

Department of Computing Bachelor of Science (Hons) in Software Development

Creche Connect

Project Report

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Abstract

The Creche Connect application aims to create a simple and secure platform for childcare practitioners to track the pupil's progress and communicate effectively with parents/guardians about their child's development.

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1. Introduction

This project report presents a comprehensive overview of developing and executing the Creche Connect application. This report aims to provide a clear understanding of the project's objectives, technical aspects, challenges faced, and valuable learning outcomes, both technical and personal.

2. Project Description

Creche Connect is a Progressive Web App (PWA), an advanced form of a responsive website that functions like a mobile app. PWA can be accessed from the browser or installed directly on the device. PWA offers multi-platform flexibility, responsiveness, and security.

2.1. Application Frontend

The Frontend user interface was built using React, React-Bootstrap and React_Router.

Facebook developed React, a JavaScript library used to build components of the Creche Connect application.

React-Bootstrap is a UI library which offers pre-built components based on Bootstrap, such as buttons, forms, and cards. It is used for styling and designing along with React. It was chosen because it optimises Bootstrap to use with React.

React-Router handled navigation between different parts of the Creche Connect.

When there was a need to style specific components, SASS (Syntactically Awesome Style Sheets) was used as it is considered better suited to work with React. SASS enhances the capabilities of CSS by providing additional features and functionality.

2.2. Application Backend

The backend of Crache Connect was created with the use of Firebase, which is a Backend-as-a-Service (BaaS) platform developed by Google. It offers various services, such as authentication, storage, and real-time databases.

2.3. Application Screens

The application is web responsive, so it can be used on mobile, tablet or desktop computers; however, the screenshots provided are for desktop pc.

2.3.1. Login Screen.

je Login	
Email address	
email	
We'll never share your email with anyone else.	
Password	
password	
Your password must be minimum 8 characters long, contain letters, numbers, special characters, upper and lower cases.	
Sign In	
Did you Forgot Password? Are you not registered? Register	

2.3.2. Register Screen.

	Register for Creche Connect
First Name	
Last Name	
Email address	
Password	
Your passwo	d must be minimum 8 characters long, contain letters, numbers, special characters, upper and lower cases.
Add avatar	
Choose file	No file chosen
User Type	
Select User F	ole
	Sign Up
	Are you already registered? Login

2.3.3. Forgot Password Screen.

Forgot Password	
Enter email registered with the application.	
Send Reset Email	
Go back to <mark>Login</mark>	

2.3.4. Home Screen.

MICHAL MANAGER "We enhance the quality of a child's development by improving communication between childcare practitioners and parents."	
"We enhance the quality of a child's development by improving communication between childcare practitioners and parents."	
Search for a child by name	
MARIUS BARRY	
Date of Birth: 2019-03-12	
Parent Name: Martina	
Parent Email: martinabarry@yahoo.com	
Parent Mobile Number: 0861741256	
Child's Health Info: *All vaccinations are up to date. *If child has a fever then give 5ml of Calpol as per parent consent.	
Additional Information: *Child is allergic to peanuts. *Child is sensitive to noise.	
DAILY REVIEWS - 17/04/2023	
Add Review Copy Review Update Child Remove	

2.3.5. Home Screen with empty search.

🔁 Creche Connect	MICHAL MANAGER Logout
Welcome	2,
MICHAL MAN	IAGER
"We enhance the quality of a child's development by improving commu	ication between childcare practitioners and parents."
ad	
There is no child with this name	in the system.
Add a child Message	Archive

2.3.6. Add Review Screen.

Daily Review	- 17/04/2023
Meals	
:	٥
Enter what the child ate	
Nappies	
	۵
Select Nappy Status	· · · · · · · · · · · · · · · · · · ·
Activities	
Enter activities	
Other Comments	
Enter other comments	
Updated By	
MICHAL MANAGER	

2.3.7. Add Review Screen with new data.

Creche Connect	ccdb-f69e9.web.app says Are you happy with the review information for child: MARIUS BADRY2	MICHAL MANAGER Logou
Meals	Cancel	
08:17		0
Oats meal		
Nappies		1
09:20		0
Dry		~
Activities		
After the meal we were playing with p	puzzles and then we went outside.	
Other Comments		
Child played well with other kids.		
Updated By		h
MICHAL MANAGER		
	Add Review	
	Back to Main Menu	

2.3.8. Home Screen with the added review.

MICHAL MANAGER

"We enhance the quality of a child's development by improving communication between childcare practitioners and parents."

Search for a child by name
MARIUS BARRY
Date of Birth: 2019-03-12
Parent Name: Martina
Parent Email: martinabarry@yahoo.com
Parent Mobile Number: 0861741256
Child's Health Info: *All vaccinations are up to date. *If child has a fever then give 5ml of Calpol as per parent consent.
Additional Information: *Child is allergic to peanuts. *Child is sensitive to noise.
DAILY REVIEWS - 17/04/2023 Meal Time: 08:17
Nappy Time: 09:20 Nappy Status: dry
Activities: After the meal we were playing with puzzles and then we went outside. Other Comments: Child played well with other kids. Updated By: MICHAL MANAGER Updated At: 09:23:32
Add Review Copy Review Update Child Remove
Add a child Message Archive

2.3.9. Copy Review Screen.

MICHAL MANAGER

"We enhance the quality of a child's development by improving communication between childcare practitioners and parents."

Search for a child by name
MARIUS BARRY
Date of Birth: 2019-03-12
Parent Name: Martina
Parent Email: martinabarry@yahoo.com
Parent Mobile Number: 0861741256
Child's Health Info: *All vaccinations are up to date. *If child has a fever then give 5ml o Daily reviews copied to clipboard! Ipol does not work use Ibuprofen, also 5ml.
Additional Information: *Child is allergic to peanuts. *Child is sensitive to noise.
DAILY REVIEWS - 17/04/2023 Meal Time: 08:17 Meals: Oats meal Nappy Time: 09:20 Nappy Status: dry Activities: After the meal we were playing with puzzles and then we went outside. Other Comments: Child played well with other kids. Updated By: MICHAL MANAGER
Updated At: 09:23:32 Add Review Copy Review Update Child Remove
Add a child Message Archive

2.3.10. Update Child Screen.

Update Child	
First Name	
marius	
Last Name	
barry	
Parent Name	
Martina	
Date of Birth	
12/03/2019	
Parent Email	
martinabarry@yahoo.com	
Parent Mobile Number	
0861741256	
Health Information	
*All vaccinations are up to date. *If child has a fever then give 5ml of Calpol as per parent consent.	
Additional Information	le le
*Child is allergic to peanuts. *Child is sensitive to noise.	
Save Changes	

2.3.11. Update Child Screen with updated data.

	cdb-f69e9.web.app says	MICHAL MANAGER LOGOU
First Marson		
marius		
Last Name		
barry		
Parent Name		
Martina		
Date of Birth		
12/03/2019		
Parent Email		
martinabarry@yahoo.com		
Parent Mobile Number		
0861741256		
Health Information		
*All vaccinations are up to date.		
*If child has a fever then give <u>5ml</u> of <u>Calpol</u> as per parer	nt consent.	
*If Calpol does not work use Ibuprofen, also 5ml.		
Additional Information		
*Child is allergic to peanuts.		
*Child is sensitive to noise.		
	Save Changes	

2.3.12. Home Screen with updated information.

MICHAL MANAGER

"We enhance the quality of a child's development by improving communication between childcare practitioners and parents."

Search for a child by name
MARIUS BARRY
Date of Birth:
Parent Name:
Martina
Parent Email: martinabarry@yahoo.com
Parent Mobile Number: 0861741256
Child's Health Info: *All vaccinations are up to date. *If child has a fever then give 5ml of Calpol as per parent consent. *If Calpol does not work use Ibuprofen, also 5ml.
Additional Information: *Child is allergic to peanuts. *Child is sensitive to noise.
DAILY REVIEWS - 17/04/2023
Meat Time: 08:17 Meals: Oats meal
Nappy Time: 09:20
Nappy Status: dry Activities: After the meal we were playing with puzzles and then we went outside.
Other Comments: Child played well with other kids.
Updated By: MICHAL MANAGER Updated At: 09:23:32
Add Review Copy Review Update Child Remove
Add a child Message Archive

2.3.13. Add Child Screen.

First Name Enter first name Last Name Enter last name	
Enter first name Last Name Enter last name	
Last Name Enter last name	
Enter last name	
Parent Name	
Enter parent name	
Date of Birth	
dd/mm/yyyy	
Parent Email	
Enter parent email	
Parent Mobile Number	
Enter parent mobile number	
Health Information	
Enter important child's health information	
Additional Information	
Enter additional information	
	0

2.3.14. Add Child Screen with new data.

Creche Connect	ccdb-f69e9.web.app says Are you sure you want to add child: ANNA WHITE?	MICHAL MANAGER LOGOU
	Сапсе	
First Name		
Anna		
Last Name		
White		
Parent Name		
Darren		
Date of Birth		
01/03/2020		•
Parent Email		
darrenwhite@yahoo.com		
Parent Mobile Number		
0891594598		
Health Information		
*All vaccinations are up to date		
Additional Information		
She likes to paint.		
	Add Child	

2.3.15. Home Screen with the new child.



Welcome, MICHAL MANAGER

"We enhance the quality of a child's development by improving communication between childcare practitioners and parents."

earch for a child by name
2020-03-01
Parent Name: Darren
Parent Email: darrenwhite@yahoo.com
Parent Mobile Number: 0891594598
Child's Health Info: *All vaccinations are up to date
Additional Information: She likes to paint.
DAILY REVIEWS - 17/04/2023
Add Review Copy Review Update Child Remove
Add a child Message Archive

2.3.16. Remove Screen.



2.3.17. Archive Screen.

		MICHAL MANAGER	Logout
	Archive		
Search by name:			
Search by date:			
dd/mm/yyyy			
Child Name	Daily Review		
MARIUS BARRY	Date: 15/4/2023		
	Meal Time: 12:03		
	Meals: Lunchbox pasta salad		
	Nappy Time: 13:15		
	Nappy Status: soiled		
	Activities: Listen to your favourite songs together and sing along.		
	Other Comments: Child played well with other kids.		
	Updated By: MICHAL MANAGER		
	Updated At: 15:53:04		
	Date: 17/4/2023		
	Meal Time: 08:17		
	Meals: Oats meal		
	Nappy Time: 09:20		
	Nappy Status: dry		
	Activities: After the meal we were playing with puzzles and then we went outside.		
	Other Comments: Child played well with other kids.		

2.3.18. Archive Screen with an invalid name.

Lecout

	Archive	
Search by name:		
d		
ds	Clear	
Search by date:		
dd/mm/yyyy		
	No Review found, please check Child's Name or Date. Try again.	
Child Name	Daily Review	

2.3.19. Archive Screen with an invalid date.

	Archive	
Search by name:		
Search by date:		
02/02/0003		ť
	Clear	
	No Review found, please check Child's Name or Date. Try again.	
Child Name	Daily Review	

2.3.20. Message Screen.



2.3.21. Message Screen failed to send a text.



2.3.22. Home Screen for childcare practitioner.

MICHAL STAFF

"We enhance the quality of a child's development by improving communication between childcare practitioners and parents."

Search for a child by name
MARIUS BARRY
Date of Birth: 2019-03-12
Parent Name: Martina
Parent Email: martinabarry@yahoo.com
Parent Mobile Number: 0861741256
Child's Health Info: *All vaccinations are up to date. *If child has a fever then give 5ml of Calpol as per parent consent. *If Calpol does not work use Ibuprofen, also 5ml.
Additional Information: *Child is allergic to peanuts. *Child is sensitive to noise.
DAILY REVIEWS - 17/04/2023 Meal Time: 08:17 Meals: Oats meal Nappy Time: 09:20 Nappy Status: dry Activities: After the meal we were playing with puzzles and then we went outside. Other Comments: Child played well with other kids. Updated By: MICHAL MANAGER Updated At: 09:23:32
Add Review Copy Review
Message Archive

2.3.23. Home Screen for a parent.



3. Challenges.

Overall, it was a challenging project from start to finish because these were new technologies to me, and I had to learn everything.

3.1. React

3.1.1. Challenge:

Although I had an opportunity to use React during my internship, it was not enough, and at the beginning, it took me some time to understand the component-based architecture in React.

Solution:

I watched a few tutorials on YouTube and then started by building small components and gradually moving on to do more complex bits of the project.

3.1.2. Challenge:

The form validation in the registration component was not working as expected.

Solution:

I identified that the 'validateForm' function was not being called on every input change. I solved the issue by adding the 'validateForm' function call to the appropriate event handlers to fix the issue.

3.1.3. Challenge:

I had an issue with navigating to the login page after a successful registration. If I add links, it will work.

Solution:

I used the useNavigate hook from the React Router library. I called navigate with the path /login after successfully creating a user and updating their profile, which redirects the user to the login page. It took me some time, but I figured it out.

3.2. Firebase

3.2.1. Challenge:

First, setting up Firebase was not easy. Documentation was also not helping. It is confusing sometimes. I preferred to watch tutorials rather than go through the documentation.

I had an issue creating a user in Firebase Authentication and Firestore. It looked like I could authenticate, but no user was created.

Solution:

I found a solution by using createUserWithEmailAndPassword to create a new user in Firebase Authentication and then using updateProfile to set the user's display name. After that, I used setDoc to create a new document in the Firestore collection "users" with the necessary data, such as uid, displayName, email, and photoURL.

3.2.2. Challenge:

The user's uploaded avatar is not being saved to Firebase Storage.

Solution:

I noticed that the storage reference was incorrectly configured. Updated the storage reference with the correct path and ensured that the user's avatar is uploaded successfully.

3.3. Cross-device development.

3.3.1. Challenge:

Progressive Web App is multiplatform, and the goal of the Creche Connect application is to be fully functional on desktop, mobile or tablet. Cascading Style Sheets (CSS) do not always allow me to make changes as I would like.

Solution:

After research, I decided to swap CSS for SASS because it offers more control. It allows for the nesting of selectors within other selectors, which makes it easier to code and read complex stylesheets.

3.3.2. Challenge:

I had an issue with the styling of the login form.

Solution:

I found a solution by importing and customizing the Bootstrap components and adding custom styles. I used the Container, Card, Form, Button, and Image components from the "react-bootstrap" library. I added custom class names and inline styles where necessary to create a visually appealing and responsive login form.

4. Learning outcomes

4.1. Personal

Problem-solving skills:

Developing a real-time messaging application requires identifying and resolving various issues related to authentication, data storage, and user interactions. It was not easy, but with persistence, I overcame these challenges.

Time management:

Building a project of this scale in such a short time frame, along with other deliverable assignments, requires good time management skills. I did not always succeed, but most of the time, I set achievable goals that helped me to move forward in the right direction to complete the Creche Connect project.

Adaptability:

When I was researching what I was going to use to develop the Creche Connect application, I thought that I need to get out of my comfort zone. I picked technologies I know very little of, like React and those I used for the first time, like Firebase. It was challenging, but I understood I must adapt and learn new skills to keep my application modernised and relevant.

4.2. Technical

React:

I better understand the React fundamentals, including components and state management. It is still a long journey ahead of me, but I feel more competent than I did a few months back.

React-Bootstrap:

I have learned to develop user interfaces using React-Bootstrap and learn how to make them responsive and visually appealing.

React-Router:

This may seem easy, but it took some time before I understood how to manage navigation and routing in a single-page application using React-Router.

Firebase Services:

I better understand using Firebase Authentication, Cloud Firestore, and Firebase Storage for user authentication, data storage, and real-time messaging.

Security:

I have learned best practices for securing user data using Firebase Authentication. Securely handle user authentication to ensure that only authenticated users can access the application and perform actions based on their assigned roles and permissions.

Versioning:

Using Git to keep track of the code is important, along with regular commits. I learned that not committing regularly may cost the extra time spent on the code, which you would not have to if you pushed your code frequently.

5. Project Review

5.1. Achieved

The sole focus of the Creche Connect application was tracking the child's progress from the day of registration to the last day in service and improving communication with parents/ guardians.

I have achieved that through the use of the Daily Reviews screen. A manager or child practitioner can add reviews on the go whether they use a mobile, tablet or desktop computer. Adding them is straightforward through drop-down selections and free text entries. It takes a couple of minutes to enter observations that can be beneficial in monitoring a child's progress.

Another feature is Copy Review which allows managers or childcare practitioners to copy the content of the review, go to messages, find a parent and send them that review. This will inform them about their child's advancement and allow them to ask follow-up questions.

An intuitive and simple design was on my mind when I was developing the Creche Connect application, and I believe I have achieved that goal. The application is self-explanatory, and anyone using it could find their way around it quickly.

An essential feature of the application was to have the option to export the child's progress details as a PDF so it can be kept and stored as a soft or hard copy and that was delivered in the Archive screen.

A manager or childcare practitioner can go to Archive, find a daily review for a child, date or both and then print it out or save it as a PDF file.

The Creche Connect is multi-platform, meaning it does not matter what device is available for a practitioner's phone, tablet or desktop. They can make observations and add them to the application using their preferred tool. This goal was achieved using bootstrap-react libraries and SASS to improve styling, and the application is entirely usable regardless of the device used to access it.

As per the original requirement, Creche Connect has a built-in communication option which allows the exchange of messages between parents and childcare practitioners. The built-in communicator can attach pre-generated daily reviews based on the entries made by the childcare practitioner. These reports can then be forwarded to parents so they can keep an eye on their child's progress and reply to them if they have any further enquiries.

5.2. Not Achieved

If I had more time, I would make it more responsive. The application is fully usable on all devices, but there is room for improvement.

The biggest missing part of the application is that I could not implement the notification feature. This does not impact the application functionality, but now the parent needs to log in to the app and check if there is a new message from the creche.

5.3. What if I had more time?

In the Daily Review screen, I would like to add more options like naps, time of naps, medicine and time taken.

The way reviews are displayed on the Home screen and in the Archives screen could be better arranged.

As I mentioned earlier, I would implement notifications so the recipient does not have to log in to the application to know that there is new information about their child's progress.

I would also consider using AI to go through child's Reviews and pick up on some behaviours or regular occurrences that could help practitioners identify if a child may need some additional needs.

Identifying earlier if a child needs additional help or a different approach could have a huge and positive impact on that child's life. The sooner practitioners and parents can recognise a problem, the sooner they can act and slow or even stop the progress o an illness.

5.4. Would I approach this project differently?

If I were starting today, I would have my Trello app ready to monitor my progress and be more agile. It took me some time to change my mindset to build something ahead and then go back and add functionalities.

I meant to deliver Messaging screen during the second iteration, but I could not grasp how to work on this if I don't have Login and Registration ready. Years stuck in the waterfall way took a toll on me, but I know now that you Identify the strongest feature of your application, what is going to sell it and build it. Prove a concept. Because if you can do that, it means that the project can be successfully developed, and now you just building back.

What if I developed Login and Registration and other components first and then fail to create messaging feature? That would mean that all that work was worthless.

Thankfully I was able to deliver my project.

5.5. Any advice for someone attempting a similar project?

If someone is considering a similar project right now, I would tell them to identify the strongest feature of the application and build it.

If you fail, then that is ok. Better at the beginning than at the end with all the money and time invested. Make sure that you commit to your progress regularly. If it works, then add, commit and push. This will help you at some stage when you will break something in your code. If your GitHub is up to date, then all you need to do just get your working code and start from that point.

Get yourself an application to track your progress. I discovered Trello in the middle of my development, but it still was very good.

5.6. Am I happy with the technologies used for my project?

Overall I am happy with the technologies I have chosen for my first iteration, except for Appwrite.

Appwrite is direct competition to Firebase, and it is open source. I liked the idea of using this application, but I needed help finding enough tutorials.

The learning curve was steep, and during this project, there was no luxury of spare time, so I deliberately decided to replace Appwrite with Firebase.

I may use Appwrite next time when I build another application.

6. Conclusions

Writing this report help me realise that most of the goals I set for Creche Connect were achieved. Some features were missing, like notifications, but overall the application is still functional.

When I decided to extend my course by one more year, I gave myself a condition. I knew that I would have to develop an application, and I told myself that if I could do it, I am not that bad and that, with years of experience, I will get better on the job.

If I don't succeed, I will look for a niche within IT and try there.

Today I am very happy because not only have I delivered a working application and I met all my original requirements, but also because I proved to myself that I am not too bad and I should be proud of what I achieved.

7. Acknowledgements

I am grateful to **Dr Chris Meudec**, who has supported and guided me throughout this endeavour.

The last few months were difficult, and I never thought I would manage to finish this project. I often thought I was not good enough, but every Monday during the meetings, Chris was there to help me to stay on track, "baby steps".

If you're reading this and looking for a supervisor to guide you through your fourth-year project, ask Chris if he's available. His calmness and experience, and straight-to-the-point approach benefited me a lot. If it allowed me to succeed, then for sure, it will help you too.

8. Declaration

- I declare that all material in this submission, e.g. thesis/essay/project/assignment, is entirely my own work except where duly acknowledged.
- I have cited the sources of all quotations, paraphrases, summaries of information, tables, diagrams, or other material, including software and other electronic media in which intellectual property rights may reside.
- I have provided a complete bibliography of all works and sources used in the preparation of this submission
- I understand that failure to comply with the Institute's regulations governing plagiarism constitutes a serious offence.

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