Star Language Star Wish

Applied Project Final Report

By

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Spring Semester, 2024

A paper submitted in partial fulfillment of the requirements for the degree of

Master of Science in Management and Systems

at the

Division of Programs in Business

School of Professional Studies

New York University

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# Declaration

I, Junjie Jia, declare that this project report submitted by me to School of Professional Studies, New York University in partial fulfillment of the requirement for the award of the degree of Master of Science in Management and Systems is a record of project work carried out be me under the guidance of Dr. Eleftheria K Pissadaki, NYU Adjunct Associate Professor of Management and Systems. I grant powers of discretion to the Division of Programs in Business, School of Professional Studies, and New York University to allow this report to be copied in part or in full without further reference to me. The permission covers only copies made for study purposes or for inclusion in Division of Programs in Business, School of Professional Studies, and New York University research publications, subject to normal conditions of acknowledgment. I further declare that the work reported in this project has not been submitted and will not be submitted, either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

# Acknowledgements

I would like to express my heartfelt gratitude to Dr. Zhe S. Chen for his invaluable support and mentorship throughout this project. His sponsorship and guidance have been fundamental to the success of our work. Additionally, I am deeply thankful to my instructor, Dr. Eleftheria K. Pissadaki, of the Management and Systems program. The courses I have taken with Dr. Pissadaki have significantly enriched my knowledge and understanding, providing a strong foundation for my academic and professional growth. Her insights and dedication to teaching have profoundly influenced my learning journey, and for that, I am immensely grateful.

# Abstract

I developed Star Language Star Wish, an Augmentative and Alternative Communication (AAC) application tailored for children with autism. This tool allows users to effortlessly select images, which the system then compiles into coherent sentences, addressing the formidable challenges in verbal communication faced by individuals with developmental disabilities. The application features a user-friendly interface with a vast database of daily images, people, emotions, objects, and actions, enhancing communication skills and fostering independence in children with autism. Parents, caregivers, and educators will find this tool invaluable for creating a positive and inclusive learning environment for children with autism.

My approach involved designing a visually appealing and intuitive platform, incorporating features such as image upload and display, audio recording and playback, dynamic content management, navigation and interaction, event-driven data handling, persistent storage and state management, and responsive design and accessibility. I utilized Uni-app for development, ensuring cross-platform compatibility and a seamless user experience across various devices. Through my efforts, I aimed to provide children with autism a tool that facilitates communication, fosters cognitive development, and promotes self-expression.

The results of my project include the successful development of an interactive and engaging AAC application, accessible via [link]. This tool empowers children with autism to express themselves effectively, bridging communication gaps and promoting language development. Additionally, it offers parents, caregivers, and educators a valuable resource for supporting the unique communication needs of children with autism, ultimately contributing to their overall cognitive and social development.

# Introduction

## 4.1 Background information

In the rapidly evolving digital age, the way we communicate is changing dramatically, especially as technology permeates our daily lives. However, not everyone benefits equally from these advances. A large segment of the population, especially those with developmental disabilities such as autism, face ongoing challenges in verbal communication. These challenges can severely limit a person's ability to interact socially and express their thoughts and feelings effectively.

“Star Language Star Wish” is an innovative app designed to meet the unique communication needs of children with autism. This tool harnesses the power of visual content to enhance users' ability to communicate, increase their independence, and participate in social interactions. The app is especially designed with a user-friendly interface that will be of interest to children and has a large database of easily identifiable images related to everyday life, including people, emotions, objects, and actions. It contains.

The importance of this application lies in its ability to transform images into coherent text, thereby providing a voice to people who struggle with traditional forms of communication. Through an intuitive navigation and selection process, children can easily select relevant images, which are then assembled into meaningful representations. This approach not only helps with communication, but also helps develop cognitive skills by linking visual cues with words and emotions.

Additionally, “Star Language Star Wish” stands out for its focus on accessibility and inclusivity. The app's design and functionality takes into account the different abilities of children with autism, ensuring a simple interface with large, easy-to-click buttons and a clear, visually appealing layout. This consideration also extends to the auditory support provided by the app, where recordings can be added to images to enhance understanding and retention of information.

In terms of technical execution, the app leverages cutting-edge technology to ensure a seamless and engaging user experience. Use the EventBus system to efficiently manage updates to various components and ensure that your application remains responsive and stable as users interact with it. Persistent storage functionality is also integrated, allowing users to save settings and data and provide continuity each time they use the application. This is very important to build user familiarity and confidence, which is an important aspect when working with children who require stability and consistency in their learning environment.

The impact of this app extends beyond the individual user and provides significant benefits for parents, caregivers, and educators. By providing tools to enhance communication, “Star Language Star Wish” also serves as a resource for educational and therapy sessions, facilitating more effective contact and interaction with children with autism. It creates a positive and inclusive learning environment and greatly contributes to the overall cognitive and social development of these children. Therefore, this app not only fulfills an important need, but also enriches the lives of autistic children by giving them greater independence and a sense of accomplishment.

As “Star Language Star Wish” continues to develop, continued feedback and advances in technology will further refine its functionality, ensuring that it remains an important tool in the toolbox for supporting the development of children with autism. Masu. This app is more than just a technological achievement, it is a beacon of hope that represents the possibility of a more inclusive society, where all children have the opportunity to express themselves and be understood.

## 4.2 Company Name

This project of mine is not offered to a specific company. In the future, this project can be used in hospitals, some organizations that help autistic children, and some families.

## 4.3 Sponsor Information

My sponsor’s name is Zhe S. Chen, PhD, Associate Professor, he is departments of Psychiatry and Neuroscience and Physiology. He can help me analyze my application and make some suggestions during the application development process that are in line with the habits of modern children and people using applications. During the process, he was also able to give me some advice that was consistent with the biological characteristics of these children.

# Problem Description and Opportunity

## 5.1 Business Opportunity

In today's world, communication is the basis of social integration and personal growth. However, for children with autism, their ability to communicate effectively is often hampered by the unique challenges they face in interpreting and expressing verbal and nonverbal cues. This disorder can severely impact social interactions and cognitive development, leading to isolation from peers and hindering educational and social progress. The need to bridge this communication gap is both a critical problem and an innovative solution that will allow these children to more fully integrate into their social, educational, and ultimately professional environments. It is also an important occasion.

According to the Centers for Disease Control and Prevention (Centers for Disease Control and Prevention, 2023), an estimated one in five children in the United States alone has an autism spectrum disorder. This popularity highlights the great need for tools and resources to help improve communication skills among this population. Traditional communication aids are often overly complex or not specifically tailored to the needs of children with autism, who require more visually-based learning and interaction methods. Therefore, developing specialized communication tools that specifically address the needs of this group represents an attractive business opportunity.

"Star Language Star Wish" aims to meet this need by providing an accessible and engaging platform tailored for children with autism. This app leverages these children's visual learning strengths and provides a comprehensive database of images representing everyday activities, emotions, and objects. This design allows children to express their ideas and needs through their choice of images, greatly reducing the stress and frustration often experienced when trying to communicate verbally.

Moreover, the digital nature of "Star Language Star Wish" allows it to be constantly updated and improved with new features and content in line with the latest educational strategies and technological advances. This adaptability makes it a sustainable and future-proof product that can evolve with continued changes in technology and the special education field.

The commercial benefits of this project are not limited to the direct users (children with autism), but are included in a broader ecosystem including parents, carers, educators, and therapists. By improving communication skills, "Star Language Star Wish" not only improves the quality of children's lives, but also reduces the emotional and practical challenges faced by those who support them. Educators and therapists can use the app as part of structured learning or therapy sessions to make these sessions more effective and engaging.

In terms of market potential, the app has multiple revenue streams, including direct-to-consumer sales, licensing agreements with educational institutions, and partnerships with government and non-government organizations focused on supporting people with disabilities. Open the way to the source. Furthermore, by positioning this application as an essential tool in special education, the potential to expand its scale and scope is enormous.

In summary, "Star Language Star Wish" solves a pressing business problem by filling a gap in the existing market for supportive communication tools for children with autism. We use technology to create greater value for disadvantaged groups, providing more effective and independent ways to communicate. Not only is this project expected to have a significant impact on society, but it also has strong commercial potential and is a prime example of how technology can be used to improve human life. It becomes.

## 5.2 Importance of the project

The "Star Language Star Wish" project holds significant importance both in terms of its societal impact and its strategic value to the organization. This application not only addresses a critical need within the community of individuals with autism by enhancing their communication abilities but also positions the organization as a leader in innovative, inclusive technology solutions that can significantly improve quality of life.

**5.2.1 Societal Impact**

Children with autism face unique communication challenges, which can severely limit their social interactions and overall cognitive development. Traditional communication methods often fail to meet their needs, as these children often require more intuitive and visual forms of interaction. "Star Language Star Wish" fills this gap by providing a platform to transform visual clues into coherent sentences, thereby promoting better understanding and expression among autistic children. By improving communication capabilities, applications directly affect users’ ability to interact with the world around them, enhancing their social integration and independence.

In addition, the app’s design emphasizes ease of use, accessibility and participation, ensuring that children with autism can use the tool with minimal help, thereby cultivating a sense of accomplishment and enhancing their confidence. The positive feedback mechanism and reward system built into the app further enhance the learning experience, making it interesting and stimulating. This not only helps children's cognitive development, but also improves their emotional health by providing a platform for self-expression.

**5.2.2 Strategic Value to the Organization**

For the organization, the “Star Language Star Wish” represents a strategic move that is consistent with its commitment to using technology to benefit society. Developing apps specifically for children with autism demonstrates the organization's dedication to inclusiveness and its role in solving complex social challenges through innovation. The project has enhanced the organization's brand reputation and consolidated its market position as an education and assistive technology pioneer.

In addition, the development and successful deployment of “Star Language Star Wish” has opened up new markets and opportunities for the organization. Demand for education and assistive technologies continues to grow due to rising awareness of the needs of people with disabilities and the push for more inclusive educational practices. By entering this market with powerful, influential products, the organization can not only reap financial benefits, but also build partnerships with educational institutions, health care providers and advocacy groups.

**5.2.3 Organizational Growth and Learning**

The project also promotes organizational development by promoting innovation and learning within the team. Participating in the development of “Star Language Star Wish” requires the team to be creative and empathize to break through the boundaries of traditional application design and functionality to meet specific user needs. This process enriches the team's skills and expands the organization's capabilities in areas such as user experience design, accessibility, and cross-platform development.

In addition, feedback and data collected through the use of “Star Language Star Wish” will provide valuable insights into user behavior and preferences and inform future projects and innovations. This data-driven approach will enhance an organization's ability to respond to market needs and user expectations, driving continuous improvement in its product supply.

All in all, “Star Language Star Wish” is not just a product. This is an important step in realizing the organization's mission of creating influential, inclusive technology solutions. The project not only meets clear social needs, but also promotes the organization's growth, learning and reputation in the technical and educational fields. The success of this project can serve as a model for future efforts, demonstrating the potential of integrating innovation and compassion, technology and humanity.

# Project Objectives and Metrics

## 6.1 Goal of the project

The goal of this project is to develop a specialized application designed specifically for children with autism, enriched with a comprehensive selection of visual content. This application will enable children to seamlessly select images which, in turn, the system will intelligently compile into coherent sentences. This design focuses on enhancing communication for children with autism by providing them with a user-friendly tool that simplifies the expression of thoughts and ideas through visual aids, ultimately facilitating improved interaction and understanding.

## 6.2 Project Deliverables and Metrics

Project Objective 1 – Design application contain three main kinds of pictures, which are people, actions and objects. And these three main category also contain a lot of pictures. For example, under the people, it contains some characters like “me”, “Mother”, “Father”, “Doctor” and so on.

Metric: Using Android Studio to launch the application. Also, the application can be downloaded by the Android System smart phones. The number of users reached 1 million:This metric measures the level of user interaction and engagement with the application. A higher number of users is usually an indication that the app is capturing and retaining the attention of children.

Project Objective 2 – Find the relevant pictures and load them into the application, such as load the “Teacher” into people category, load the “read” into the action category and load the “book” into the object category. Design a function that users can also upload some pictures by themselves.

Metric: Communication Progress: Evaluate the improvement in communication skills among children using the application. This can be measured by tracking the number of sentences constructed, the complexity of language used, and the diversity of words incorporated. Assessing communication progress provides insights into the app's effectiveness in supporting language development.

Project Objective 3 – Test the application’s functions which users are autism children. Children with autism can click one category and choose one or many pictures. After they pick up one or many pictures in one category, they can back to the category chosen page and then choose the other category’s pictures.

Metric: Customer satisfaction reaches 4 out of 5 stars: Collect user feedback through surveys, reviews, or direct feedback mechanisms within the app. After let autism children test the application, their parents should give the feedback of the applications. Qualitative data is analyzed to understand user satisfaction, identify areas for improvement, and assess the overall impact on children and their caregivers. Positive feedback and high satisfaction scores indicate the success of the application.

Project Objective 4 – System will record those pictures then print and read out one sentence. Therefore, children with autism can “speak out”. For example, children choose three pictures which are “me”, “want to eat”, “apple”, then the system will come up a sentence “I want to eat apple.” After the application come up, it should be tested by all types of phone and systems.

Metric: Sustained Usage reaches 80%: Measures the percentage of users who continue to use the application after a certain period of time. A high retention rate indicates that an application is providing ongoing value and meeting the needs of its users. Monitoring retention helps determine whether users are finding the content engaging and whether the app is meeting its long-term goals.

## 6.3 Project Evaluation

Project success is evaluated by following three aspects.

**6.3.1 Project Schedule Monitoring**

The progress of the project will be tracked against the detailed timeline outlined in the Project Plan. This schedule outlines key milestones and deadlines for all project activities. Regular progress updates will be communicated to both the project sponsor, Dr. Zhe S. Chen, and the NYU Course Professor, Dr. Eleftheria K. Pissadaki, through the "Project Weekly Status Report." This report will serve as a crucial tool to ensure that the project remains on track and any deviations are promptly addressed.

**6.3.2 Project Weekly Status Report and Dashboard**

The weekly status report will provide a comprehensive overview of the current status of the project, including a summary of tasks completed, predictions of upcoming activities, and a detailed analysis of any risks and issues encountered. The report will also provide an updated project progress dashboard that provides a visual representation of progress and schedule. The report will be prepared using tools such as Microsoft Word, Excel or PowerPoint to ensure clarity and accessibility. It will be systematically distributed to project sponsors and professors to maintain transparency and promote ongoing feedback.

**6.3.3 Project Communication Plan, Issues Log, and Risk Register**

Effective communication and risk management are important parts of the project management process. The project will utilize a structured communication plan to outline agreements for information-sharing among the project team, sponsors and stakeholders. In addition, a dynamic issue log and a comprehensive risk register will be maintained to record and track any potential obstacles or challenges. The status of these items will be updated regularly and included in weekly status reports and dashboards. This ensures that all parties are fully aware of the health of the project and can quickly implement any necessary mitigation strategies.

# Alternate Solutions Evaluated

## 7.1 Alternate Solutions

During the development of “Star Language Star Wish”, several alternative solutions were considered to ensure that the chosen method best met the needs of children with autism. An evaluation of these alternatives is critical to producing an effective and user-friendly tool. This paper outlines the alternative solutions explored and the reasons why they were not ultimately adopted.

* + 1. **Customization Voice Recognition Software**

One alternative considered is the development of customizable speech recognition software tailored for children with autism. The software will use advanced speech recognition technology to understand and interpret the unique speech patterns of children with autism, converting spoken words into text or commands within the app.

Pros:

1. Personalization: Ability to tailor to each user’s individual speech patterns, potentially improving accuracy over time through machine learning.
2. Hands-free operation: Allows voice commands, reducing the need to physically interact with the device, which is beneficial for children with motor disabilities.

Cons:

1. High development complexity: Developing accurate speech recognition software, especially software that adapts to the different speech patterns of children with autism, is technically complex and resource-intensive.
2. Potential Frustration: Inaccuracies in speech recognition can cause user frustration, especially for children with unpredictable speech patterns.
3. Privacy Issues: Continuous recording raises serious privacy and data security issues, requiring strong protection measures.
   * 1. **Interactive Augmented Reality (AR) Application**

Another alternative is interactive augmented reality apps, which overlay digital images onto the real world via a tablet or smart glasses. This AR tool will allow children to interact with their environment by selecting virtual objects that appear in their surroundings.

Pros:

1. Engaging and immersive: AR can provide a highly engaging, immersive experience that is very motivating for children.
2. Situated Learning: Provide opportunities for situated learning by integrating digital interactions into real-world environments.

Cons:

1. Hardware affiliation: Requires access to AR-capable devices, but these devices may not be widely available or affordable to all users.
2. Usage Complexity: Navigating and interacting with AR can be challenging for users who are new to augmented reality, potentially complicating the user experience.
3. Development challenges: Creating stable, intuitive, and educational AR environments requires significant technical expertise and testing.
   * 1. Visual-Based Communication Application

After evaluating the alternatives, it was decided to develop "Star Language Star Wish", a visual-based communication application. Using a simple, intuitive interface and a comprehensive visual database, the solution allows children to communicate by selecting images, which are then converted into sentences.

Pros:

1. Accessibility: Easy to use on widely used devices such as tablets and smartphones, ensuring broad accessibility.
2. Customization: Allows the image database to be easily updated and customized to suit individual user preferences and needs.
3. Low technical barriers: Simplifies the interaction process, reduces frustration, and makes the technology accessible to children of varying technology proficiency levels.

## 7.2 Solution Evaluation Criteria

When evaluating potential solutions for the Star Talk Star Wish project, developing a clear, objective set of criteria will ensure that the chosen solution effectively meets the project goals and meets the specific needs of children with autism. These criteria are critical in assessing the feasibility, effectiveness, and sustainability of each alternative. The following are the key criteria used to evaluate and select the final solution:

**7.2.1 User Accessibility**

1. Ease of use: Taking into account the different needs and abilities of children with autism, solutions must be easy to understand and operate.

2. Device compatibility: It should be compatible with commonly used devices to ensure wide accessibility without the need for specialized equipment.

3. Interface design: The interface should be intuitive, with visual cues and simple navigation to suit the cognitive and sensory sensitivities of the target users.

**7.2.2 Technical Feasibility**

1. Resource Development: The solution should be feasible within the project budget and resource constraints, including time, technical skills, and financial costs.

2. Scalability: The technology should be scalable and adaptable to accommodate a growing user base and future enhancements.

3. Maintenance requirements: Ongoing maintenance requirements should be manageable, allowing updates to be performed and issues to be troubleshooted efficiently.

**7.2.3 Engagement and Interactivity**

1. User engagement: The solution must effectively engage children with autism, using elements that capture their attention and encourage regular use.

2. Interactive features: It should include interactive elements that promote active participation and learning, which is essential for educational and communication tools.

**7.2.4 Educational and Therapeutic Value**

1. Learning Outcomes: The solution must support educational and communication goals tailored to children with autism, enhancing their ability to express themselves and understand others.

2. Cognitive Development: It should aid in cognitive development including language skills, object recognition, emotion recognition and social interaction.

**7.2.5 Privacy and Security**

1. Data security: The solution must adhere to high standards of data protection and privacy, especially given the sensitivities associated with children with autism.

2. User privacy: It should ensure user privacy through transparent data usage policies and secure data processing procedures.

**7.2.6 Market Viability**

1. Market need: The solution should meet the target market and meet a proven need.

2. Competitive advantage: It should offer clear advantages over existing solutions, such as improved functionality, better user experience, or more efficient results.

**7.2.7 Impact Measurement**

1. Feedback mechanisms: The solution should include collecting user feedback to measure the impact and effectiveness of the application.

2. Performance Metrics: It should support the collection of performance data to facilitate ongoing evaluation and improvement of the application.

**7.2.8 Final Decision**

Based on these criteria, I would ultimately choose the Visual-Based Communication Application as an alternative solution to "Star Language Star Wish". Because it meets all the criteria, especially in terms of user accessibility, technical feasibility, educational value, and privacy security standards. This solution not only meets the immediate communication needs of children with autism, but also offers the possibility of a huge positive impact on their continued development and social integration.

## 7.3 Selection Rationale

The decision-making process for selecting the most appropriate solution for the Star Language Star Wish project was meticulous and centered on a structured framework to ensure objectivity and alignment with the overall goals of the project. The process involves several key stages, each designed to rigorously evaluate potential solutions against established criteria.

**7.3.1 Defining Requirements and Objectives**

The first phase involves a thorough understanding of the needs of children with autism in terms of communication aids. Consultations with education experts, therapists and parents provided insight into the daily challenges these children face. This understanding helps outline specific program goals, including improving communication skills, promoting cognitive development, and ensuring accessibility for children with a variety of needs.

**7.3.2 Identification of Potential Solutions**

Once the needs are clearly defined, the next step is to brainstorm and compile a list of potential solutions. These include innovative technologies such as augmented reality, speech recognition software and vision-based communication applications. A preliminary assessment of each potential solution's relevance and potential impact on the target user group was conducted.

**7.3.3 Detailed Evaluation Against Criteria**

Each solution is then evaluated in detail against established criteria:

**7.3.3.1 User accessibility**

1. Ease of use: A simple interface is designed with large icons and minimal text for easy navigation by children with autism. User testing confirmed the effectiveness of the layout in enhancing autonomous use.

2. Device Compatibility: Tested on a variety of devices to ensure functionality and responsiveness, promoting broad accessibility.

**7.3.3.2 Technical feasibility**

1. Development Complexity: Leverage a modular architecture to simplify updates and troubleshooting, enhancing scalability and maintainability.

2. Scalability: Use cloud services to adapt to growing user numbers and data, ensuring strong performance.

**7.3.3.3 Engagement and interactivity**

1. User engagement: Incorporate gamification elements such as rewards to keep users interested and encourage regular interaction.

2. Interactive Learning: Features interactive scenarios that are evaluated and improved based on therapist feedback to practice communication in real-life settings.

**7.3.3.4 Educational and therapeutic value**

1. Helps communicate: Supports visual sentence making, validated by speech therapists to ensure it meets different user needs.

2. Emotion Recognition: Teaches emotion recognition through visual cues, which is important for social interaction.

**7.3.3.5 Privacy and Security**

1. Data Protection: Adhere to high standards of encryption and regular security audits to protect user data.

2. User Privacy: Comply with strict privacy laws such as GDPR and COPPA, focusing on protecting the data of minors.

**7.3.3.6 Market viability**

1. Market demand: The study found that demand for autism-specific communication tools is strong and has huge potential due to limited direct competition.

2. Competitive Advantage: Stands out due to its professional design and educational features based on expert insights.

**7.3.3.7 Impact measurement**

1. Feedback collection: Provide in-app feedback tools to achieve user-driven continuous improvement.

2. Performance Tracking: Use analytics to monitor usage and measure educational outcomes to ensure the tool is effective in enhancing communication skills.

**7.3.4 Scoring and Ranking**

Each potential solution, including speech recognition software and augmented reality applications, was quantitatively scored based on the extent to which it met predefined evaluation criteria such as user accessibility, technical feasibility, and educational value. The scoring process involves assigning a weight to each criterion, reflecting its importance, which is determined through consultation with stakeholders such as educators, therapists and parents of children with autism. The Visual-Based Communication Application consistently scores high in most criteria, particularly excelling in user accessibility due to its intuitive visual interface and the technical feasibility of its scalable cloud-based architecture.

**7.3.5 Stakeholder Consultation and Feedback**

Draft results of the scoring process were presented to key stakeholders, including project sponsors and potential users. During these consultations, stakeholders reviewed the scores and provided insights based on their experiences and expectations. Their feedback highlighted the need for a highly accessible and easy-to-navigate application, validating the Visual-Based Communication Application's strong performance in these areas. This stage is critical for incorporating real-world insights that help refine solution selection and ensure that the chosen application truly meets user needs.

**7.3.6 Final Selection**

With the help of comprehensive feedback and detailed scores, the final decision was made. The Visual-Based Communication Application stood out as the most suitable choice because of its strong performance in key areas, such as its suitability for children with varying degrees of autism, and its ability to be quickly enhanced and updated based on user feedback. Its high score for educational value, coupled with its potential to facilitate communication through visual cues, makes it a top choice. The decision was also influenced by the solution’s alignment with the project’s strategic goal of improving communication and quality of life for children with autism.

This structured decision-making process not only ensured that the final selection of the Visual-Based Communication Application was thoroughly vetted against rigorous criteria, but also closely aligned with the project's strategic goals and the actual needs of the target user group. It provides a transparent and solid foundation for stakeholder engagement, laying the foundation for successful execution of programs that meet the needs of children with autism.

# Approach and Methodology

The “Star Language Star Wish” app was developed based on a user-centered design approach that focuses on the unique needs and abilities of children with autism. This approach ensures that the application not only meets the functional requirements to enhance communication for users with developmental disabilities, but also provides an engaging and accessible user experience. The development process is iterative and involves multiple stages of design, testing, and feedback to refine the app's functionality and interface.

## Development Stages and Methodologies

**8.1.1 Requirements Gathering**

Initial consultations were conducted with behavioral therapists, special education specialists, and families of children with autism to gather detailed requirements and understand the communication challenges these children face. This stage is crucial to align the design of the application with the real-world needs of end users.

**8.1.2 Prototyping**

A prototype of the application was developed to visualize the basic layout and functionality. The prototypes were used in focus groups with children, their parents, and educators to gather feedback on usability and engagement.

**8.1.3 Design and Feature Implementation**

Based on insights gained during the prototyping phase, the full app was designed with a focus on simplicity and visual appeal, which are crucial to engaging children with autism without overwhelming them. The application includes several key features:

1. **Image upload and display:** A simple and intuitive interface has been developed that allows users to select images from the device or capture new images using the camera. Images are displayed on a centralized canvas for easy organization and manipulation.
2. **Recording and playback:** Each image can complement the recording, enhancing the multimodal learning experience. The audio interface is simple, allowing kids and parents to record their own or voices.
3. **Dynamic content management:** The application supports dynamic updating of content, and users can add or remove images and audio as needed. This flexibility allows for personalized and evolving use of the application.
4. **Interactive navigation:** A well-designed navigation bar and intuitive touch interactions help you navigate through the app, making the app suitable for a variety of uses.

**8.1.4 Event-Driven Architecture and Data Management**

Leveraging EventBus, the application efficiently manages updates between different components, ensuring smooth and responsive interactions. A persistent storage mechanism was implemented using the capabilities of the development tool Uni-app, which helps maintain user data integrity across sessions, which is critical for building a consistent learning environment.

**8.1.5 Responsive Design and Accessibility**

To ensure that the application is accessible to all users regardless of device, we implemented a responsive design. This design can be adjusted to fit the screen size and orientation of a variety of devices, from tablets to smartphones. Accessibility features such as image text descriptions and auditory cues complement the visual content, making the application accessible to a wider range of people, including those with visual impairments.

## Testing and Iteration

The app went through an extensive testing phase, which included testing and testing of all features and experiences of sponsors to ensure that the interface and features were not only fully functional, but also engaging and effective in improving communication. Feedback from these meetings is used to make iterative adjustments to the design and functionality of the app. In the future, children with autism will be allowed to experience and test it.

## Deployment and Feedback Loop

Once launched, the app is monitored for user engagement and effectiveness. Regular updates and improvements are planned based on ongoing collection of user feedback and performance data. This ongoing feedback loop is integral to the long-term success and relevance of your app.

By taking this comprehensive, user-centered approach, the “Star Language Star Wish” project not only addresses a significant gap in communication assistance for children with autism, but also sets the standard for future educational technology developments. Through careful design, testing and iteration, the project maximizes its impact on the target user group, enhancing their ability to communicate and interact with the world around them.

# Results

## 9.1 Usage method and Results

The "Star Language Star Wish" application passed the test and ran smoothly. Here's how the application is used and the results:

* + 1. **Application Installation and Access**

1. On mobile devices such as ios and Android, it can be installed through a packaged installation package.
2. On the PC side, through GitHub, you can download the code and simulate it in the browser.
   * 1. **Application Usage Method**

During the development process, the development tool I mainly used was uni-app. Uni-app is a framework for developing all front-end applications using Vue.js. It enables developers to use a set of code to simultaneously publish to multiple platforms such as iOS, Android, web pages (Web), and various small programs. In short, uni-app is a cross-platform development solution designed to improve development efficiency and reduce development costs.

1. **Navigating the Main Interface**

Main Interface contains three key areas: Navigation bar, Canvas, and button container.

(1). Navigation Bar

Location and Functionality: The navigation bar is fixed at the top of the screen to ensure it is always accessible, regardless of the user's position on the page.

Components:

Title: Displays the name of the application, "Star Language Star Wish," which is centrally aligned for prominent visibility.

Settings Icon: Located on the right-hand side, this icon (styled as a gear) allows users to access settings. Clicking this icon can lead to a settings menu where users can adjust preferences, manage accounts, or access help.

1. Canvas

Location and Functionality: The canvas occupies a central position on the screen, directly below the navigation bar. It serves as the main interactive area where images are displayed and manipulated.

Display of Images: Users can see their selected images displayed on the canvas. This area is interactive, allowing for tasks such as resizing, dragging, or editing images.

Audio and Text Integration: Associated audio plays can be triggered from this area, and text descriptions are shown directly on or beside the images.

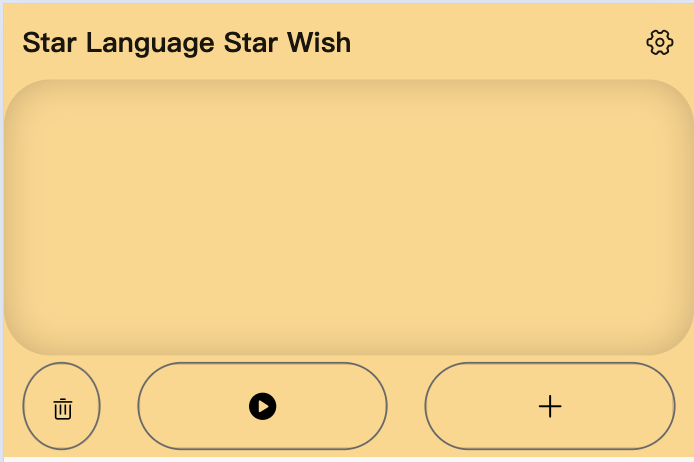
1. Button Container

Buttons:

Clear Canvas: This button allows users to remove all current content from the canvas, giving them a clean slate for new entries.

Play Audios: Initiates the playback of audio associated with the images on the canvas, useful for auditory learning or review.

Add New Entry: Opens a new page or modal where users can upload new images, record audio, and write descriptions.

Fig. 9-1 Main Interface

1. **Adding New Entries**

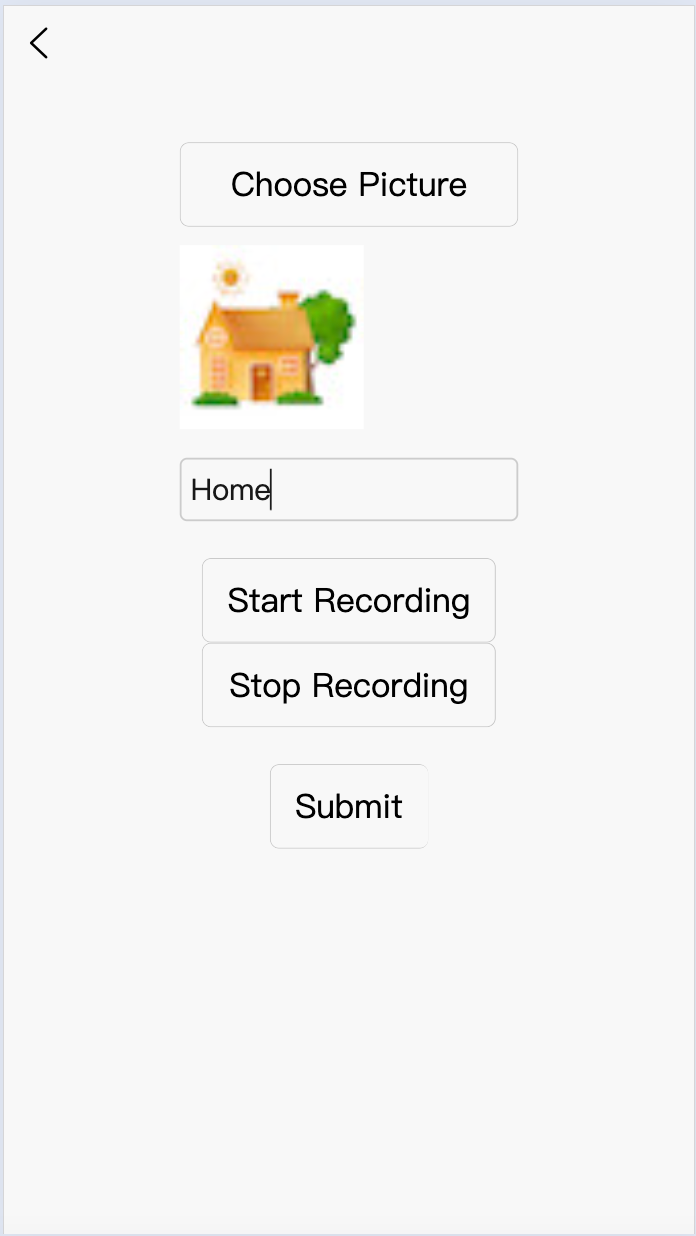
After clicking the Add New Entries button, the system will be reprinted to another add page.

1. **Choosing Pictures and Adding Descriptions**

In this page, users can choose to add pictures from their own albums or photos taken, and users can also write the descriptions for these pictures. These pictures can be of some furniture in the home, or they can be of members of the family. These self-added images can help children with autism better understand the environment and members of the family.

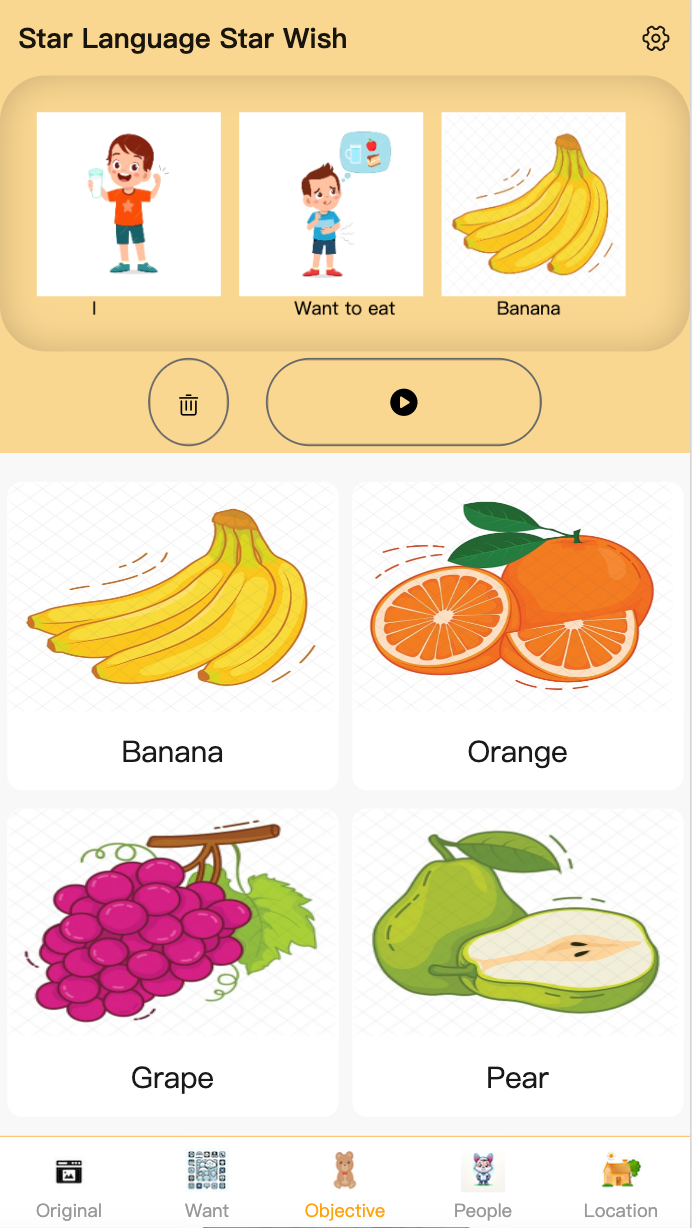
1. **Recording Audio**

Users can also record their own voice on this page. When the user clicks Start Recording, the application starts recording what the user says. When the user is finished speaking, click Stop Recording and the audio recording will stop. Through this function, when subsequent users click and play their added pictures, they will make their own recorded sound. For example, mothers can record some content with their own voice, which can help autistic children better familiarize themselves with their mother's voice when they use and click on it.

 Fig. 9-2Adding New Entries Page

1. **Click on the pictures and link them into sentences**

When the user clicks on an image in the main screen, the image will be displayed in the Canvas. And when clicking on the picture, the system will play the name of the picture, such as clicking on the picture of a Banana, the system will play the audio of "banana". Through the Play Button, the system will link the pictures in the Canvas into a sentence, and the sentence will be displayed below the picture. Users can use the bottom navigation to select different categories of pictures.

 Fig. 9-3 Main Function

* + 1. **Results of Using the Application**

After extensive testing, the “Star Language Star Wish” has shown significant benefits for children with autism. This interactive tool has significantly enhanced their communication skills to a certain extent and also slightly increased the frequency of their interactions.

9.1.3.1 Benefits of the Application:

1. Enhanced Sensory Stimulation:

The application's rich visual and auditory content engages children with autism, promoting the learning of new concepts and vocabulary through vivid images and sounds. This enhances their language skills and cognitive development.

1. Structured Learning Environment:

"Star Language Star Wish" provides a structured learning environment with an organized interface and intuitive navigation. This is crucial for children with autism, who often need a stable and predictable environment.

1. Encouragement of Social Interaction:

Designed to include multi-user interaction, the app allows children to engage in activities with parents or peers, aiding them in practicing social skills in a safe setting.

1. Customizable Content:

Users can upload and modify content, including images and audio, customized to their children's specific interests and educational needs. This customization helps parents and educators adapt materials to fit individual learning requirements.

1. Boosting Self-Confidence:

Successfully using the app and understanding its content can build self-confidence in children with autism. Every successful interaction is an increase in their self-efficacy.

## 9.2 Repository of Data Sets and Code

The data sets created for this project and the code for the tool may be found at: https://github.com/JunjieClark/Star-Language-Star-Wish.git.

## 9.3 Summary of Results

In conclusion, the “Star Language Star Wish” has proven to be a valuable tool for children with autism, enhancing their communication skills and increasing the frequency of their interactions. It provides enhanced sensory stimulation through visual and auditory stimulation, helping children learn new words and concepts and supporting language and cognitive development. The app's organized interface provides a structured learning environment, which is crucial for children with autism. It encourages social interaction with caregivers and peers, developing social skills in a controlled environment. Users can customize images and audio to meet individual educational needs, making it adaptable to different learning preferences. The app's success increases children's confidence and willingness to engage further, and serves as a support tool for speech therapists, aiding with therapeutic exercises and communication. Overall, Star Talk Star Wish supports the social, emotional and cognitive development of children with autism, demonstrating its effectiveness as an educational and therapeutic resource.

# Risk Analysis

Risk 1: User Engagement and Retention: Ensuring the application remains engaging and valuable to children with autism over time, preventing drop-off in usage.

Strategy 1: Develop a feedback mechanism within the app to collect user suggestions and improvements regularly. Implement a feature update roadmap based on this feedback to keep the application fresh and engaging.

Happened/Not: Happened. I have not yet had autistic children experience the app personally during the testing phase, but the next step is to find an organization and allow autistic children to experience it.

Risk 2: Accuracy of Image-to-Text Conversion: The technology used must accurately interpret and convert selected images into coherent, contextually appropriate sentences.

Strategy 2: Collaborate with specialists in natural language processing to enhance the algorithm over time. Plan for periodic updates to improve accuracy based on user feedback and technological advancements.

Happened/Not: Happened. I added some auxiliary words before and after the verb through the code in advance, so the sentences formed by the system will be much smoother.

Risk 3: Content Relevance and Diversity: Maintaining a comprehensive, diverse, and relevant image database that accurately reflects the daily experiences, emotions, and needs of children with autism.

Strategy 3: Establish partnerships with educators, therapists, and parents for continuous content review and update. Create a community-driven feature allowing users to suggest new images and content, vetted by experts before inclusion.

Happened/Not: Not Happened. Because the picture sources I have found are relatively rich, and the function of users adding pictures independently has been successfully added.

Risk 4: Technical Compatibility and Performance: Ensuring the application performs reliably across a wide range of devices and operating systems without causing devices to lag or crash due to memory overload from added pictures.

Strategy 4: Conduct extensive testing across a wide range of devices and operating systems early in development. Plan for a beta testing phase to identify and address performance issues before full release.

Happened/Not: Not Happened. Because I packaged different apps for ios and Android so there were no system incompatibilities. And when the user adds the picture, the picture will be automatically compressed, reducing the memory usage.

Risk 5: User Privacy and Data Security: Protecting sensitive user information, especially considering the vulnerable user base of children with autism.

Strategy 5: Implement robust encryption and data protection measures from the outset. Regularly audit security protocols and conduct penetration testing to identify vulnerabilities. Offer regular security updates to users.

Happened/Not: Data was strictly controlled according to professional requirements, and there was no leakage.

Risk 6: Feedback and Iterative Improvement: Collecting and effectively incorporating user feedback into continuous updates to improve the application's functionality and user experience.

Strategy 6: Design the app with scalability in mind, allowing for easy updates and modifications. Set aside budget and resources for continuous development based on user feedback cycles.

Happened/Not: Happened. After the application was developed, I did not set up real-time system usage monitoring in the background, because that would take up a lot of memory and potentially invade user privacy. So I put a question feedback button on the app.

Risk 7: Accessibility and Ease of Use: Designing an intuitive, easy-to-navigate interface that accommodates the varied abilities and preferences of children with autism.

Strategy 7: Involve user experience (UX) experts and children with autism in the design process to ensure the interface is intuitive. Plan for iterative design enhancements based on usability testing results.

Happened/Not: Not happened. The navigation bar is very clear and easy for users to see and use.

Risk 8: Expert Collaboration and Endorsement: Securing ongoing collaboration with experts in autism education and therapy to ensure the application's content and design are effective and endorsed by professionals.

Strategy 8: Build a diverse advisory board of experts in autism, education, and child psychology to guide development. If specific collaborations falter, have a network of professionals to turn to for continued support.

Happened/Not: Happened. At present, we have not found any professional or organization willing to cooperate for a long time, and we will try to find more organizations to cooperate after further development and development of the application.

Risk 9: Funding and Resource Allocation: Acquiring sufficient funding and resources for development, maintenance, and marketing of the application to reach its intended audience.

Strategy 9: Diversify funding sources through grants, crowdfunding, and partnerships. Develop a lean operating model to adjust quickly in response to financial pressures without compromising project quality.

Happened/Not: Not happened. Because it does not require a lot of money for maintenance and development at this stage, it may be needed later when more features are developed.

Risk 10: Market Penetration and User Acquisition: Effectively marketing the application to reach a wide audience of potential users, including children with autism, their parents, caregivers, and educators.

Strategy 10: Create a multi-channel marketing strategy focusing on social media, partnerships with schools and therapy centers, and parent networks. If initial strategies do not yield expected results, pivot based on market feedback, focusing on the most effective channels.

Happened/Not: Not happened. Because the application not ready to be rolled out yet.

# Issues Encountered

While working on the "Star Language Star Wish" project, I encountered several issues, all of which were minor and did not have a major impact on the project. Thanks to the robust risk management strategies in place, all issues were promptly addressed and resolved, allowing the project to be completed on time and with high quality. Below is a detailed overview of the types of issues the project team faced during the duration of the project:

## Compatibility Across Devices

Issue: Preliminary testing shows that older device models have slower response times when loading high-resolution images.

Resolution: I optimized the image files and implemented a dynamic content loading system that adjusts image quality based on the capabilities of the device. This solution not only solves immediate compatibility issues but also enhances the overall user experience across devices.

## User Interface Navigation

Issue: Feedback from early testing indicated that navigation between different parts of the app was confusing.

Resolution: I responded by simplifying the interface, using larger icons, and a more intuitive interface display tailored to the needs of children with autism.

## Audio Playback Reliability

Issue: There is an intermittent issue with audio playback, where the audio clip does not always start immediately after selection.

Resolution: I implemented a more robust audio management system that preloads audio files when entering a session, thus reducing latency. This solution ensures a smoother and more reliable user experience.

## Feedback Collection Mechanism

Issue: The initial functionality to collect user feedback had the desired effect, thereby limiting user feedback to mobile phones.

Resolution: I increased the visibility and accessibility of feedback and tried to provide a small incentive for feedback submission. These changes significantly increased user engagement in the feedback process, providing valuable insights for further improvements.

## Image-to-Text Conversion Accuracy

Issue: Early iterations of the image-to-text feature sometimes produced incorrect sentences, which could confuse users.

Resolution: I made the app improve the accuracy of its text generation by adding auxiliary words upfront and updating it as I used it. This is critical to ensuring that the tool meets its educational and communication objectives.

# Project Chronology and Critique

The “Star Language Star Wish” project unfolded in several distinct phases, each making a unique contribution to the final product. This section presents the progress of the project in chronological order and reflects on aspects that could have been enhanced.

## Initiation Phase

Goal Setting: The project began by defining clear goals based on the needs of children with autism for better communication tools.

Sponsor involvement: Early in the project, sponsors who are educators are involved to gather insights and requirements to ensure the application is user-centered and effective.

## Planning Phase

Technology Choice: Decisions were made regarding the technology stack, including using Uni-app for application development and cross-platform compatibility, and EventBus for efficient data processing.

Risk Management Planning: A comprehensive risk management plan is developed that identifies potential barriers and details strategies to mitigate these risks.

## Development Phase

Prototyping: I created initial prototypes for use in user testing sessions to gather feedback and iteratively refine the design.

Function development: Developed key functions such as image uploading, audio recording, dynamic content management and picture conversion to sentences. Regular reviews and adjustments based on ongoing testing and sponsor feedback.

## Testing Phase

User testing: The app went through rigorous testing involving children with autism to ensure the interface is intuitive and engaging. The feedback collected is crucial to improving the application.

Performance Optimization: The app is optimized for various devices to ensure smooth performance, with a special focus on older and less powerful devices.

## Deployment Phase

Application packaging preparation: Design different application installation packages for different operating systems.

Rollout plan: The application is launched within a unified testing organization and comes with full support and documentation.

## Critique and Reflection

1. Early and more extensive testing: While extensive testing occurs, starting this phase early and potentially broadening the testing base can uncover usability issues more quickly, thereby reducing the need for later adjustments.
2. Increased focus on accessibility: Although the app was designed with accessibility in mind, a more thorough preliminary study of accessibility standards and technology could enhance the app's usability for children with disabilities.
3. Enhanced sponsor engagement: While sponsor feedback is an integral part of the development process, more consistent and structured engagement can provide deeper insights, especially from a professional perspective.
4. Resource allocation for unexpected delays: Properly planning for unexpected delays by allocating more resources and time can reduce stress and ensure a smoother workflow.

Overall, the "Star Language Star Wish" project effectively achieved its goals and provided a valuable tool for communication among children with autism. Lessons learned from this project will undoubtedly inform future projects and potentially improve efficiency and product quality. An ongoing commitment to iterative improvements based on user feedback highlights the project's commitment to meeting and exceeding user needs.

# Lessons Learned

Throughout the course of the Applied Projects course, I gained a wealth of valuable skills and insights, particularly in the areas of project management, sponsor engagement, technology development, and user-centered design. These courses not only enhanced my academic knowledge but also provided practical skills that will benefit me in my future career.

## Mastery of Technical Skills

One of the key areas where I have gained considerable expertise is in the technical development of applications tailored to specific user needs. Prior to this project, I had limited experience developing applications, particularly those for users with special needs such as children with autism. Throughout the course, I learned to use tools like Uni-app to create cross-platform applications, and EventBus to manage data flow and state across components. This technical knowledge was critical to the successful implementation of the "Star Language Star Wish" application, which required a responsive and intuitive user interface to meet the unique needs of its users.

## Enhanced Project Management Skills

Project management is another key area that I developed on this course. I learned how to effectively plan and execute projects from conception to launch. This includes developing a comprehensive project plan, setting realistic timelines, and managing resources effectively. I also gained a deeper insight into risk management - strategies for identifying potential risks early in the project life cycle and developing mitigation plans. These skills are put to the test while managing different elements of the project, ensuring that every phase from development to deployment is executed on schedule and within budget.

## Improved Sponsor Engagement

Engagement with sponsors is perhaps one of the most enlightening aspects of the course. I learned from the early stages of a project the importance of involving all relevant sponsors, including end users. Through regular interactions with educators and sponsors, I was able to gather important feedback that significantly impacted the design and functionality of the app. This process taught me valuable lessons about communication, empathy, and the importance of incorporating different perspectives into the development process to create products that truly meet user needs.

## User-Centered Design and Accessibility

Another important area of study is user-centered design, with a particular focus on accessibility. Designing apps for children with autism requires a deep understanding of their interaction patterns and preferences. I learned how to design interfaces for kids with varying cognitive and motor skill levels that were not only visually appealing, but also easy to navigate. This includes implementing features such as simple navigation bars, large interactive elements, and audio feedback, which significantly enhance the user experience.

Applied project courses help bridge the gap between theoretical knowledge and practical applications. It allowed me to apply what I learned to real-world situations, enhancing my technical skills, project management abilities, and understanding of user-centered design. These experiences not only prepared me for future projects in my career, but also instilled in me a passion for creating technology solutions that solve real-world problems. The lessons learned from this project will undoubtedly influence my approach to future endeavors, encouraging me to take a holistic and inclusive perspective in all my professional activities.

# Conclusion and Summary

The completion of the “Star Language Star Wish” project marks an important milestone in the development of augmentative and alternative communication (AAC) tools tailored for children with autism. This project not only demonstrates the power of technology in solving real-world problems, but also highlights the importance of careful project planning, sponsor collaboration, and user-centered design.

## 14.1 Project Outcomes

The "Star Language Star Wish" application successfully achieves its primary goal of providing a dynamic and intuitive platform for children with autism to enhance their communication skills. By integrating visual and auditory elements into an accessible user interface, the app allows children to use images to form coherent sentences, thereby promoting more effective communication. Feedback from initial users – people from organizations and educators who care for children with autism – has been overwhelmingly positive, highlighting the app’s potential to make a real difference to the lives of children with autism.

## 14.2 Key Achievements

1. **Technology Development:** The project effectively utilizes modern development tools and practices to create a cross-platform application that is both scalable and robust. The use of Uni-app and EventBus ensures that the application provides a consistent user experience across different devices and platforms.

2. **Sponsor Engagement:** Ongoing engagement with sponsors is critical throughout the project lifecycle. Their insights not only shape the development process but also ensure that the application meets the real needs of end users.

3. **User-centered design:** One of the project’s outstanding features is its focus on user-centered design. The app has been developed with the feelings and perspectives of its intended users - children with autism and their carers - ensuring it is accessible and suitable for their needs.

## 14.3 Lessons Learned

The program offers numerous learning opportunities, particularly in the areas of project management and user experience design. The importance of early and continuous testing is one of the key lessons, as it allows for iterative improvements that significantly enhance the final product. Additionally, the project highlights the need to involve all sponsors and professors in a feedback loop to ensure the product not only meets but exceeds user expectations.

## 14.4 Future Directions

Going forward, there's a lot of room to expand the functionality and reach of applications. Future updates could incorporate more sophisticated natural language processing algorithms and the use of AI to improve image-to-text conversion accuracy, and introduce new features such as customizable avatars and interactive games to make learning more engaging for children with autism. . Additionally, expanding the app’s language options makes it accessible to a wider global audience.

## 14.5 Conclusion

In conclusion, the “Star Language Star Wish” project demonstrates how targeted technology solutions can address specific needs within communities, particularly for children with developmental disabilities. The project not only achieved its stated goals but also paved the way for future innovations in the field of educational technology for special needs education. As the application continues to be refined and expanded upon this initial success, the potential to positively impact more lives continues to grow, driven by a commitment to inclusivity, innovation, and continuous improvement.

GitHub Link: <https://github.com/JunjieClark/Star-Language-Star-Wish.git>

# Limitations, Recommendations and Scope for Future Work

The “Star Language Star Wish” project has made significant progress in enhancing communication for children with autism through tailored augmentative and alternative communication applications. However, like any project, it has its limitations, which opens up various opportunities for further development and enhancement. Even as this project was able to deliver as expected, there are still some limitations within this project and some of the limitations may be improved in the future similar projects in NYU MASY.

## Limitations

1. **Language support:** The current version of the app only supports a limited number of languages, which may limit its usability in non-English speaking regions. Expanding language options is critical to making the app accessible to a global audience.
2. **Advanced customization features:** While the app allows basic customization in terms of selection of images and audio, it lacks deeper personalization options that could enhance user engagement, such as customizing the interface based on user preferences or cognitive abilities.
3. **Integration with other educational tools:** Currently, the app operates independently and is not integrated into wider educational or treatment programs. Integration with other tools can provide a more comprehensive educational experience for children with autism.
4. **Data Analysis Features:** The app does not currently capture detailed usage data, which may help understand user engagement and improve app functionality based on actual usage patterns.

## Recommendations

1. **Extended language support:** Future versions of the app should include additional language packs to cater to non-English speakers. This may involve working with linguists and educators to ensure translations are accurate and contextual. And it can use AI to generate speech and learn the user's voice, which can greatly reduce the post-production workload and improve the user experience.
2. **Develop advanced customization tools:** Enhance application customization capabilities, allowing users to adjust the audio-visual elements of the interface to their specific needs. This could include resizable text, different color schemes for better visibility, and custom sound options.
3. **Integrate with educational frameworks:** Work to integrate the app with existing educational tools and frameworks used by children with autism. This could facilitate a more comprehensive approach to education and treatment, potentially increasing the effectiveness of the application.
4. **Integrated data analytics:** Implement analytics capabilities to collect and analyze user interaction data with full respect for privacy and security. This data can be invaluable for continuous improvement of the application based on user behavior and feedback.

## Scope for Future Work

1. **Machine learning enhancements and AI usage:** Implementing machine learning algorithms can improve an application’s ability to generate coherent sentences from images, making communications more natural and effective. The use of AI can improve the user experience and enhance the intelligence of applications.
2. **Community-driven content development:** Developing a community platform where users can suggest and share new images and content can help keep the app relevant and continually enriched with new material.
3. **Long-term impact study:** Conduct a longitudinal study to assess the long-term impact of the app on communication skills and social integration in children with autism. This can help refine the application based on long-term results and user needs.
4. **Accessibility and inclusion:** Further work could focus on enhancing accessibility features to include support for children with other disabilities, such as visual impairment or hearing loss, thereby broadening the app's user base.

Although the "Star Language Star Wish" application was successfully developed, the journey did not end there. Each limitation and recommendation provides avenues for further research and development. By addressing these areas, the program can expand its reach and efficacy, ultimately providing stronger support for children with autism and their caregivers. The scope of future work is large and promises not only to enhance existing frameworks but also to explore new areas of assistive technology.

# Literature Survey

In the contemporary digital era, the omnipresence of technology has transformed the landscape of communication, revolutionizing how individuals interact and connect with one another. Despite the remarkable advancements in communication technology, there remains a significant segment of the population grappling with formidable challenges in verbal communication. These challenges can stem from a myriad of factors including developmental disabilities, acquired conditions, or linguistic barriers. As a response to this pressing need, augmentative and alternative communication (AAC) applications have emerged as indispensable tools, offering individuals with communication difficulties alternative avenues to express themselves, engage with their surroundings, and participate meaningfully in social interactions.

Star Language Star Wish stands at the forefront of this technological evolution, embodying the ethos of accessibility and inclusivity through its innovative platform. By providing users with a curated collection of visual aids in the form of picture cards, Star Language Star Wish empowers individuals with communication challenges to construct sentences, convey emotions, express needs, and navigate everyday interactions with greater ease and confidence. The inclusion of voice sound files further augments the user experience, facilitating auditory comprehension and aiding in language development.

However, while AAC applications like Star Language Star Wish have made significant strides in addressing communication barriers, there remains an imperative to delve deeper into their efficacy, impact, and potential areas for improvement. This study endeavors to explore the existing literature surrounding AAC applications, with a specific focus on Star Language Star Wish, to gain insights into its utility, effectiveness, and implications for individuals with communication difficulties. By critically analyzing the literature, this research seeks to contribute to the ongoing discourse surrounding AAC technology and pave the way for future advancements in the field, ultimately enhancing communication accessibility and fostering greater inclusion for all.

The extant body of literature pertaining to AAC applications offers a wealth of knowledge regarding their efficacy, benefits, and challenges in supporting individuals with communication difficulties. Numerous empirical studies have underscored the transformative impact of AAC tools, such as Star Language Star Wish, in facilitating communication, language development, and social interaction across diverse populations. For instance, research by McNaughton and Light (2013) elucidated the instrumental role of mobile AAC technology in empowering individuals with communication challenges, enabling them to overcome barriers and engage meaningfully in various social and educational contexts.

Moreover, investigations into the educational applications of AAC technology have yielded promising results, highlighting its potential to enhance learning outcomes and academic participation for students with diverse needs. McCarthy and Swierenga (2019) demonstrated the efficacy of incorporating AAC tools like Star Language Star Wish in language learning environments, facilitating vocabulary acquisition and promoting linguistic proficiency among English learners. Similarly, Alper et al. (2019) emphasized the importance of inclusive educational practices and the role of AAC applications in fostering an inclusive learning environment conducive to the diverse needs of students.

Additionally, studies examining the social dynamics and support systems of families utilizing AAC have shed light on the critical role of familial support and community resources in promoting communication success. Blackstone (2013) conducted a qualitative inquiry into the social networks of families of children using AAC, highlighting the significance of familial bonds and external support systems in fostering communication competence and social integration.

Despite the promising findings, challenges persist in the design, implementation, and utilization of AAC applications. Tøssebro (2015) expounded upon the paradox of supported communication for individuals with severe disabilities, emphasizing the need for personalized support and innovative inclusion strategies to address the unique needs of this population. Similarly, Albrecht and Devlieger (1999) delved into the disability paradox, elucidating instances of individuals with disabilities experiencing high-quality life despite prevailing societal stigmas and structural barriers.

In summation, the literature reviewed in this study illuminates the multifaceted landscape of AAC applications and their profound impact on individuals with communication difficulties. AAC tools like Star Language Star Wish serve as catalysts for empowerment, offering individuals alternative modalities for communication, self-expression, and social engagement. The findings underscore the transformative potential of AAC technology in fostering communication accessibility, promoting language development, and enhancing social inclusion for individuals with diverse needs.

However, while AAC applications have made significant strides in addressing communication barriers, there exist persistent challenges and opportunities for improvement. Issues such as personalized support, inclusive design, and societal attitudes toward disabilities necessitate ongoing attention and concerted efforts to enhance the effectiveness and accessibility of AAC tools. By addressing these challenges and building upon the insights gleaned from the literature, future advancements in AAC technology can further empower individuals with communication challenges to navigate the complexities of social interaction and thrive in diverse environments.

Through collaborative endeavors among researchers, developers, educators, and stakeholders, we can chart a course towards a more inclusive and accessible future where communication barriers are minimized, and all individuals have the opportunity to express themselves, connect with others, and participate meaningfully in society. This study contributes to this collective endeavor by providing a comprehensive analysis of AAC applications, shedding light on their efficacy, challenges, and implications for communication accessibility and inclusion.

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# Appendix A - Project Acceptance Document

**Sponsor’s Project Acceptance Document**

*This document is the means by which your project sponsor formally agrees that your project has been satisfactorily completed and that it meets the project goal and objectives that were set at the onset of the project. It is therefore important that you describe the goal, objectives, and related metrics in the appropriate section below. The “PLAN” section is to be prepared at the beginning of the project and the “RESULTS” and “ACCEPTANCE” sections after your project has been completed. Your sponsor should provide input and sign where indicated. The signed document will also be a required section in your Project Final Report. This document is a template whose sections may be expanded as necessary.*

**PLAN**

(To be filled out and signed at the **start** of the project)

**Project Name: \_\_\_\_\_\_\_\_\_Star Language Star Wish\_\_\_\_\_\_\_\_\_\_\_\_**

**Student Name: \_\_\_\_\_\_\_\_\_\_\_\_Junjie Jia\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Sponsoring Organization: \_\_\_\_\_\_\_\_New York University\_\_\_\_\_\_\_\_\_\_\_\_**

**Project Sponsor Name and Title: \_\_\_\_\_\_Zhe S. Chen, PhD, Associate Professor, Departments of Psychiatry and Neuroscience and Physiology\_\_\_\_\_\_\_\_\_**

**Project Sponsor Contact Information (email and phone): \_\_\_\_Email : zhe.chen@nyulangone.org**

**Phone: 646-754-4765\_\_\_\_\_**

**Planned Start Date: \_02/09/2024\_\_ Planned End Date: \_05/02/2024\_\_**

**PROJECT PLAN**

At the project start, show the project goal; the project objectives, and related metrics to be used to show successful project completion. The sponsor should sign to indicate agreement. Please use PDF version for signatures

**Project Goal\_\_\_\_** 1 Develop an application tailored for children with autism,

featuring an abundance of visual content. Through this application, children can select images effortlessly, and the system will subsequently compile these images into coherent sentences.

**Objective #1\_\_\_\_** Design application contain three main kinds of pictures, which are people, actions and objects. And these three main category also contain a lot of pictures. For example, under the people, it contains some characters like “me”, “Mother”, “Father”, “Doctor” and so on.

**Objective #2\_\_\_\_** Find the relevant pictures and load them into the application, such as load the “Teacher” into people category, load the “read” into the action category and load the “book” into the object category. Design a function that users can also upload some pictures by themselves.

**Objective #3\_\_\_\_** Test the application’s functions which users are autism children. Children with autism can click one category and choose one or many pictures. After they pick up one or many pictures in one category, they can back to the category chosen page and then choose the other category’s pictures.

**Objective #4\_\_\_\_** System will record those pictures then print and read out one sentence. Therefore, children with autism can “speak out” . For example, children choose three pictures which are “me”, “want to eat”, “apple”, then the system will come up a sentence “I want to eat apple.” After the application come up, it should be tested by all types of phone and systems.

**I agree with the above-planned project goal, project objectives, and related metrics.**

**\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_02/13/2024\_\_\_\_\_\_\_\_\_**

**Project Sponsor Signature Date**

**RESULTS**

(To be filled out and signed at the **end** of the project)

**PROJECT RESULTS**

**Planned Start Date: \_02/09/2024\_\_ Planned End Date: \_05/02/2024\_\_**

**Actual Start Date: \_02/09/2024\_\_ Actual End Date: \_04/23/2024\_\_**

If actuals differ from planned dates, the revised dates (Actual) are accepted by the sponsor if initialed here: **Sponsor Initials** \_\_Chen\_\_\_

**Project Goal**

Was the project goal achieved as planned? ☑Yes □No **Sponsor Initials** \_\_Chen\_\_\_

**Project Objective #1:** <as shown above in Plan section>

*Did the student’s project meet this objective with associated measures and metrics as established at project inception?*

**Objective#1 🗹**has or **🞏**has not been met. **Sponsor Initials** \_\_Chen\_\_\_

*If not met please explain why this is or is not an acceptable deviation*.

**Objective#2 🗹**has or **🞏**has not been met. **Sponsor Initials** \_Chen\_\_

*If not met please explain why this is or is not an acceptable deviation*.

**Objective#3 🗹**has or **🞏**has not been met. **Sponsor Initials** \_\_Chen\_\_\_

*If not met please explain why this is or is not an acceptable deviation*.

**Objective#4 🗹**has or **🞏**has not been met. **Sponsor Initials** \_\_Chen\_\_\_

*If not met please explain why this is or is not an acceptable deviation*.

**Sponsor’s Overall Evaluation of student’s performance:** \_\_\_\_The overall function is very perfect, but also reached the expected goal. There is still some room for improvement in the future, such as customization for certain content, such as classroom communication, family communication and so on. In the future, AI technology can be introduced to further optimize and intellectualize the content.\_\_\_\_\_\_(*expand, as necessary*)

**ACCEPTANCE**

(To be filled out and signed at the **end** of the project)

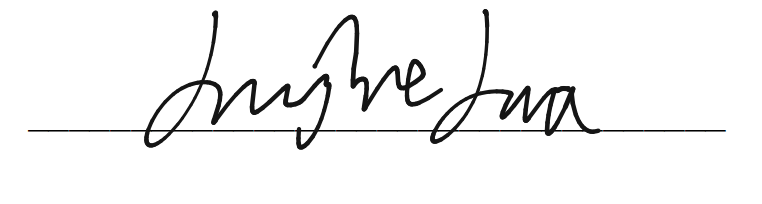
**PROJECT ACCEPTANCE**

☑ Project was completed satisfactorily and is hereby accepted

☑ Project was completed satisfactorily but did not meet all objectives, as shown above.   
The Project is, nevertheless, accepted.

**\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_04/23/2024\_\_\_\_\_\_\_\_**

**Project Sponsor Signature Date**

****

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_04/23/2024\_\_\_\_\_\_\_\_**

**Student Signature Date**

# Appendix B - Project Sponsor Agreement

**New York University**

**MS in Management and Systems**

**Applied Project**

**Project Sponsor Agreement**

### Goals of the Program

**For Participating Organizations**

* Begin relationship with New York University
* Receive help from highly trained NYU graduate student
* Provide internship opportunity for NYU graduate student
* Receive assistance at no cost

**For NYU Graduate Students**

* Manage and implement a meaningful project aligned with their professional and educational goals
* Hands-on experience interacting with a start-up or operational small business or organization
* Earn credit toward completion of graduate degree by conducting an unpaid Applied Project under the mentorship of an NYU-SCPS professor.

### Project Sponsor and Student Responsibilities

* Student prepares project planning documents
* Sponsor reviews and approves student’s project plan
* Student submits project plan to faculty supervisors for approval
* Student conducts project according to plan
* At predetermined milestones sponsor reviews and approves status reports submitted by student
* Status reports reviewed and evaluated by faculty supervisors to assure student effort and project meet course requirements
* Project sponsor and student participate in periodic project reviews with NYU
* At project completion project sponsor completes evaluation forms
* Student prepares final report

### Project Selection Process

* Project Evaluation Committee reviews proposed projects
* Projects are:
  + Relevant to MS degree course content
  + Significant to the participating organization
  + Substantial in terms of duration and scope
  + Challenging to the student
  + Capable of being measured against predetermined goals

### The MS in Management and Systems

**Concentrations in:**

* Strategy and Leadership
* Systems Management
* Database Technologies
* Enterprise Risk Management

**Typical Participating Student Profile**

* Students selected to participate in this program meet stringent criteria
* Have completed all coursework
* High achievers with highest level GPAs and strong academic credentials
* 2-10 years of business experience
* Highly motivated for success

### Sponsor and Project Information

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Type of Organization | 🞏 For Profit 🗹 Not for Profit | | | | | | | |
| Name of Organization | New York University | | | | | | | |
| Address | 20 W 43rd St | | | | | | | |
| City | New York | State | NY | | | Zip | | 10003 |
| Project Sponsor | First Name | Zhe S. | | Last Name | | | Chen | |
| Title | Associate Professor, Departments of Psychiatry and Neuroscience and Physiology | | | | | | | |
| Phone | 646-754-4765 | | |  |  | | | |
| Email | zhe.chen@nyulangone.org | | | | | | | |
| Web Site | https://med.nyu.edu/faculty/zhe-s-chen | | | | | | | |
| Type of Business | NYU Professor | | | | | | | |

|  |  |
| --- | --- |
| Student Name | Junjie Jia |
| Project Title | Star Language Star Wish |

|  |
| --- |
| Description of Project |
| The project involves developing an application specifically designed for children with autism, with a primary focus on enhancing their communication skills. The application will feature a visually appealing and user-friendly interface, incorporating a vast database of images related to daily people, emotions, objects, and actions. Through intuitive navigation and selection processes, children will be able to effortlessly choose images that the system will then compile into coherent sentences. The end result will be an interactive and engaging platform that empowers children with autism to express themselves effectively, bridging communication gaps and promoting language development. The application aims to be a valuable tool for parents, caregivers, and educators, fostering a positive and inclusive learning environment for children with autism while contributing to their overall cognitive and social development | | |
| Estimated Hours of Student Participation | | 270 Hours |

|  |
| --- |
| Anticipated Results |
| All the functions of the application can be used normally, and the sentences translated from pictures can have high accuracy. The most important thing is that children with autism can feel that there is help and that it makes a difference. | |

|  |
| --- |
| Knowledge and expertise student will need to be able to complete the project |
| Application programming languages, such as Java, C++, HTML. The UI/UX design makes the application look more kid-friendly. And some of the living habits of children with autism characteristics. |

|  |  |
| --- | --- |
| Will the project sponsor be available for periodic meetings with NYU to review progress, address questions and concerns with the professor supervising the program? *This is a requirement for the program* | 🗹 Yes  🞏 No |
| Describe the form and frequency of supervision of the student by the Project Sponsor.  Once a month, Student should go to Sponsor’s office to show the project outcomes. When Student meets some problems or get some import results, can make a zoom call with Sponsor. | |

### Sponsor Agreement

Students are interns, not professional consultants. NYU is not responsible for the outcomes of projects undertaken by students. Work is on a best-efforts basis; no guarantees or warranties are expressed or implied. Organization is responsible for evaluating work presented, determining its value and whether to use it or not. Some projects may require on-going management or even re-work by the Organization after the student completes their Applied Project.

Please note that in order to post an unpaid position, the internship must encompass all 6 components below:

1. The internship, even though it includes actual operation of the facilities of the employer, is similar to training which would be given in an educational environment;
2. The internship experience is for the benefit of the intern;
3. The intern does not displace regular employees, but works under close supervision of existing staff;
4. The employer that provides the training derives no immediate advantage from the activities of the intern; and on occasion its operations may actually be impeded;
5. The intern is not necessarily entitled to a job at the conclusion of the internship; and
6. The employer and the intern understand that the intern is not entitled to wages for the time spent in the internship.

I have read and agree with the information shown in the Terms and Conditions for employers contained on the following web page(s): <http://www.nyu.edu/life/resources-and-services/career-development/employers/post-a-job/terms-and-conditions.html>

Please complete and sign this form in the space provided below and return to the course professor via the student who will upload the document to the course drop-box. For any questions, please email the professor: Prof. Israel Moskowitz [im36@nyu.edu](mailto:im36@nyu.edu).

I agree to all of the above

Participating Organization \_\_\_\_\_\_New York University\_\_\_\_\_\_\_ Date \_\_\_02/14/2024\_\_\_\_

By (signature): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Project Sponsor

Printed Name: \_\_\_\_\_\_\_\_Zhe S. Chen\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Title: \_\_\_Associate Professor, Departments of Psychiatry and Neuroscience and Physiology\_\_\_\_\_\_\_\_\_

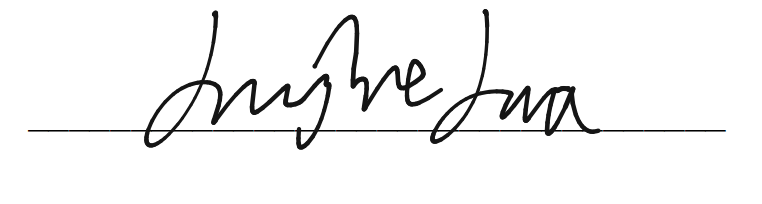
### Student Agreement

Students who are planning to conduct an unpaid Applied Project must read and agree to the “Important Considerations Before Accepting a Job or Internship” contained on the following web page(s): <http://www.nyu.edu/life/resources-and-services/career-development/find-a-job-or-internship/important-considerations-before-accepting-a-job-or-internship.html>.

**Students do not register their Applied Project with the Wasserman Center.**

I agree to the all of the above

Student Name (Print) \_\_\_\_\_\_\_\_Junjie Jia\_\_\_\_\_\_ Date \_\_\_\_\_02/14/2024\_\_\_\_



Signature:

# Appendix C - Project Charter

**Star Language Star Wish**

**Project Charter**

Project Manager: Junjie Jia

Sponsor: Zhe S. Chen

Prepared by: Junjie Jia

Name and Location of Client Organization: N/A

1. **Project Goal**

Develop an application tailored for children with autism, featuring an abundance of visual content. Through this application, children can select images effortlessly, and the system will subsequently compile these images into coherent sentences.

1. **Problem/Opportunity Definition**

There are many children who are suffering from autism, who are unable to complete daily communication and express their thoughts. They need an object or software to help them express their thoughts and what they want to say.

1. **Proposed Project Description**

The first step is to design a UI that is suitable for children and children like. Next I'm going to add some categories of images to the UI. Then I will collect some pictures online that fit these categories and import these pictures into these categories. Next, I will make an area to place the pictures of application user, children's choice, and add the ability to combine the pictures into sentences. Next I'll add speech features to read the sentences out. Finally, autistic children will be asked to test the application.

1. **Project Sponsor**

Name and Title: Zhe S. Chen, Associate Professor, Departments of Psychiatry and Neuroscience and Physiology

Role within the organization: Associate Professor

Role on the project: Provide some suggestions on application function optimization to help sort out the application development process. At the end, a method for verifying the application is provided.

1. **Objectives**
2. Design application contain three main kinds of pictures, which are people, actions and objects. And these three main category also contain a lot of pictures. For example, under the people, it contains some characters like “me”, “Mother”, “Father”, “Doctor” and so on.
3. Find the relevant pictures and load them into the application, such as load the “Teacher” into people category, load the “read” into the action category and load the “book” into the object category.
4. Design a function that users can also upload some pictures by themselves.
5. Test the application’s functions which users are autism children. Children with autism can click one category and choose one or many pictures. After they pick up one or many pictures in one category, they can back to the category chosen page and then choose the other category’s pictures.
6. System will record those pictures then print and read out one sentence. Therefore, children with autism can “speak out”. For example, children choose three pictures which are “me”, “eat”, “apple”, then the system will come up a sentence “I want to eat an apple.” After the application come up, it should be tested by all types of phone and systems.
7. **Project Selection & Ranking Criteria**

Project benefit category: Charitable income

Project urgency: This project has a limited, lower urgency, but it should be provided a prototype by the end of April. It can be improved later after users use it.

1. **Cost/Benefit Analysis**

Tangible Benefits

Benefit: N/A

Value & Probability: N/A

Assumptions Driving Value: N/A

Intangible Benefits

Benefit: Help children to communicate normally to a certain extent, and exercise children's self-expression ability. So that parents can better help their children out of autism.

Value & Probability: N/A

Assumptions Driving Value: Parents' care for their children can make their children more willing to use this application to express their ideas. In the process of expression, children can learn to speak by themselves through the sentences and sounds in it.

Cost Categories

Internal Labor hours : About 270 hours.

External costs: Ask an organization that cares for children with autism to help, it may cost about $200.

Labor (consultants, contract labor): N/A

Equipment, hardware or software : N/A

List other costs such as travel & training: N/A

Financial Return

1. **Assumptions**
2. Sponsor can provide me with the communication characteristics of autistic children and the difficulties faced by different types of autistic children.

2. Some basic codes on the network can help me build this application better.

3. Some children with autism can help test the application for future improvements.

1. **Scope**

Quality: Each deliverable will be tested to ensure that it meets the functionality outlined in the requirements.

Time: The effort is limited to 270 hours and the project needs to be completed by May 2nd, 2024

Resource Allocation: The computer equipment for programming is owned by the project manager

Out of scope activities: The project delivers a complete application, but some features may not be complete and mature.

Constraints

1. Students have limited expertise in deploying application and VUE programming.

2. The project is limited by the time of one semester in a university context, so the time to develop the tool is very limited

3. The test may not be suitable for all children with autism, and targeted improvements are needed

1. **Risks and Mitigation Strategies**

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Risk Description | Risk Level | Mitigation strategy |
| 1 | Application may not be accepted by all children with autism | Medium | Some functions can be developed for most autistic children, meet the use of most children, and provide targeted customization for special children. |
| 2 | By the end of the semester, not all features of the application will be ready and ready to use. | High | Improve the most basic functions and suggest to the Sponsor that some functions of the application may be reduced. Try to find some code on the web that you can use for reference. |

1. **Communications Plan**
2. Frequency: weekly

2. Method: ZOOM meetings

3. Content: Monthly status reports, including: What has been accomplished this month, tasks for the next month, risks, and issues. Report milestones as they occur.

1. **Schedule Overview**

Project Start Date: Feb. 7th, 2024

Estimated Project Completion Date: May 2nd, 2024

Major Milestones:

1. UI interface design completed: Feb 28th, 2024
2. Functions completed: April 15th, 2024
3. Test application: April 18th, 2024

External Milestones Affecting the Project: Project needs to be completed by the end of the Spring semester (May 2nd, 2023)

1. **Impact of Late Delivery**

The project is the first phase of a larger plan that will provide an entire communication system for children with autism. Late delivery This stage may delay delivery of the full application

1. **Resources Required**

Personnel:

|  |  |  |  |
| --- | --- | --- | --- |
| Role | Responsibilities | Duration of work | Qualifications needed |
| Project Manager: Junjie Jia | Project management; Requirements collection and documentation; design and coding | 270 hours | Solid project management and business analysis skills. Have some logical and technical design ability. Basic SQL, HTML, JavaScript, C++ and VUE skills |
| Zhe S. Chen | Project sponsor; | 20 – 30 hours | Expertise in the relevant processes (characteristics of autistic children and part of the code writing), and provide suggestions for improvement of the application. |

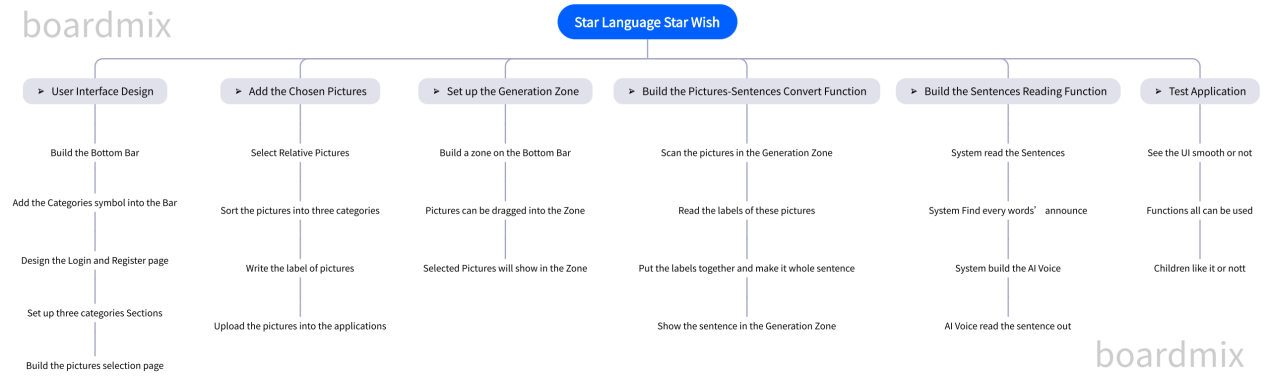
Facilities, Software, Hardware and other Resources

Laptop, SQL Server Management Studio,HTML, VUE and JavaScript development software

Procedures/ Methodology: HBuilderX

1. **Project Plan, Gantt**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Major Task* | *Level 1*  *subtasks* | *Level 2*  *subtasks* | *Level 3*  *subtasks* | *Level 4*  *subtasks* | *Level 5*  *subtasks* | *Level 6*  *subtasks* | *Duration Days* |
| *User Interface Design* | *Build the Bottom Bar* | *Add the Categories symbol into the Bar* | *Design the Login page* | *Design the Register page* | *Set up three categories Sections* | *Build the pictures selection page* | *7 Days* |
| *Add the Chosen Pictures* | *Select Relative Pictures* | *Sort the pictures into three categories* | *Write the label of pictures* | *Upload the pictures into the applications* |  |  | *7 Days* |
| *Set up the Generation Zone* | *Set a zone on the Bottom Bar* | *Pictures can be dragged into the Zone* | *Selected Pictures will show in the Zone* |  |  |  | *8 Days* |
| *Build the Pictures-Sentences Convert Function* | *Scan the pictures in the Generation Zone* | *Read the labels of these pictures* | *Put the labels together and make it whole sentence* | *Show the sentence in the Generation Zone* |  |  | *14 Days* |
| *Build the Sentences Reading Function* | *System read the Sentences* | *System Find every words’ announce* | *System build the AI Voice* | *AI Voice read the sentence out* |  |  | *14 Days* |
| *Test Application* | *See the UI smooth or not* | *Functions all can be used* | *Children like it or not* |  |  |  | *3 Days* |



1. **Project Evaluation** (How the project will be evaluated)

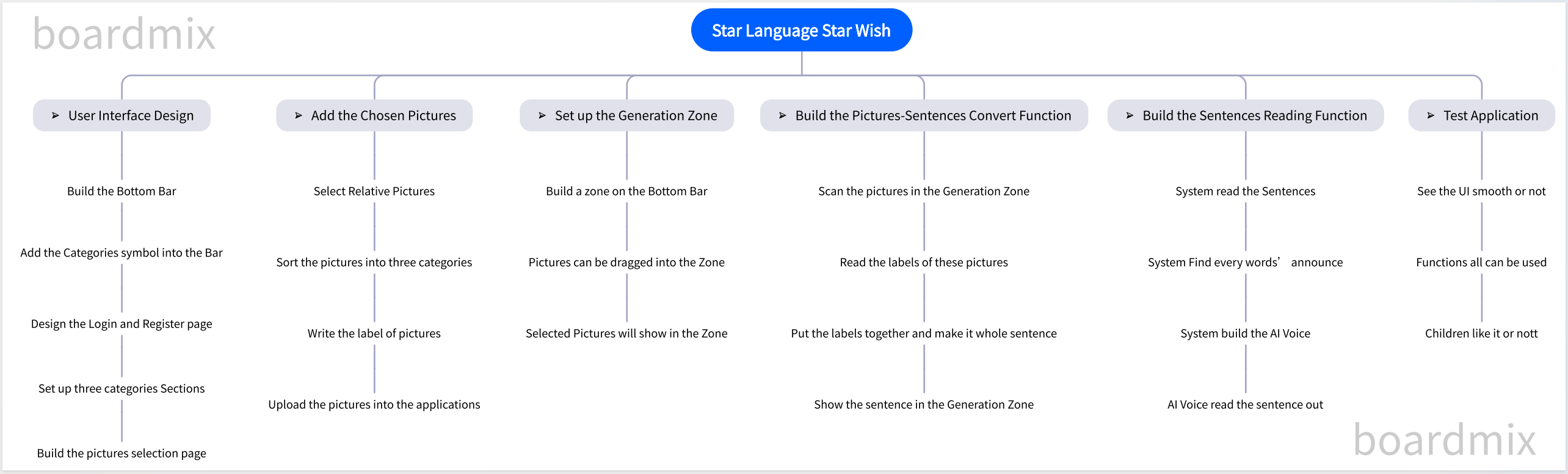
1. Project schedule: The actual progress will be measured against the Project Plan, which details the time for the project work. The progress will be shared with the project sponsor and the NYU Course Professor, via the “Project Weekly Status Report”.

2. Project weekly status report and dashboard: The weekly report will cover the tasks completed, upcoming tasks, risks, issues, and the up-to-date project schedule. It will be developed using Microsoft Word, Excel or PowerPoint and made available to the Professor and Sponsor.

3. Project communication plan, issues log, risk register: Project risks and issues are tracked and managed using the risk register (risks) and the issue log (issues). Their status will be included in the “Project weekly status report and dashboard”

# Appendix D - Project Plan

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Major Task | Level 1  subtasks | Level 2  subtasks | Level 3  subtasks | Level 4  subtasks | Level 5  subtasks | Level 6  subtasks | Duration Days |
| User Interface Design | Build the Bottom Bar | Add the Categories symbol into the Bar | Design the Login page | Design the Register page | Set up three categories Sections | Build the pictures selection page | 7 Days |
| Add the Chosen Pictures | Select Relative Pictures | Sort the pictures into three categories | Write the label of pictures | Upload the pictures into the applications |  |  | 7 Days |
| Set up the Generation Zone | Set a zone on the Bottom Bar | Pictures can be dragged into the Zone | Selected Pictures will show in the Zone |  |  |  | 8 Days |
| Build the Pictures-Sentences Convert Function | Scan the pictures in the Generation Zone | Read the labels of these pictures | Put the labels together and make it whole sentence | Show the sentence in the Generation Zone |  |  | 14 Days |
| Build the Sentences Reading Function | System read the Sentences | System Find every words’ announce | System build the AI Voice | AI Voice read the sentence out |  |  | 14 Days |
| Test Application | See the UI smooth or not | Functions all can be used | Children like it or not |  |  |  | 3 Days |



# Appendix E - Risk Management Plan

TO: Dr Eleftheria K Pissadaki

FROM: Junjie Jia

DATE: March 7, 2024

RE: **Assignment 6 – Risk Management Plan**

**Project**

*Star Language Star Wish*

**Risks**

*Make sure to list all risks of not completing the project on time, on budget, and with high quality. Add rows to the table for all identified risks.*

|  |  |  |  |
| --- | --- | --- | --- |
| Risk | Description | Probability (1-3) | Exposure (1-3) |
| 1 | User Engagement and Retention: Ensuring the application remains engaging and valuable to children with autism over time, preventing drop-off in usage. | 2 | 2 |
| 2 | Accuracy of Image-to-Text Conversion: The technology used must accurately interpret and convert selected images into coherent, contextually appropriate sentences. | 2 | 3 |
| 3 | Content Relevance and Diversity: Maintaining a comprehensive, diverse, and relevant image database that accurately reflects the daily experiences, emotions, and needs of children with autism. | 1 | 2 |
| 4 | Technical Compatibility and Performance: Ensuring the application performs reliably across a wide range of devices and operating systems without causing devices to lag or crash due to memory overload from added pictures. | 2 | 3 |
| 5 | User Privacy and Data Security: Protecting sensitive user information, especially considering the vulnerable user base of children with autism. | 2 | 3 |
| 6 | Feedback and Iterative Improvement: Collecting and effectively incorporating user feedback into continuous updates to improve the application's functionality and user experience. | 1 | 2 |
| 7 | Accessibility and Ease of Use: Designing an intuitive, easy-to-navigate interface that accommodates the varied abilities and preferences of children with autism. | 1 | 3 |
| 8 | Expert Collaboration and Endorsement: Securing ongoing collaboration with experts in autism education and therapy to ensure the application's content and design are effective and endorsed by professionals. | 2 | 2 |
| 9 | Funding and Resource Allocation: Acquiring sufficient funding and resources for development, maintenance, and marketing of the application to reach its intended audience. | 2 | 2 |
| 10 | Market Penetration and User Acquisition: Effectively marketing the application to reach a wide audience of potential users, including children with autism, their parents, caregivers, and educators. | 2 | 2 |

**Risk Matrix**

*Place each risk in the risk matrix below. Enter just the number into the appropriate box.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | RISK (exposure) | | | |
| Probability (of occurrence) |  | 1.Slight | 2. Moderate | 3. High |
| 1. Very Unlikely |  | 3，6 | 7 |
| 2. Possible |  | 1，8，9，10 | 2，4，5 |
| 3. Expected |  |  |  |

**Contingency Plan**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Risk** | **Description** | **Probability (1-3)** | **Exposure (1-3)** | **Contingency Plan** |
| **1** | User Engagement and Retention: Ensuring the application remains engaging and valuable to children with autism over time, preventing drop-off in usage. | 2 | 2 | Develop a feedback mechanism within the app to collect user suggestions and improvements regularly. Implement a feature update roadmap based on this feedback to keep the application fresh and engaging. |
| **2** | Accuracy of Image-to-Text Conversion: The technology used must accurately interpret and convert selected images into coherent, contextually appropriate sentences. | 2 | 3 | Collaborate with specialists in natural language processing to enhance the algorithm over time. Plan for periodic updates to improve accuracy based on user feedback and technological advancements. |
| **3** | Content Relevance and Diversity: Maintaining a comprehensive, diverse, and relevant image database that accurately reflects the daily experiences, emotions, and needs of children with autism. | 1 | 2 | Establish partnerships with educators, therapists, and parents for continuous content review and update. Create a community-driven feature allowing users to suggest new images and content, vetted by experts before inclusion. |
| **4** | Technical Compatibility and Performance: Ensuring the application performs reliably across a wide range of devices and operating systems without causing devices to lag or crash due to memory overload from added pictures. | 2 | 3 | Conduct extensive testing across a wide range of devices and operating systems early in development. Plan for a beta testing phase to identify and address performance issues before full release. |
| **5** | User Privacy and Data Security: Protecting sensitive user information, especially considering the vulnerable user base of children with autism. | 2 | 3 | Implement robust encryption and data protection measures from the outset. Regularly audit security protocols and conduct penetration testing to identify vulnerabilities. Offer regular security updates to users. |
| **6** | Feedback and Iterative Improvement: Collecting and effectively incorporating user feedback into continuous updates to improve the application's functionality and user experience. | 1 | 2 | Design the app with scalability in mind, allowing for easy updates and modifications. Set aside budget and resources for continuous development based on user feedback cycles. |
| **7** | Accessibility and Ease of Use: Designing an intuitive, easy-to-navigate interface that accommodates the varied abilities and preferences of children with autism. | 1 | 3 | Involve user experience (UX) experts and children with autism in the design process to ensure the interface is intuitive. Plan for iterative design enhancements based on usability testing results. |
| **8** | Expert Collaboration and Endorsement: Securing ongoing collaboration with experts in autism education and therapy to ensure the application's content and design are effective and endorsed by professionals. | 2 | 2 | Build a diverse advisory board of experts in autism, education, and child psychology to guide development. If specific collaborations falter, have a network of professionals to turn to for continued support. |
| **9** | Funding and Resource Allocation: Acquiring sufficient funding and resources for development, maintenance, and marketing of the application to reach its intended audience. | 2 | 2 | Diversify funding sources through grants, crowdfunding, and partnerships. Develop a lean operating model to adjust quickly in response to financial pressures without compromising project quality. |
| **10** | Market Penetration and User Acquisition: Effectively marketing the application to reach a wide audience of potential users, including children with autism, their parents, caregivers, and educators. | 2 | 2 | Create a multi-channel marketing strategy focusing on social media, partnerships with schools and therapy centers, and parent networks. If initial strategies do not yield expected results, pivot based on market feedback, focusing on the most effective channels. |

# Appendix F - Status Report

**Project Status Report**

**Your Name:** Junjie Jia

**Project Title:** Star Language Star Wish

**Date of report:** 04/02/2024

1. **Project Status and Explanation:**

|  |  |  |
| --- | --- | --- |
| **Project Status Area** | **Status (RYG)** | **Explanation** |
| 1. Overall Project Status |  | At present, two third of the project has been completed, the preliminary UI design has been completed, the audio function of the image, user add picture function and all pages have same stage function have been written. |
| 1. Project Schedule |  | In the next 7 days, complete all the user add pictures functions required for the project. |
| 1. Project Deliverables |  | The Project can be completed on time. At present, only one of the main functions required by the project left. At present, there are no particular difficulties. |
| 1. Resources & Collaboration |  | I have found a lot of corresponding literature, through which I can know how to modify the application to better suit the target customers. |
| 1. Changes |  | Some features have changed, and the pictures can show in the same stage, and users can add their own pictures. |
| 1. Communication |  | I have smooth communication with professors and sponsors. |

For status above, indicate **Red**, **Orange**, or **Green**:

* **Red**: Critical issues, serious risks to project, significant intervention must occur to achieve success, potential for stoppage of project activity. Project slipping by 5+ days, and resources uncommitted to meet deliverables
* **Orange**: Some major issues, moderate risk to project, must monitor closely, some internal or/and external dissatisfaction with progress. Project plan slipping by 2+ days.
* **Green**: No major issues, minimal risk to project, on target with expected outcomes, project on schedule, everyone satisfied with progress.

1. **List All Completed Project Tasks:**

* The preliminary UI design is complete.
* The image selection function is complete. After clicking the image, it will appear in the canvas.
* The voice function of the picture has been completed. When the picture is clicked and added to the canvas, the system will read out the text content corresponding to the picture.
* The stage of all pages which can show different pictures from different pages.
* The function that the system read out the sentences.

1. **List any concerns or issues that need the professor’s involvement:**

* No issues for now.

1. **Next series of tasks to complete:**

* Complete the user's self-add function, so that users can not only add their own pictures but also add the audio with their voice.
* Test Application.

1. **Sponsor Signoff**

Sponsor indicates agreement with the above status report:

By (signature): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Project Sponsor

Printed Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_Zhe S. Chen\_\_\_\_\_\_\_\_\_\_\_

Please print in English

# Appendix G - Annotated Bibliography



**MASTER OF SCIENCE IN MANAGEMENT AND SYSTEMS**

**Applied Project Capstone**

**MASY GC- 4100**

**MEMORANDUM**

TO: Dr. Eleftheria K Pissadaki

FROM: Junjie Jia

DATE: 02/28/2024

PROJECT: Star Language Star Wish

RE: **Assignment 5A: Annotated Bibliography**

**References**

1. McNaughton, D., & Light, J. (2013). The iPad and mobile technology revolution: Benefits and challenges for individuals who require augmentative and alternative communication. *Augmentative and Alternative Communication, 29*(2), 107-116.

*The iPad and other mobile technologies provide powerful new tools to potentially enhance communication for individuals with developmental disabilities, acquired neurogenic disorders, and degenerative neurological conditions. These mobile technologies offer a number of potential benefits, including: (a) increased awareness and social acceptance of augmentative and alternative communication (AAC), (b) greater consumer empowerment in accessing AAC solutions, (c) increased adoption of AAC technologies, (d) greater functionality and interconnectivity, and (e) greater diffusion of AAC research and development. However, there remain a number of significant challenges that must be addressed if these benefits are to be fully realized: (a) to ensure the focus is on communication, not just technology, (b) to develop innovative models of AAC service delivery to ensure successful outcomes, (c) to ensure ease of access for all individuals who require AAC, and, (d) to maximize AAC solutions to support a wide variety of communication functions. There is an urgent need for effective collaboration among key stakeholders to support research and development activities, and to ensure the successful implementation of mobile technologies to enhance communication outcomes for individuals who require AAC and their families.*

**The article highlights the potential benefits of ipads and mobile technologies in providing AAC, while also pointing out some of the challenges they may face. The study provides valuable insights into research and practice in the AAC field, helping to advance the development and application of these technologies in practical applications.**

1. Thistle, J. J., Wilkinson, K. M., & Wilkinson, A. (2017). Augmentative and alternative communication intervention in children with neurodevelopmental disorders: A meta-analysis. *Journal of Developmental and Behavioral Pediatrics, 38(*5), 365-374.

*This review evaluated the effects of augmentative and alternative communication (AAC) on speech development in children with autism spectrum disorders (ASD); replicated, updated, and extended the systematic review by Schlosser and Wendt (American Journal of Speech-Language Pathology 17:212-230, 2008). Twenty-five single case design articles and three group design articles published between 1975 and May 2020 met inclusion criteria related to participant characteristics, intervention type, design, and visual analysis of dependent variable outcomes. Overall, AAC resulted in improved speech production; however, speech gains that did occur did not surpass AAC use.*

**This article provides important evidence for understanding the effects of AAC intervention in children with neuron developmental disorders, highlighting the importance of such intervention to improve children's language and communication skills. The study helps guide clinical practice and provides direction for future research to further explore the effects and influencing factors of AAC interventions.**

1. Lancioni, G. E., Singh, N. N., O’Reilly, M. F., Sigafoos, J., Didden, R., & Oliva, D. (2014). Persons with moderate Alzheimer’s disease improve activities and mood via instruction technology. *American Journal of Alzheimer's Disease & Other Dementias®, 29*(7), 592-601.

*Background: Three studies assessed the (a) effectiveness of verbal instructions presented via technology in helping persons with moderate Alzheimer's disease perform daily activities and (b) impact of activity engagement on mood.*

*Methods: The 3 studies targeted coffee preparation with 2 women, use of make-up with 2 women, and use of make-up and tea preparation with 3 women. Intervention effects on activity performance were assessed through nonconcurrent multiple baseline designs across participants or multiple baseline designs across activities. The impact of activity on mood was assessed by recording indices of happiness during activity trials and parallel nonactivity periods.*

*Results: Verbal instructions presented via technology were effective in helping all participants perform the target activities. The participants also showed mood improvement (ie, increases in indices of happiness) during the activity.*

*Conclusion: These results suggest that the approach reported may be a useful strategy for helping persons with Alzheimer's disease.*

**This article provides beneficial evidence for the use of instructional techniques to improve daily activities and emotional states in patients with moderate Alzheimer's disease. This study helps to expand the care and treatment strategies for patients with Alzheimer's disease, and provides new ideas and methods to improve the quality of life of patients. In addition, the study also has certain guiding significance for the application of guidance technology in other cognitive disorders and Alzheimer's patients.**

1. Bryen, D. N., Carey, A., Friedman, M., & Lutz, J. (2018). The role of augmentative and alternative communication (AAC) devices in supporting the performance of vocational tasks by individuals with intellectual and developmental disabilities. Journal of Vocational Rehabilitation, 48(1), 111-119.

*Establishing evidence- and research-based practices relies upon research synthesis of individual studies in reviews and meta analyses. Further summarizing scientific evidence about a specific topic by synthesizing reviews is an area of need to determine practices that have a strong evidence base and to identify areas of methodological weakness and gaps in the literature. A mega-review of literature reviews, systematic reviews, and meta-analyses on interventions using aided augmentative and alternative communication (AAC) interventions for children with intellectual and developmental disabilities from 2000 to mid-2020 was conducted. Participant and interventionist demographics, interventions, settings, outcomes, and recommendations of each review were reported and summarized. A MeaSurement Tool to Assess systematic Reviews Revised (AMSTAR 2; Shea et al., 2017) was used to examine the methodological rigor of 84 included reviews. Over the past 20 years, published reviews have increased slightly in methodological rigor but demonstrate a number of methodological weaknesses that detract from the strength of evidence for AAC interventions with this population. Suggestions for improving the methodological rigor of literature reviews and areas for future research specific to AAC interventions are discussed.*

**This article emphasizes the important role of AAC devices in the career development of individuals with intellectual and developmental disabilities, and provides important reference and guidance for research and practice in related fields. By studying the application effect of AAC technology in occupational environment, it can better promote the career development and social integration of individuals with intellectual and developmental disabilities, improve their quality of life and self-realization ability.**

1. Light, J., & McNaughton, D. (2014). Designing AAC research and intervention to improve outcomes for individuals with complex communication needs. *Augmentative and Alternative Communication, 30*(1), 1-18.

*There is a rapidly growing body of research that demonstrates the positive effects of augmentative and alternative communication (AAC) intervention on the communication of children and adults with complex communication needs. Despite the positive impact of many AAC interventions, however, many individuals with complex communication needs continue to experience serious challenges participating in educational, vocational, healthcare, and community environments. In this paper, we apply the framework proposed by the International Classification of Functioning, Disability and Health (ICF) to illustrate the need to re-think AAC intervention to improve outcomes for individuals with complex communication needs, and to foster a new generation of intervention research that will provide a solid foundation for improved services. Specifically, the paper emphasizes the need to take a more holistic view of communication intervention and highlights the following key principles to guide AAC intervention and research: (a) build on the individual's strengths and focus on the integration of skills to maximize communication, (b) focus on the individual's participation in real-world contexts,(c) address psychosocial factors as well as skills, and (d) attend to extrinsic environmental factors as well as intrinsic factors related to the individual who requires AAC.*

**This article provides important guidelines and recommendations for the design of AAC studies and interventions, emphasizing the importance of individualized and comprehensive intervention programs. By considering individual characteristics and needs, a more effective AAC intervention scheme can better meet the needs of individuals with complex communication needs and improve their communication ability and quality of life. This research is of great significance for promoting the development and progress in the field of AAC.**

1. Thistle, J. J., Wilkinson, K. M., & Wilkinson, A. (2018). The effectiveness of augmentative and alternative communication (AAC) interventions for persons with complex communication needs: A systematic review. *Augmentative and Alternative Communication, 34*(1), 1-12.

*The purpose of this meta-analysis was to investigate the effects of augmentative and alternative communication (AAC) interventions that included aided AAC input (e.g., aided AAC modeling, aided language modeling, aided language stimulation, augmented input) on communicative outcomes (both comprehension and expression) for individuals with developmental disabilities who use AAC.*

**This study provides important evidence for understanding the effects of AAC intervention in individuals with complex communication needs, helps guide clinical practice, and provides directions for future research to further explore the effects and influencing factors of AAC intervention.**

1. Alper, M., Kress, G., Marino, M., & Marcolini, S. (2019). "It's not all about AAC": Exploring use of mobile technology for augmented and alternative communication in inclusive classrooms. *Journal of Research on Technology in Education, 51*(1), 18-35.

*The purpose of this study was to explore how speech-language pathologists (SLPs) who are augmentative and alternative communication (AAC) specialists approach the assessment process for 2 case studies, 1 child with cerebral palsy and 1 with autism spectrum disorder. The aim of the study was to answer the following questions: (a) How do clinicians with expertise approach the AAC assessment process for children with developmental disabilities? (b) Can any initial hypothesis be drawn about how SLPs approach the assessment of children with motor versus social interactive deficits? This study used a phenomenological qualitative design. The researchers conducted 2 in-depth, semistructured interviews with 8 SLPs who specialized in AAC and self-identified as primarily working with children. Four major themes emerged from the data: area of assessment, method of assessment, evaluation preparation, and parent education. Each major theme contained multiple subthemes and categories within those subthemes. Participants discussed similar areas of assessment for both cases, indicating that some aspects of AAC assessment are universal. However, the specific aspects of what they were assessing and how they went about assessing them differed between the 2 cases. The results of the current study provide an outline of an assessment protocol for children with complex communication needs.*

**This study provides important insights into understanding the practice of using mobile technology to support AAC in an inclusive classroom environment. It highlights the potential of mobile technologies to improve student communication, engagement and learning outcomes, to help guide educational practices, and to promote the development and promotion of inclusive education.**

1. McCarthy, J. W., & Swierenga, S. J. (2019). Mobile technology in the classroom: How student‐generated digital media and augmented reality apps can support language learning for English learners. *Journal of Computer Assisted Learning, 35*(3), 481-490.

*This study sought to measure the effect of using augmented reality (AR) on developing language learning. It also explored teachers’ perceptions about the use of augmented reality in general, and its effect on students’ autonomy. A quasi-experimental research design using a pre-test and a post-test with control and experimental groups was followed to measure the effect of using augmented reality on elementary students’ language learning. Further, two questionnaires were designed to explore EFL teachers’ perceptions about AR, and its effect on students’ autonomy. The sample consisted of 72 Saudi EFL elementary students and 80 EFL teachers. The results revealed that the use of augmented reality enhanced EFL students’ language learning significantl. The results also showed that teachers perceived AR technology as valuable and effective. They acknowledged its multiple benefits for EFL elementary students. It enabled better learning of essential skills, increased students’ motivation and positive attitudes, and fostered students’ autonomy. It is expected that these findings will help learners, teachers, curriculum developers, and administrators.*

**This study provides important insights into how mobile technology can support language learning for English learners. It highlights the role of student-generated digital media and augmented reality applications in improving language learners' language competence and learning motivation, helping to guide educational practices, and driving the development and application of mobile technology in the field of language education.**

1. Blackstone, S. W. (2013). Social Networks, Social Support and Social Interaction: A Qualitative Study of Families of Children with Severe Speech Impairment Who Use AAC. Augmentative and Alternative Communication, 29(4), 372-386.

*Asking a question can be a highly challenging task for a person with multiple disabilities, but questions have not received much attention in research on augmentative and alternative communication (AAC). Conversation analysis is employed to examine an instance of multiparty interaction where a speech and language therapist supports a child with multiple disabilities to ask a question with a communication board. The question is accomplished through a practice where the action is built as a trajectory of interactional steps. Each step is built using ways of involvement that establish different participation spaces designed to deal with different aspects of asking a question: agreeing on the action type, the speaker and recipient, the content of the question, and then asking the question. The segmentation of a question into discrete steps and participation spaces can be used in intervention to model the construction of a question for AAC users and significant others.*

**This study provides important insights into understanding social networks, social support, and social interactions in AAC user families. It highlights the important role family members play in the lives of AAC users, helps guide the practice of family support, and makes some recommendations on how to enhance family support. At the same time, this study also provides reference and enlightenment for future research in related fields.**

1. Albrecht, G. L., & Devlieger, P. J. (1999). The disability paradox: high quality of life against all odds. *Social science & medicine, 48*(8), 977-988.

*This paper builds on the work of Sol Levine to examine a disability paradox: Why do many people with serious and persistent disabilities report that they experience a good or excellent quality of life when to most external observers these individuals seem to live an undesirable daily existence? The paper uses a qualitative approach to develop an explanation of this paradox using semi-structured interviews with 153 persons with disabilities. 54.3% of the respondents with moderate to serious disabilities reported having an excellent or good quality of life confirming the existence of the disability paradox. Analysis of the interviews reveals that for both those who report that they have a good and those who say they have a poor quality of life, quality of life is dependent upon finding a balance between body, mind and spirit in the self and on establishing and maintaining an harmonious set of relationships within the person's social context and external environment. A theoretical framework is developed to express these relationships. The findings are discussed for those with and without disabilities and directions are given for future research.*

**This article provides important insights into how individuals with disabilities can achieve a high quality of life in difficult situations. It emphasizes the importance of an individual's subjective experience and social support in shaping the quality of life, helps to promote attention to the rights and well-being of persons with disabilities, and provides implications for improving the quality of life of individuals with disabilities. This study is of great significance for promoting the understanding and respect of disabled people in society, and also provides reference and inspiration for future research in related fields.**

# Appendix H - Main Codes:

<template>

<view>

<view class="fixed-container">

<view class="nav-bar">

<view class="title">Star Language Star Wish</view>

<view class="nav-icon" @click="onSettingsClick">

<tn-icon icon="set" size="lg"></tn-icon> <!-- Assume there is an icon named 'settings' -->

</view>

</view>

<canvas canvas-id="myCanvas"></canvas>

<view class="button-container">

<button style="background-color: #FAD791; border-radius: 50%; border: 2rpx solid dimgray;" @click="clearCanvas"><tn-icon icon="delete"></tn-icon></button>

<button style="background-color: #FAD791; width: 300rpx; border-radius: 50rpx; border: 2rpx solid dimgray;" @click="startPlayingAudios()"><tn-icon icon="video-fill" size="lg"></tn-icon></button>

<button style="background-color: #FAD791; width: 300rpx; border-radius: 50rpx; border: 2rpx solid dimgray;" @click="goToAnotherPage()"><tn-icon icon="add" size="lg"></tn-icon></button>

</view>

</view>

<view class="content-container">

<!-- Other content -->

<view class="container">

<view class="card" v-for="(image, index) in images" :key="index" @click="onCardClick(image)">

<image :src="image.url" class="card-image"></image>

<text class="card-text">{{ image.text }}</text>

<audio :src="image.audio"></audio>

</view>

</view>

</view>

</view>

</template>

<script>

import tnIcon from '@/uni\_modules/tn-icon/components/tn-icon/tn-icon.vue'

import {EventBus} from '../../../main.js';

export default {

data() {

return {

// Example image data, should contain image URL, text, and audio

images: [

{url:'../../../static/want/wanttoeat.jpg', text: 'Want to eat', audio: '../../../static/wantaudio/wanttoeat.mp3'},

{url:'../../../static/want/wanttodrink.jpg', text: 'Want to drink', audio: '../../../static/wantaudio/wanttodrink.mp3'},

{url:'../../../static/want/wanttogo.jpg', text: 'Want to go', audio: '../../../static/wantaudio/wanttogo.mp3'},

// Add more images

],

nextImageX: 20, // Next image X coordinate on Canvas

nextImageY: 20, // Next image Y coordinate on Canvas

};

},

onShow() {

this.redrawCanvas();

},

mounted() {

// Get system information

const systemInfo = uni.getSystemInfoSync();

// Set screen width

this.screenWidth = systemInfo.windowWidth;

// Draw the images selected at page load

this.redrawCanvas();

EventBus.$on('update-data', this.handleUpdateData);

},

methods: {

handleUpdateData(data) {

// Add received data to images array

this.images.push({

url: data.imagePath,

text: data.imageDescription,

audio: data.audioPath

});

},

beforeDestroy() {

// Remove event listener

EventBus.$off('update-data', this.handleUpdateData);

},

goToAnotherPage() {

uni.navigateTo({

url: '/pages/tabbar/add/add' // Ensure path is correct

});

},

redrawCanvas() {

const ctx = uni.createCanvasContext('myCanvas', this);

ctx.clearRect(0, 0, this.screenWidth, 400); // Clear Canvas content

// Redraw Canvas based on the images in global state

this.$selectedImages.forEach((image, index) => {

// Assume layout and drawing logic

const x = (index % 3) \* 110 + 20; // Example layout

const y = Math.floor(index / 3) \* 100 + 20;

ctx.drawImage(image.url, x, y, 100, 100);

});

ctx.draw();

},

pushImage(image) {

this.$selectedImages.push(image);

uni.setStorageSync('selectedImages', this.$selectedImages); // Optionally use local storage to persist selected image information

},

onCardClick(image) {

this.pushImage(image); // Call pushImage to handle image selection logic

this.drawSelectedImages(); // Draw selected images on Canvas

this.playAudio(image.audio); // Play the audio corresponding to the clicked image

},

drawSelectedImages() {

const ctx = uni.createCanvasContext('myCanvas', this);

this.$selectedImages.forEach((img, index) => {

const x = (index % 3) \* 110 + 20; // Simple layout: two images per row

const y = Math.floor(index / 3) \* 100 + 20;

ctx.drawImage(img.url, x, y, 100, 100); // Assume each image size is 100x100

});

ctx.draw(true);

},

drawSelectedText() {

const ctx = uni.createCanvasContext('myCanvas', this);

this.$selectedImages.forEach((img, index) => {

const x = (index % 3) \* 110 + 50; // Simple layout: each row two images

const y = Math.floor(index / 3) \* 100 + 130;

ctx.fillText(img.text, x, y); // Assume each image size is 100x100

});

ctx.draw(true);

},

playAudio(audioPath) {

var audio = uni.createInnerAudioContext();

audio.src = audioPath; // Set the audio file path

audio.play(); // Play the audio

audio.onPlay(() => {

console.log('Start playing');

});

audio.onError((res) => {

console.error('Audio playback failed:', res.errMsg);

});

},

playAudioSequentially(index = 0) {

if (index < this.$selectedImages.length) {

const audioPath = this.$selectedImages[index].audio;

if (audioPath) {

const audio = uni.createInnerAudioContext();

audio.src = audioPath; // Set the audio file path

audio.play(); // Play the audio

audio.onPlay(() => {

console.log('Start playing:', audioPath);

});

audio.onEnded(() => {

console.log('Audio playback ended:', audioPath);

this.playAudioSequentially(index + 1); // Play the next audio

});

audio.onError((res) => {

console.error('Audio playback failed:', res.errMsg);

// Even if current audio playback fails, try to play the next one

this.playAudioSequentially(index + 1);

});

} else {

// If the current index audio path does not exist, skip to the next one

this.playAudioSequentially(index + 1);

}

} else {

console.log('All audios have been played');

// Here you can execute the logic after all audios are played

}

},

// When you want to start playing audios in the global state, call this method

startPlayingAudios() {

this.playAudioSequentially(); // Start playing from the first audio

this.drawSelectedText();

},

clearCanvas() {

const ctx = uni.createCanvasContext('myCanvas', this);

ctx.clearRect(0, 0, this.screenWidth, 400);

ctx.draw();

// Set the local storage flag to true

this.$selectedImages.splice(0);

},

},

}

</script>

<style>

.fixed-container {

position: fixed; /\* Fixed positioning \*/

top: 0; /\* Positioned at the top of the page \*/

left: 0;

width: 100%; /\* Container width is 100% \*/

z-index: 999; /\* Ensure it is above other page content \*/

background-color: #FAD791;

}

.nav-bar {

display: flex;

justify-content: space-between;

align-items: center;

padding: 10px;

background-color: #FAD791;

}

.title {

font-size: 30rpx;

font-weight: bold;

text-align: center;

}

.nav-icon {

display: flex;

align-items: center;

justify-content: flex-end;

}

canvas {

width: 100%;

height: 300rpx;

background-color: #FAD791;

border-radius: 50rpx;

box-shadow: inset 0 0 20px rgba(0, 0, 0, 0.2); /\* Internal shadow \*/

}

.button-container {

display: flex;

justify-content: center; /\* Horizontally centered \*/

align-items: center; /\* Vertically centered \*/

background-color: #FAD791;

height: 55px;

}

.content-container {

margin-top: 505rpx; /\* Leave enough space to avoid content being obscured, adjust based on actual height \*/

}

.container {

display: flex;

flex-wrap: wrap;

justify-content: space-around;

padding: 10px 0;

}

.card {

display: flex;

flex-direction: column;

align-items: center;

width: 48%; /\* Two-column layout \*/

margin-bottom: 10px;

background-color: #fff;

border-radius: 8px;

overflow: hidden;

}

.card-image {

width: 100%; /\* Image width adjusts automatically \*/

height: 125px; /\* Fixed image height \*/

}

.card-text {

margin: 10px;

}

button {

margin: 0 10px; /\* Add some margin to the buttons \*/

}

</style>