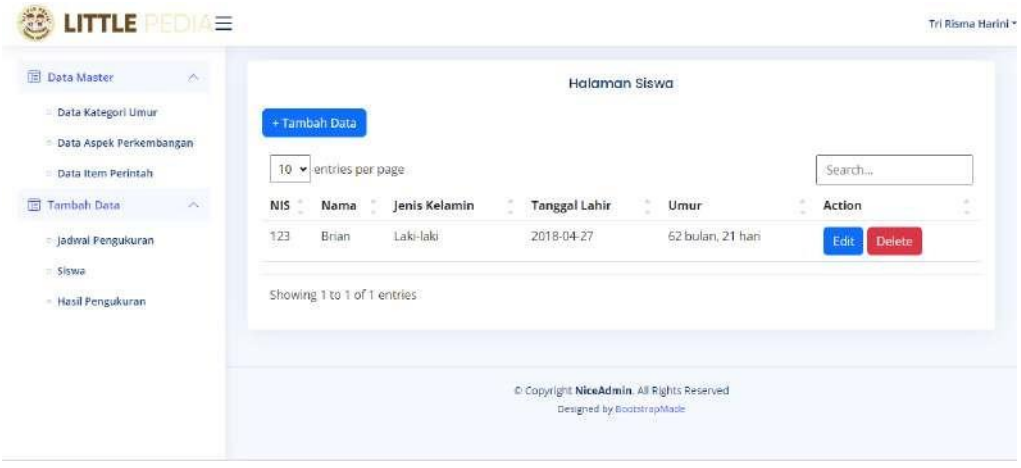


Figure 12. Implementation of Student Pages

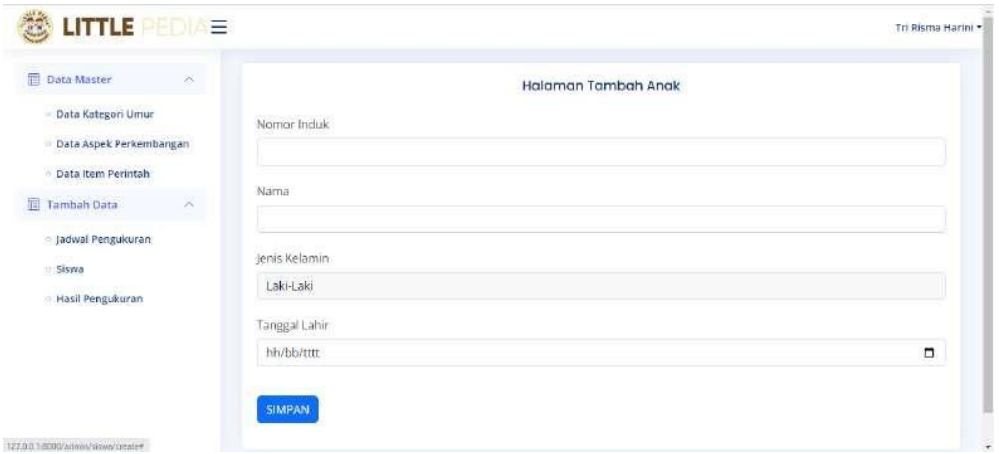


Figure 13. Implementation of the Add Student Page

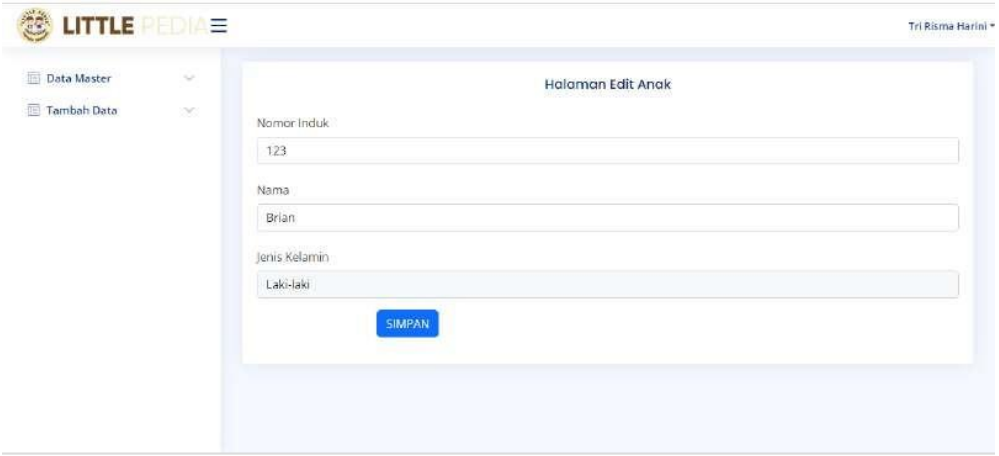


Figure 14. Implementation of Student Edit Pages

The student page has several menus. In the picture above the admin can view student data, add data, edit data, and delete student data.

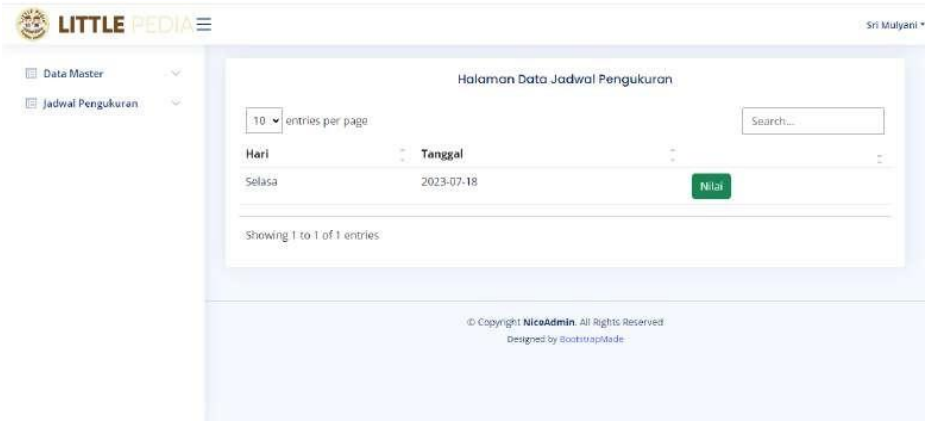


Figure 15. Implementation of the Measurement Schedule Page

Figure 16. Implementation of Per Aspect Assessment Pages

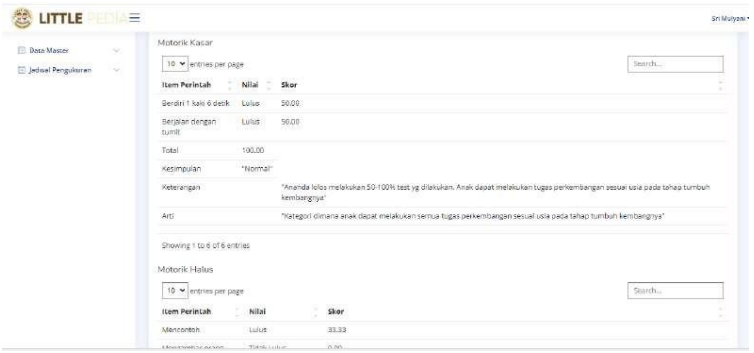


Figure 17. Implementation of Assessment Result Pages Per Aspect

Figure 18. Implementation of the Conclusion Results Page of Measurement of Child Growth and Development

Figure 19. Implementation of the Child Overall Results Page

The student page has several menus. In the picture above the teacher can see the data for

measuring the child's growth and development schedule which will later be clicked to start the measurement. In this menu the teacher will choose the name of the child who will be measured based on his age. Information on the name and age of this page has been provided so that it is easier for the teacher to choose the age category based on the age of the child.

Accuracy Testing

Accuracy test with the Denver Development Screening Test (DDST) as a measuring tool in monitoring the growth and development of children, there are several aspects that will be assessed, namely aspects of fine motor, gross motor, language and personal (Inggriani, Rinjani, & Susanti, 2019). Each aspect has different command items according to the age category. To calculate the measurement of child growth and development per aspect is as follows:

1. The formula for calculating the value of each order is 100% / the number of items ordered for each aspect.
2. For aspects whose value reaches 50% it is said to be "Normal" meaning "children can carry out all developmental tasks according to their age at the stage of growth and development".
3. For aspects whose value is less than 50% it is said "/Warning" means "the child has not been able to carry out all the developmental tasks at his age. In the caution category, the child who cannot perform the task may be possible because the child is sleepy or tired while undergoing a growth and development stage test.

After the value per aspect is known, the next step is to combine the value per aspect into the final conclusion with the following formula:

1. It is said "Normal" if there is at most 1 caution. Do a repeat check.
2. It says "Suspect" if there are 2 cautions. In this case the delay occurs due to failure not due to rejection.
3. It says "Untestable / Cannot be tested" if there are 3 / more cautions / more. In this case the delay/caution occurs because of rejection not because of failure.

DISCUSSION

The growth and development of children must be monitored because growth and development monitoring is an activity to find early deviations in growth such as poor or poor nutritional status, short children (Sepang & Lariwu, 2022). In addition, growth and development monitoring detects early developmental deviations such as late speech, and mental emotional deviations in children such as concentration problems and hyperactivity (Merida & Hanifa, 2022). Growth and development monitoring activities also aim to follow up immediately on deviations or delays in growth and development. Activities in growth screening are carried out by weighing body weight, measuring body length/height and head circumference (Halim, 2020). The measurement results will be seen and compared with the appropriate growth curve for age and sex in the child health book (Wahyuni, 2018). Meanwhile, when carrying out developmental screening, it is carried out by direct observation of children by health workers, teachers, parents or guardians (Ariani, Iswandari, & Fetriyah, 2018).

Screening or growth and development monitoring is recommended to be carried out routinely. In infants it is recommended to be monitored every month, for children aged 12-24 months it is recommended every 3 months, and children aged 24 months to 72 months are recommended every 6 months (Apriyani & Rani Purwani, 2023). The target in this activity is to develop a website-based child development measurement application to make it easy for PAUD teachers to measure children's growth and development. The existence of this application arose because there had been a cessation of activities measuring the growth and development of children which could become a problem in the process of monitoring the abilities of their students. The

problem of manually recording reports is also prone to human error or human-caused errors such as data entry errors or file loss. This can have an impact on the child's development process in the future. Therefore, to improve harmony in measuring child growth and development between schools and parents, it is necessary to support technology to facilitate reporting, namely application design, so that the process of recording child growth and development can be done more quickly and recording errors can be minimized. Given these problems, a website-based application was created that could facilitate the performance of early childhood teachers in measuring the growth and development of children. The results of the analysis and user responses with this application are stated to be able to help save time, make it easier to search student data when needed, as well as save the budget spent on reporting.

In line with research conducted by Diani et al., (2022) has used mobile media for monitoring the growth and development of children named m-KIA. The results of his research from a series of activities carried out for 3 days regarding monitoring children's growth and development through m-KIA showed that m-KIA facilitated the task of teachers to carry out monitoring and early detection of children's growth and development. In m-KIA there is also material regarding child growth and development as well as material regarding what parents/teachers should do if a child becomes ill such as diarrhea, fever and cough before taking him to a health worker. In addition, the results also show that 96.2% of PAUD teachers and AUD parents in Central Jakarta Region 1 know the benefits of m-KIA.

CONCLUSION

Based on the discussion and evaluation of the chapter, it can be concluded that a new system has been developed called the Little Pedia application. This new system makes it easier for users, namely admins and early childhood teachers, compared to the previous manual method. This application has been designed according to the needs of the school in terms of monitoring students, starting from facilitating the search for student data, knowing the current age, monitoring the growth and development of fine motor, gross motor, language, and socialization according to DDST. This application has also been designed with final conclusions regarding child development. The Little Pedia application that has been compiled is stated to be able to help save time, make it easier to find student data when needed, as well as save the budget spent on reporting.

REFERENCES

Apriyani, T., & Rani Purwani. (2023). Edukasi Pijat Bayi Untuk Mendukung Tumbuh Kembang Bayi Dan Meningkatkan Pengetahuan Ibu. *Jurnal Peduli Masyarakat*, *5*(2), 437–442. Retrieved from http://jurnal.globalhealthsciencegroup.com/index.php/JPM

Ariani, M., Iswandari, N. D., & Fetriyah, U. H. (2018). Upaya Peningkatan Kesehatan Anak Melalui Pemantauan Tumbuh Kembang di PAUD Terpadu Berkat Mulia Kota Banjarmasin Kalimantan Selatan. *Metallurgical and Materials Transactions A*, *30*(8), 2221.

Diani, P. A., Diani, P. W., Asnawiyah, D., Nurfadilah, N., Fitria, N., & Rohita, R. (2022). Pemanfaatan Mobile-Kesehatan Ibu Anak untuk Memantau Tumbuh Kembang Anak Usia Dini. *Jurnal Pemberdayaan Masyarakat Universitas Al Azhar Indonesia*, *5*(1), 1. https://doi.org/10.36722/jpm.v4i3.1305

Erik, Rohman, A., Rosyana, A., Rianti, A., Muhaemi, E., Yuni, E. E., … Huda, N. (2020). Stunting Pada Anak Usia Dini (Study Kasus di Desa Mirat Kec Lewimunding Majalengka). *Jurnal Pengabdian Masyarakat*, *2*(1), 24–36.

Faizi, M., Irwanto, Setyoningrum, R. A., Puspitasari, D., G., P. I., Widjaja, N. A., … H., M. H. (2018). *Pediatric Clinical Update 2018*. *Pediatric Clinical Update 2018*.

Halim, R., & Aryanty, N. (2020). Pemeriksaan Status Gizi Dan Penyuluhan Kesehatan Anak Mengenai Pengaruh Gadget Pada Perkembangan Anak. *Jurnal MEDIC (Medical Dedication)*, *3*(2), 99–101. Retrieved from https://online-journal.unja.ac.id/medic/article/view/11177

Inggriani, D. M., Rinjani, M., & Susanti, R. (2019). Deteksi Dini Tumbuh Kembang Anak Usia 0-6 Tahun Berbasis Aplikasi Android. *Wellness And Healthy Magazine*, *1*(1), 115–124. Retrieved from https://wellness.journalpress.id/wellness/article/download/w1117/65

ISPC. (2020). Golden Age _Fase Emas_. In *Healthline PT INternastional Sevices Pasific Cross*. PT INternastional Sevices Pasific Cross.

Laswati, D. T. (2017). Masalah Gizi Dan Peran Gizi Seimbang. *Agrotech : Jurnal Ilmiah Teknologi Pertanian*, *2*(1), 69–73. https://doi.org/10.37631/agrotech.v2i1.12

Merida, Y., & Hanifa, F. N. (2022). Pengaruh Pijat Bayi Dengan Tumbuh Kembang Bayi. *Jurnal Kesehatan*, *11*(1), 27–32. https://doi.org/10.37048/kesehatan.v11i1.424

Par'i, H. M., Wiyono, S., & Harjatmo, T. P. (2017). *Bahan Ajar Gizi Penilaian Status Gizi*. (Sapriyadi, Ed.). Tim P2M2.

Pusdatin. (2018). Situasi Balita Pendek (Stunting) di Indonesia. *Buletin Jendela Data Dan Informasi Kesehatan*, *301*(5), 1163–1178.

Rahayu, A., Yulidasari, F., Putri, A. O., & Anggraini, L. (2018). *Study Guide - Stunting dan Upaya Pencegahannya*. *Buku stunting dan upaya pencegahannya*.

Ruangmom, R. (2021). Golden Age (Masa Emas Anak), Periode Pertumbuhan Krusial.

Sepang, M. Y. ., & Lariwu, C. K. (2022). Deteksi Dini Tumbuh Kembang Anak Melalui Peningkatan Keterampilan Kader Kesehatan. *Jurnal Pengabdian Masyarakat MAPALUS*, *1*(1), 1–8. Retrieved from https://e-journal.stikesgunungmaria.ac.id/index.php/jpmm/article/view/10%0Ahttps://e-journal.stikesgunungmaria.ac.id/index.php/jpmm/article/download/10/6

Soedjatmiko, S. (2016). Deteksi Dini Gangguan Tumbuh Kembang Balita. *Sari Pediatri*, *3*(3), 175. https://doi.org/10.14238/sp3.3.2001.175-88

Uce, L. (2015). The golden age : Masa Efektif Merancang Kualitas Anak. *Bunayya : Jurnal Pendidikan Anak*, *1*(2), 77–92. https://doi.org/10.1177/002070200906400118

Wahyuni, C. (2018). *Panduan Lengkap Tumbuh Kembang Anak Usia 0-5 Tahun*. Retrieved from http://repository.iik-strada.ac.id/20/3/BUKU AJAR TUMBUH KEMBANG ISI new.pdf