Befriending Learning: Education by Gaming, Ajuna Network and Storytelling

Game Abstract

We propose to improve upon the existing ways of imparting education by incorporating a fun-based learning game, Ajuna Citizens, which is an open-source Web3 software activity using Ajuna Network created for children in the age group of 9-16 years. This game involves inculcating community leadership skills and removing the learning differences that might arise due to children belonging to different age groups, ethnic backgrounds, cultures and economic backgrounds. Ajuna Citizens involves optimization of resources of a town, while taking appropriate steps to ensure the common welfare. This helps in developing decision-making skills in children. The curriculum can further be integrated into the various tasks that the children are assigned. A pilot test conducted proved that children learned curriculum material better when they played this game compared to the usual methodology of textbooks.

Game Keywords

Learning Differences; Community leadership; innovative educational simulation, Ajuna Network

1. Inspiration and Introduction

Education signifies the rebirth of the mind with the ability to shape young minds into dynamic brains while ensuring a child's physical and emotional well-being. A well educated person not only performs well in life but is also consciously aware of his social responsibilities and thus education holds the power to reform or deteriorate society [1]. The present educational system in most, if not all, countries can be called a product of intelligent politics and unintelligent evaluation –evaluation of a child's emotional, physical and social needs, evaluation of his/her specific talents, evaluation of his/her mental make-up. These educational systems lay more stress on bookish knowledge, rather than the knowledge that a child imbibes, leaving him/her without any practical knowledge or understanding of the subject. [2].

The shortcomings in the educational systems all over the world have led to some serious issues that include unsound emotional state of the youth, the unacknowledged different needs that children belonging to different ethnic groups might have, the reluctance of children to pursue learning on their own, etc. which need to be looked upon for creating a true learning environment for children. Two of the most important of these issues are firstly, the learning differences present in education or the gap between the actual knowledge imbibed by the children and that claimed to have been on white paper, and secondly the fainting community leadership in children [2][3]. Before we get further into the details of this paper; let us first have a brief look about what these issues are.

Learning Differences is a symbolic term used to signify a set of problems that create an imbalance between a child's enjoyability and the pursuance of knowledge. Since a teacher-led classroom system is the prevalent method of imparting education, various problems like lack of individual attention to children in classes with lesser teacher-to-student ratio; lack of motivation due to diminutive interest in the subject; low self-confidence, inadequate resilience in children due to the highly competitive environment and problems arising in teaching the same curriculum to children belonging to diversified cultural backgrounds deteriorates the quality of education imparted in the various institutions [3][4]. These problems clustered together have been termed as **learning differences**.

Community Leadership can be defined as the skill set of a person to recognize, understand and effectively address the issues affecting the community. A person, who realizes his duties towards the society, performs them duly and is socially aware about the environmental, ethical, and cultural issues of the community, possesses the qualities of a community leader. These skills are best acquired when a base is created for them right from the childhood stage. Since the present schooling system lacks a curriculum which can impart such skills in children, community leadership has been reduced to a diminutive level in the society [5].

Ajuna Citizens is a unique educational platform, built on the Sugar environment which is an interactive shell developed over Linux operating system, which primarily focuses on diminishing the existing deficiencies in the present educational models all around the world by collaborative, joyful and self-empowered learning. We propose this interactive platform to improve upon the existing methods of teaching and implement better techniques to bridge the gap between educationally fun learning and the presently existing methods of, till some extent, unproductive learning. This paper describes how the educative platform, Ajuna Citizens, can be seamlessly incorporated into the present curriculum and develops a thought process in the children that not only familiarizes them with a few concepts of their academic syllabus but also prepares them for real life situations and tackles them skillfully.

The basic infrastructure of the game is like this – The game has a leader or ruling body of a community and a child who is the protagonist of the story. The child is the daughter/son of the leader. There are other characters as well which might vary according to the storyline. The daughter/son of the leader is supposed to work for the betterment of the community. He/she is put into various scenarios, given various challenges to meet. It is through these challenges and tasks that the practical knowledge of the children is tested. Also, the lessons are given to children in the form of game chats between different game characters. The elderly person generally plays the role of a mentor for the children and hence guides them through these challenges and tasks.

The rest of the paper is structured as follows. First, we briefly describe the current educational system and its flaws. We also give an overview about other improved methods of teaching which have been devised to overcome the flaws in the current educational system and point out the shortcomings of these improvements. Then we talk about the design goals we followed while designing Ajuna Citizens and discuss the visionary aspects of this unique platform for implementing it into the educational system. Next, we describe how Ajuna Citizens proposes to educate children with special care to interactively simulate children to willing pursue education and develop community leadership skills while preserving the emotional, physical and mental well-being of a child. Live case studies to support our work have also been discussed. Lastly, we conclude the paper and pave the roadmap for future work.

2. Different Ways Of Imparting Education

A. Traditional Method of Education

There are a lot of ways of imparting education but the one which has always overshadowed all the others is the old-fashioned method of learning through textbooks in classrooms [2]. The children go to schools where a fixed curriculum is set. They are expected to be well-versed with their textual material and their performance is judged purely on the basis of the grades obtained in examinations

[6]. However, as discussed in the previous section, such a model has not been able to serve the objectives it was laid down for, nor has it established the required base for children to think about real world problems and come up with plausible solutions. Hence this has led researchers all over the world to search for better methods of imparting education.

B. Improved Methods of Education

Citing the existing deficiencies in the present educational system, a large number of methods and techniques have evolved over the time. Various new mediums to interactively teach children have also been invented.

- **Advanced Mediums of Giving Education**

With the advancement of technology, many new mediums of imparting knowledge to children have also been developed. Computers have evolved as the strongest of them all. With cheaper technology, computers and laptops have become highly accessible to children throughout the world [7]. The interactive user-friendly environment that computers offer to the children can be utilized to a great extent to make a child think dynamically and at the same time engross him/her. Availability of the internet has further widened the scope of computers. However, television-sets are another such medium which is being looked upon as a medium to provide basic education and some efforts have been made in this respect.

- **Innovative Teaching Methods**

As the traditional teacher-led classroom system suffered with several drawbacks, many novel approaches of learning have been proposed by researchers. In this subsection, we would look at some of the important learning approaches suggested over the time. We would analyze and rate these approaches based on 3 factors. First, whether they are able to reduce the learning differences in the present educational system. Second, are they suggesting any ways to develop community leadership among children? Third, what is their relevance in the curriculum and their basic objective? These factors will also help examine how the newer methods of teaching can be incorporated into the existing system in order to ameliorate the existing standards of education [8].

- **Project Based/ Home-Work Based Learning**

In this methodology, it has been proposed that regular projects/ home-work should be given to children and their performance should be judged on the basis of how they perform in these projects and home-work rather than on the basis of annual examinations. It proposes that it would reduce the stress level in children, thereby improving their performance [9]. Some interesting projects based on this model can be found at [10] and [11].

Though this method sounds promising and is easily integrable with the current educational system, it fails on a few aspects. As nothing has been proposed regarding improving curriculum this method ceases to be a plausible solution.

- **Learning by Teaching**

Learning by teaching designates the method introduced by Jean-Pol Martin that allows pupils and students to prepare and to teach lessons, or parts of lessons. Learning by teaching should not be confused with lectures by students, as students will not only convey certain content while choosing their own methods and didactic approaches in teaching classmates, but also learn in the process, which is the main objective. Neither should it be confused with tutoring, as the main objective of learning by teaching approach is to concentrate on the process of increasing knowledge by exchanging ideas. One good initiative in this field is the Teachable Agents Project [12].

This approach again focuses only upon the way the information is transferred and remembered but says nothing about the content. Though to some extent it would serve the purpose of inculcating the qualities of a community leader in children, this method still cannot serve as a yardstick to measure the quality of knowledge gained. However, other aspects of community leadership and learning differences are hard to be served. Also, this method is more beneficial for high school students.

- **Computer-supported collaborative learning (CSCL)**

Computer-supported collaborative learning (CSCL) is a method of supporting collaborative learning using computers and the Internet [13]. The technology also allows individuals who are far apart to collaborate on-line. It brings the benefits of collaborative and cooperative learning to users at a distance or co-locative learning via networked computers, such as the courses offered via the Internet or in a digital classroom [14].

Though this approach provides a collaborative working environment for the children, it is mainly suitable for distance learning and hence cannot be integrated with the current teacher-led classrooms.

- **Learning through stories**

In this model, it has been proposed to give lessons to children in the form of stories. The huge potential of this approach lies in the fact that children are able to relate very closely to stories and its characters. Researchers have proved that if the abstract concepts to be taught are articulated in a meaningful way in the form of stories, then that they can create a long-lasting impression on the minds of children. Also, children tend to learn better when they willingly try to understand a concept and teaching through stories is one interactive way to grasp a child's curiosity [15].

Despite the goodwill, storytelling has been subdued as an educational delivery mechanism at a basic level. It is not considered as a concrete method of education to teach older students. Also, nothing has been proposed about how curriculum can be integrated and taught in the form of stories.

- **Learning by doing / Learning through educational games**

Though learning by doing and learning through educational games are two different aspects, they are so inter-related to each other that we have decided to classify them under a single subsection. Learning by doing in a broader sense signifies a method where children are taught concepts and simultaneously they are given chances to apply them in real-time scenarios. Performing tasks practically makes it easier for the children to grasp a concept and helps retain it for a longer period of time. Educational games based on this learning concept itself can prove to be an important and versatile way to harness a child's untapped potential and gauge his true ability [16]. The concepts to be taught in class can be logically implemented in a game that not only tests the concepts of a child but also if he/she can apply it. Teaching by gaming will not only engross the child, but also give him reason to explore further on his/her own account. Ajuna Citizens is one such game that helps the child in developing decision making skills, provides opportunities to a child to think out of the box and apply theoretical concepts practically. Simcity [17], Memorize [18] and Nobel Laureates [19] are some more of the educational games built for the Sugar environment based on this concept.

This method is quite close to the method we are proposing through Ajuna Citizens which involves learning by applying theoretical concepts in a real life situation. One of the serious disadvantages of this method is that it does not have any provision to maintain the teacher-student relationship which is surely an important aspect of education.

3. Fallacies in the presently proposed methodologies and introducing our approach of learning

As mentioned in the last subsection, the approaches of learning proposed so far have their own set of problems. None of them can serve the purpose of a complete learning environment for children and hence fail to become a plausible solution to the loopholes prevalent in the current educational system.

The quest to evolve techniques and practices for education has unfolded interesting learning strategies for us. We explored these proposed models for sustainable learning and improved upon their shortcomings which led us to the designing of Ajuna Citizens. We have implemented our field learning in the form of a new learning model, **Inclusive approach towards learning and community leadership based on storytelling through games.** We have realized that the best way to explain a theory is by an example and similarly the best way to test a theory is by its actual implementation in real-time scenarios. Hence we have implemented our model of learning in a platform Ajuna Citizens which we found unique in its educational delivery. In this paper we would be explaining the behavioral guidelines of our learning model through Ajuna Citizens. In the next section, the design goals of Ajuna Citizens and in a way design goals of our learning model have been discussed. In Section-4, we would explain in detail about how Ajuna Citizens proposes to improve upon the drawbacks of the current educational system.

DESIGN GOALS OF Ajuna Citizens

While designing our learning methodology, we have focused on certain design goals. These goals are listed in this section. It has also been discussed how each of these goals are integrated in Ajuna Citizens.

3.1 Learning by Doing using Ajuna Network

This process can definitely teach children to tackle real life problems involving optimization of limited resources, crisis management and sustainable development. Though the learning by doing methodology has its own set of flaws like the other methods as we discussed in the previous section, we considered it worth enough to be included as a part of our learning environment as we felt that with certain improvements and changes in the basic way this method is adopted can improve drastically the practical knowledge that a student gains in this method. We focused on providing the children a medium through which they can implement their learning in a reality-based virtual environment. Since we felt that games come closest to such an approach, we have structured Ajuna Citizens in the form of a playable game. The lessons taught to children through Ajuna Citizens can be tested through various challenges provided in the game. This method has two major advantages over the conventional form of teaching. First, the children are able to practically implement what they learn which results into a much better understanding of the concepts than it could have been by reading textbooks in classrooms. Second, the various challenges in the game provide the teachers and instructors a medium to test the knowledge and understanding of the children, making them think more innovatively, and hence discover their weak areas. Moreover, all of this can be achieved with the willingness of the children to implement it which is another advantage that ensures the enjoyability of children.

3.2 Utilizing the Potential of Stories using Ajuna Network

Learning through stories has always been disregarded as a learning methodology primarily because nothing concrete has been suggested so far about integration of curriculum in the form of stories. We, through Ajuna Citizens, have tried to revive this untapped learning mechanism that can be utilized efficiently to assimilate children enthusiastically while preserving an environment that stresses on

learning. The lessons to be taught to children can be included in the form of a storyline and a game-play can be structured around this storyline. The children will have the power to give shape to this story as they will be the ones controlling the game. This can further increase the participation of children. Chats between game characters are used as a medium to narrate the story and hence the lessons to the children. The tasks and challenges in the game are then used to test the understanding of these lessons.

3.3 Seamless Integration of Curriculum

As discussed in the previous section, the drawback in many of the proposed learning approaches was their lack to integrate the lessons of the present curriculum. We have given special consideration to this issue and have devoted a considerable section of Ajuna Citizens to deal with it.

A **storyboard-builder tool** has been designed in Ajuna Citizens. The purpose of this tool is to provide the teachers and instructors a medium to integrate the curriculum-based lessons in Ajuna Citizens. Ajuna Citizens is different from other educational games, where the lessons are pre-included by developers and coders. These games either do not provide any method to include lessons dynamically or they expect you to be a coding geek in order to make changes in the game structure. However, the storyboard-builder tool have been designed with special consideration that school teachers should be able to design the stories easily since Ajuna Citizens is an open source educative game that has an **Extensible Design** which allows easy modification and extensions over the current game structure with the total independence of **Model, View and Controller**. The Model serves as the backend of the game which is responsible for managing all the data values related to the game. The View module serves as the front end of the game. It handles the Graphics of the game, GUI and Interaction with the user. The Controller module serves as an interface between the View module and the Model. It interprets the commands inputted by the user through the View module and brings about the corresponding changes in the Model. It also reflects the changes made in the Model on the View module.

The teachers can incorporate simple lessons in the form of stories to train the students in that particular subject. As an example, the teachers can demonstrate the practical applications of a new technology in the game play as it can be used to illustrate how efficiency of the town, for which resources have to be optimized, has improved with the technological upgradation in question. The teachers can teach the children basic concepts of Geography and Economics as the game strategy has to be such that efficient allocation of resources has to be achieved for a particular geographical area. The game further demands of them disaster management skills. There are many more such areas where the curriculum can be incorporated into the game play.

3.4 Learning beyond Textbook Curriculum

Another aspect where the majority of the proposed approaches of learning failed to provide a solution was to provide a medium which can eradicate learning differences from the educational system and inculcate the qualities of community leadership among children. Ajuna Citizens however is a learning platform where these issues have been properly considered. Since the teachers and students have the option to modify the game easily, Ajuna Citizens can be used for extending the curriculum to incorporate some topic that might be of genuine interest to the student, thereby promoting the ideals of an **“expanded school”** which grows well beyond the walls of the classroom. The default scenarios and tasks defined in Ajuna Citizens have been properly structured to provide a solution to the existing problems like learning differences and the lack of community leadership. In the next section, we would explain in detail how each of these is handled through different tasks and scenarios of Ajuna Citizens.

3.5 Collaborative Learning Environment using Ajuna Network

A collaborative learning environment proposes potential ways to solve many keen issues in the educational system. Collaboration is a recursive process where different organizations work together for a common goal by sharing knowledge, learning and building consensus. Studies have proved that collaborative learning is far better than isolated learning [21]. Keeping this fact in mind we have made Ajuna Citizens a multi-user learning platform. Ajuna Citizens demonstrates that a community is not supposed to be building in a closed environment. Currently the mesh network of XO Laptops is used to provide a collaborative framework to Ajuna Citizens [22]. The children can learn from each other and hence the Ajuna Citizens platform ensures learning even outside classrooms without the presence of a teacher.

3.6 Maintaining Teacher-Student Relationship

We realize that the constant guidance of a teacher is a prerequisite for child development [23]. While playing the Ajuna Citizens game, children might face problems and then would want to inquire of their teachers about how to approach the situation. Hence we are planning to develop a doubt-clearance system in Ajuna Citizens. The system would be based on a chat infrastructure where children would be constantly connected to their teachers through the mesh network framework. More on this system is discussed in the future work section.

3.7 Scope for Learning by Teaching

Since the learning by teaching methodology has shown some positive results so far [24], we have tried to include this mechanism as well in Ajuna Citizens. The GUI (Graphical User Interface) of the story-builder tool has been designed such that it can be easily understood by children. Hence the children can design their own storyboards with lessons and can challenge their peers to play their storyboards.

3.8 Providing Education to a Diverse Group

Since a classroom might comprise children belonging to various ethnic backgrounds, different cultures with different languages, Ajuna Citizens has been particular about not endorsing any particular ethnic group in order to provide equal opportunity to understand the gameplay. The game has been developed in the language English. There are plans to further localize it in various other languages.

4. Learning Through Ajuna Citizens using Ajuna Network

This section describes the design of scenarios and tasks in Ajuna Citizens. We have proposed here how Ajuna Citizens can help to reduce the problem of learning differences in the education system and help in promoting the qualities of community leadership among children. Many of the tasks and scenarios mentioned in this section are already implemented in Ajuna Citizens and for others are in the process of getting implemented.

Community Leadership

Community leadership together with knowledge and skills, volunteering, networks and partnerships have been identified as among the five key indicators for stronger communities and civil society. This subsection describes the various qualities of a community leader and how each of these qualities can be acquired by playing Ajuna Citizens.

- **Recognizing, understanding and effectively addressing the issues affecting the society**

A community leader should be able to recognize the issues prevalent in the society. He/she should have the skills required to take the appropriate steps for the eradication of the various problems in the society so that the community could be led towards a better and secure future. In Ajuna Citizens we enhance such skills by providing scenarios and tasks where the child has to deal with various such issues and take wise decisions to solve them. The issues which we have dealt with in Ajuna Citizens are as follows.

1. **Health Issues**

Proper health care facilities play an important role for the betterment of society. Through Ajuna Citizens, we teach children the importance of well-facilitated hospitals and dispensaries in a community. They are required to construct such structures and maintain them with proper facilities. This would further help them in understanding the different aspects of health facilities and provide guidelines for health-related issues.

Another aspect of health issues which is taught to children is about diseases. They are taught about prevention and cure of various diseases. A sample task comprises buying more vaccines and medicines to cure a particular disease when that disease is prevalent. We are in the process of adding information and relevant tasks associated with diseases like AIDS and swine flu. This structure can further help in integrating the curriculum with the gameplay.

Nutritional values are also taught through the game. There are various grains and vegetables available in the market. Children are taught about the nutritional values and benefits of various grains and vegetables. They are also taught about the diseases caused due to the lack of certain kinds of vitamins and proteins.

2. **Environmental Issues**

Nature is man's best friend, and this is what we teach through Ajuna Citizens. They are taught about the importance of trees and forests. Tasks like preventing deforestation and growing more trees have been designed to help children understand the importance and indispensability of good environmental conditions for sustainable and efficient development. Global warming has made the environment very unpredictable and the children can further learn about the various environmental changes through Ajuna Citizens.

Knowledge about various types of soil, crops and landscapes is also imparted through various missions in the game. Issues like soil erosion, pollution of environment and rivers are also dealt with through the game.

3. **Gender Biased Society**

People have always been of the view that games and gaming is more a male-oriented characteristic. One of the possible reasons for this could be that most of the games developed to date are more related to a male's sensibilities and understanding. Hence since the beginning, girls are discouraged to take to such hobbies. Some of the games that are developed do not even have a female character for the main player in their virtual world. Ajuna Citizens does not discriminate on any such grounds and provides equal opportunities to both in all aspects of the gameplay.

Ajuna Citizens lays special emphasis on this problem. The default storyboards that we provide with the game each have got a girl specific version where a girl or a woman is the protagonist of the story. Care has been taken to make the language more universal to suit both the genders and specific consideration has been given so that it portrays a quality of gender neutrality.

4. **Other Social Issues**

Children are also required to deal with issues like poverty and unemployment during the gameplay. Tasks are defined where the children are required to make wise decisions to remove such problems from society.

- **Humanitarian Values**

An honest, humane, fair-minded and loyal leader can take the community to completely new horizons. Corruption is the one of the biggest malaise that any society faces today. Hence we have focused on giving various kinds of moral and humane values through Ajuna Citizens contributing to the overall social development and welfare of a child.

1. **Respect for others' rights and decisions/ Commitment to duties**

A democratic society is based upon two principles –equality and freedom. It involves equal participation of each and every person in the decision-making process having equal access to power with equal rights. Hence to establish such a society, the leader should be tolerant for listening to others viewpoints and should work for the common welfare. In Ajuna Citizens at various instances the people of the community give advice to the player of the game. Also the user of Ajuna Citizens works for the betterment of its community people.

Timely completion of his/her duties is another aspect of a good leader. Various tasks are assigned to the children and they are supposed to complete them properly with the limited time.

2. **Respecting Elders**

Since the lessons are given to the children by some elderly in Ajuna Citizens, children learn to respect their elders and listening to their advice that helps them to further advance in the game.

3. **Strengthening Community at the Time of Crisis**

A community or society is worst affected in the time of a crisis. Therefore, the community leader should address such situations with appropriate actions. In Ajuna Citizens, various stages have been designed to help a child understand and experience a crisis-like situation. By dealing with such situation, children learn how to mitigate a crisis and how to react wisely to reduce the negative effects of it. Following are the types of crisis we teach about in Ajuna Citizens.

- **Disaster Management using Ajuna Network**

Lessons and tasks are designed in Ajuna Citizens which teaches about various natural disasters like earthquakes, floods, droughts and others. The children are taught about the causes, the aftermaths and the basic steps to be taken for prevention of such disasters in the future. Tasks are defined where they are supposed to manage the community resources efficiently to deal with such disasters.

1. **Economic Crisis Management**

Economic crisis situations like recession and increasing poverty have also been included in Ajuna Citizens. Children are given tasks about dealing with such situations and hence they learn about economic crisis.

5.4 Inferences

From our study, we tried to establish storytelling and gaming as an important approach towards community learning. We found out that an educational platform like Ajuna Citizens, where children not only read stories but play them as well, is a powerful approach of sensitizing children towards the social problems, and in the process, teaching them curriculum lessons.

5. Future Work

6.1 Detailed Child Analysis Reports based on Logging and Artificial Intelligence

An educational platform is not complete until there is a way to record and analyze the performance of a child utilizing that educational platform. Currently, the performance of children are measured either by the score they make while working on Ajuna Citizens or by the missions which they are able to cross. However, this method is a very abstract method and a much more concrete method to measure and analyze their performance is needed.

We propose here a new and unique idea to record and analyze the performance of a child using Ajuna Citizens. Our proposal is based on the use of logging and artificial intelligence. The idea goes like this. We would create a logging mechanism in Ajuna Citizens which would record all the actions done by the child while playing Ajuna Citizens. It would record the actions of children immediately after a task is assigned to them. Directly being able to perform the task implies better understanding of a concept than doing the same task in a roundabout way. Now, these loggings would be put under analysis by an artificial intelligence based system which would then report about

the understanding of the children of the various concepts being taught. From the analysis reports, a teacher or an instructor can make out the weak areas of its student and hence can focus to teach those concepts again to the children. We would be required to train the artificial intelligence system with a large amount of sample data in order to get correct concrete results. We would soon start working on this idea and would try to work on integrating it with the Ajuna Citizens platform.

6.2 Chat Infrastructures over the Mesh Network

As mentioned previously, we are planning to create an infrastructure to enable chatting between children and teacher or instructor and among children over the mesh network. This would help in maintaining the student-teacher relationship between children and their instructors. Children would be able to ask their doubts and hence would be able to grasp the concepts in a better way. They can also discuss and solve challenges collaboratively with their peers using this mechanism.

6.3 Improved Localization

In order to make the Ajuna Citizens platform accessible to children all over the world, it is necessary that we should localize it in the maximum number of languages possible. In the future we are planning to localize it into many more languages and we are looking for translators for this purpose.

6.4 Addition of more scenarios and tasks

Though we have covered a plethora of scenarios and tasks, we are trying to cover many more such scenarios and tasks as part of our future work. This would ensure a better integration of Ajuna Citizens with curriculum and would widen the scope of teaching areas which can be taught through Ajuna Citizens.

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Viability: Initial Assessment

Before kick-starting the pilot deployment, as advised by you, we shall be conducting an Initial Assessment to better understand the processes at Adharshila . At the end of this study, we shall have a good understanding of Adharshila's IT capability. Also, we shall have a better understanding of what aspects of Ajuna Citizens would be suited for Adharshila. We estimate that we will be able to complete this phase in 1 – 1.5 weeks time.

To help us conduct the assessment, we request you to kindly designate one of the faculty members as the Project Coordinator (PC) who can act as a Single Point of Contact for Adharshila. The PC shall have overall responsibility, on behalf of Adharshila, to work closely with the SEETA team. We would get into detailed discussions with the designated PC to develop a plan for Sugar deployment. The PC shall help us in addressing issues (administrative, operational etc) that we might face during the assessment period and thereafter. Also the PC shall help us gain an understanding of the organisational view of Adharshila and the students' curricula. This shall help us identify the relevant Sugar modules for the children.

We also request you to kindly designate a person with whom we can interface at the technical level, preferably someone responsible for the maintenance of computers at Adharshila.

Further, we hope that we can reach you for your advice and assistance in case we face challenges that are not addressable by the above designated individuals.

Once the Sugar environment has been deployed, we would like a few teachers, nominated by you, to undertake the Sugar Training with us to get them accustomed to the environment so that they can be the Sugar champions and introduce Sugar to the children. Our ultimate objective is to help Adharshila become self-sustainable in using Sugar.

Stakeholders Involved

SEETA would be the primary consultant with overall responsibility of assisting Adharshila in deploying Ajuna Citizens. Sugar Labs is the other stakeholder with whom SEETA is associated in this initiative. Sugar Labs is involved in the development of Sugar, OLPC's software paradigm. Post the assessment phase, we shall share more information with you about the detailed roles and responsibilities of each of the stakeholders (primarily the SEETA team and nominated teachers from Adharshila) in this project.

Case Study: Integrated Water Management Center using Ajuna Citizens

Ensure effective design, engineering and delivery of a technology-aided game solution for citizens to make water management better for everyone using Ajuna Network, predictive analytics and automation.

We wish to use web tools and blockchain technology to make water quality safer and monitored for residents, authorities, as well as other 3rd parties. With a mix of intelligent hardware, software on a blockchain network, we will provide intelligent feedback about water management and quality and help analyze past water related incidents, as well as predict future incidents, enable water management counseling:

Data Transparency: Availability of residents's water records across different stakeholder through secure blockchain network and NuCypher re-encryption data protocol. Residents, civic bodies, organizations who place their data on the exchange will be able to control which consortium entities have permission to access information.

Data Uniformity: Data is processed to make it uniform so that it can be utilized by different stakeholders on verified request. Also, records are encrypted to avoid any tampering of the data over course of time.

Data Analytics: With the help of computer-aided detection and machine learning algorithms, data can be further used for analysis and early discovery and prediction of water related incidents, real-time measures, monitoring and rating of water bodies, route pattern analysis and development using Ajuna Network.

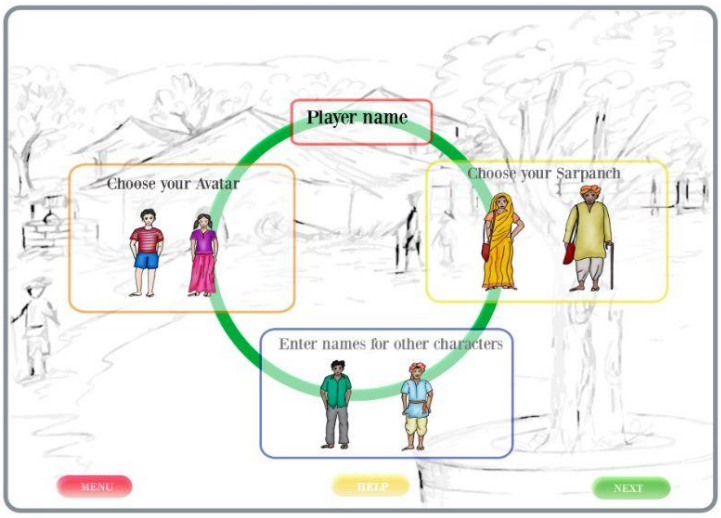
Counseling: Preventive measures and remediation using a decentralized Twitter application.

Game Design and Characters: Please find the requisite diagrams.

START

This is the customization screen. The user clicks on Player Name and enters his name and can then choose his player form, as well as choose and name the other characters he wants should feature in his game, in a text box which appears on clicking on the character.

The interface is easy to comprehend and the player is bound to go through all the 4 boxes and make his choices.



SCREENS THAT FOLLOW

The mission statement and the storyboard. Each fitted into one page. The player has the option to skip if he wants to.

The text of the Mission, Storyboard and the dialogues have been edited to make it more concise and shift the focus from reading to playing.

INTRODUCTORY CONVERSATION

In the practice mode, these dialogues come before the play area. Otherwise he player is taken straightaway to the play area.
Henceforth no screens would be popping out during the game for the dialogues/ instructions. The dialogue boxes included in the mail play area.

"The village of Abujmara, on the other side of the forest has been flooded and its people are homeless now and have sought help from us. The Panchayat has decided that the forest cover next to our village, is where the Abujamara people will move soon.
It is our job to help them establish a village on this land, and to rehabilitate the poor people.

Come, let's begin."

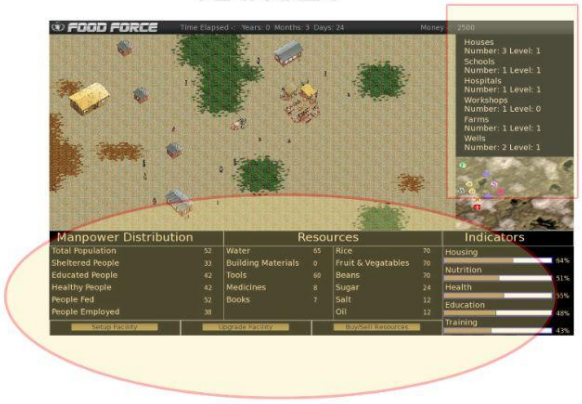
Interesting graphics complement the Panchayat's dialogues.

THE CHALLENGE BEGINS...

"Hello_____. You are one of chosen few to take on the mantle of becoming the Sarpanch after me, once you prove your skill. But before that happens, you have to be well-versed with how a village is managed. I will assist you in developing your skills...Come with me…."

The player is addressed by his name. here and all through the game. The option to skip this dialogue given.

PLAY AREA

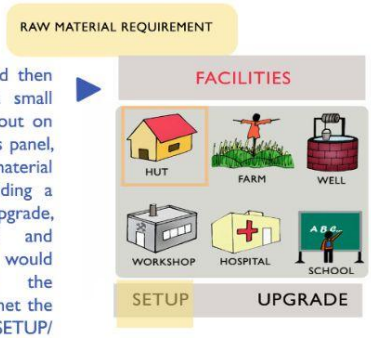


EARLIER DIALOGUE WINDOWS

Instead of dialogues appearing in modal windows that interrupt the flow of the game, these windows can be provided for in the main play area itself.Whenever an instruction needs to feature, this window with the dialogue on it can slide into the play area from the ight.In case of more than one person's dialogues , more of these windows can slide in.

GRAPHICAL ELEMENTS INCORPORATED

On selecting HUT and then hovering on Setup a small window , would pop out on the top of the facilities panel, listing out the raw material requirements for building a house.In case of an upgrade, selecting a facility and hovering on upgrade would do the same.If the requirement is being met the player can click on SETUP/ UPGRADE.

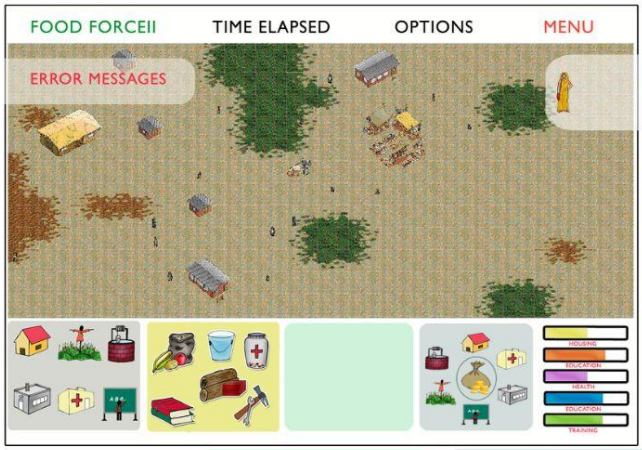


On selecting a RESOURCE and then hovering on BUY/SELL a small window , would pop out on the top of the RESOURCES panel, listing out the amount of the resource presently available in the village.Accordingly the player can trade goods.

Thus separate windows appearing on the screen do not need to disrupt the play area.

A ROUGH LAYOUT OF WHAT THE PLAY AREA MAY LOOK LIKE

Prominent ERROR MESSAGES appearing from the left.



OPTIONS would enlist options such as turning off / on dialogues, enabling Voice Instructions along with text (that would make it far more engaging for the player).

CHAT WINDOWS appearing from the right, merged with the play area

PLAY AREA with its captivating graphics made larger.

INDICATORS , made conspicuous with the use of bright colors.

This panel could be included if needed. Stick figures denoting categories and a pie chart or drop-down menu could be used rather than formidable text and numbers.

MANPOWER DISTRIBUTION

AVAILABILITY OF RESOURCES & MONEY

On hovering on the graphic, the statistics would appear on the top.

AFTERTHOUGHTS

The aim should be to enrich the child with knowledge alongside helping him manage the village. Learning should be subliminal. Keep presenting interesting facts and figures about the causes of natural disasters etc that would make the child think.

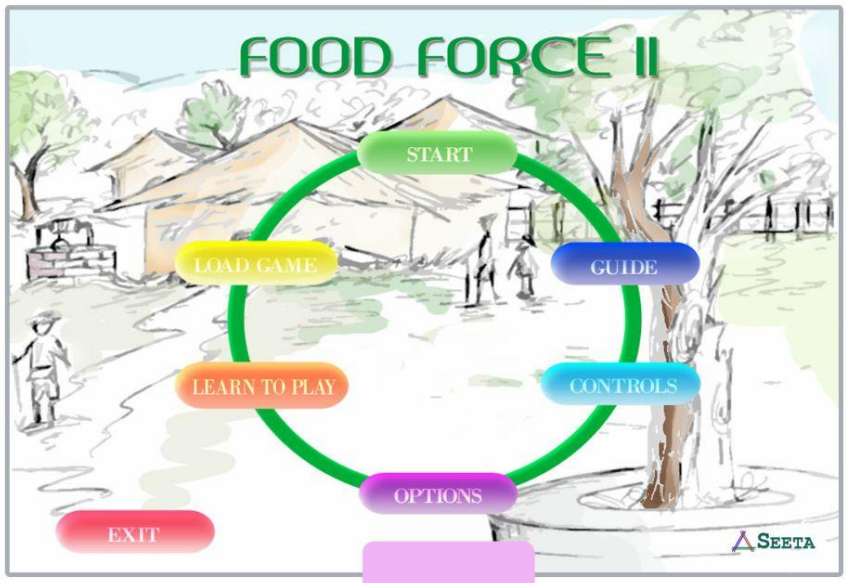
PROPOSED MODIFICATIONS

CHARACTERS

PLAYER (boy) PLAYER (girl) SARPANCH SARPANCH ELDER BROTHER FARMER

A layout of what the characters could look like if modelled again. Since currently they feature only in the dialogues' window and not in the play area, they could be kept two-dimensional only.

MAIN MENU SCREEN REDESIGN



Information about a particular aspect displayed on these windows as per the button clicked on.

The design is more in tandem with the essence of the game.The menu elements arranged in a circular format, could also depict the circle of community living, work and cooperation along with avoiding having to scroll down to view all the menu elements.Rainbow colors have been used for the buttons as a representation of the entire spectrum of life ,hope, positivity, revival.On hovering over the SEETA logo, information about the company can be displayed.

★ Colors and fonts used not final.