Add It Up: A Financial Literacy Tool for K-12 Education

by

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Abstract

There are different ways used to engage learners through online learning environments. Especially for kids the online learning environment must be more interactive, fun, colorful, and must have good usability techniques used when an online learning environment is being designed for them. Lot of educators wants to use the current new technologies in online learning environment. Now the problem here is that are the kids ready to cope up with such high technological standards? So even new technology trends are used in the design of online learning environment it must look simple, clear and also the environment must be designed in such a way that the kids must be engaged in the online learning environment. The younger students have more knowledge on the current new technological trends because they are always acclaimed to new technology and also depend on the environment they are grown up.

There are many online learning environment online but many of them doesn't meet the needs of the youth and the educators. The learning environment must designed and organized in such a way that they meet the traditional classroom teaching methods and the youth must be engaged in the learning environment. The main purpose of this study is to develop and educator friendly learning environment with the current trends in technology which satisfy the youth as well as the educator. Also we make sure that this online learning environment also supports mobile phones so that student and educators living in rural areas have access to it.

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CHAPTER 1: INTRODUCTION

Learning no longer occurs in one place and at one time. As we can see there is rapid growth of computers and information technologies in the past few years, so large number of people has access to various information sources and services. There are many mechanisms where the text book format traditional teaching is being converted into hypermedia learning. Now days the most popular instructional delivery system is hypermedia learning. By using internet new forms of social interaction, activities and organizing are enabled. Computer Technologies provide and present new opportunities for schools and universities to develop interactive multimedia learning environments which can improve student learning and their scored. Web based intelligent tutoring technologies are in great demand for K-12 schools. Financial Literacy is one of the most important in any one's life. Everyone needs to have good knowledge about Finances in their middle school or high school days so that they can have congenial financial life in their future. Fewer than 50% of the kids consider themselves knowledgeable about how to budget money (41%), how to pay bills (34%), how credit card interest and fees work (26%) or what a 401(k) plan is (13%).According to NRI Research stats teenagers are active consumers spending over $250billion in year 2009 with 27% having their own credit card or they have access to their parent's credit cards.

So to overcome the financial problems in kids, they need to be taught about finances in their school or through WWW. As the interest in educational reform in growing rapidly along with the growth of information technology the educators, parents have lot of expectations on the

Educational Software which may be helpful for their kids in gaining financial knowledge. If we consider today's educational components more emphasis is done on learning and student collaboration is considered as secondary matter. Develop a large library of components for example one which is sufficient enough to cover K 12 financial curriculum). There are many educational web sites for K 12 students on various topics like math's, sciences, Fun games and many more. We are coming up with an Educational site for K 12 students which will help the students to gain knowledge on Finance.

1.1 Problem Statement

There are different ways used to engage learners through online learning environments. Especially for kids the online learning environment must be more interactive, fun, colorful, and must have good usability techniques used when an online learning environment is being designed for them. Lot of educators wants to use the current new technologies in online learning environment. Now the problem here is that are the kids ready to cope up with such high technological standards? So even new technology trends are used in the design of online learning environment it must look simple, clear and also the environment must be designed in such a way that the kids must be engaged in the online learning environment. The younger students have more knowledge on the current new technological trends because they are always acclaimed to new technology and also depend on the environment they are grown up.

Some of passionate people and educators from Cornell University whose main aim is to help kids in giving them a goof financial start in life have come up with an educational environment more specifically saying it's an education web site designed for K 12 kids called as Moneyville. Many researchers and educators have supported this learning environment in USA. This site has various information regarding to finances like consumer protection, insurance,

banking services, how to use ATM card etc. This learning environment has some Usability design issues which are

- The Moneyville Learning Environment is not user friendly which may create problems to kids when they go through the learning environment. Web usability is an approach that is used to make the end user satisfy without making the user to undergo any training on how to use the learning environment.
- The look of the environment was not aesthetically appealing. Kids love to use any environment which is colorful, has lots of animations in it, engaging.
- All the information that's there in learning environment at present in all text based format which is very boring for the kids. Because there are some pages which have around 30 to 50 lines on a topic so the kid will not be retain him when he goes through such kind of pages and as a result he may skip it which is not a good practice in any learning environment.
- The navigation in the home page is not appealing as the navigation style is very long and appears on one mouse over event on the navigation.
- KXNN has a separate YouTube page. As now days we can see with the vast growth social networking sites every web page has their own pages in Face book, twitter or any other social networking sites. These mechanisms were missing the Moneyville learning environment.
- With the technology taking new trends every day and rapid growth in the number of user using social networking sites the educators face an uphill task in designing a learning environment meeting these requirements to satisfy the techno youth.

There are many online learning environment online but many of them doesn't meet the needs of the youth and the educators. The learning environment must designed and organized in such a way that they meet the traditional classroom teaching methods and the youth must be engaged in the learning environment. The main purpose of this study is to develop and educator friendly learning environment with the current trends in technology which satisfy the youth as well as the educator. Also we make sure that this online learning environment also supports mobile phones so that student and educators living in rural areas have access to it.

1.2 Research Justification

With the above problem mentioned we have come up with a new learning environment called as ADDITUP which solves all the above issues. The moneyville learning environment was more into a text based format where all the case studies were text based. So we did a lot of research on how to convert those texts based case studies into animations. After doing lot of research we decided to draw paper prototypes of the case studies. These prototypes have each and every scene drawn and narrated according to the case study. Once the paper prototypes were accepted then these prototypes were converted to animations to increase the user acceptance of user interface design. We added verbal tutorials (audio) of what's happening in a particular scene. So by doing so the kid will get engaged into the learning environment. Also coming to navigation issue we used stylish JQUERY navigation style menus to make learning environment more engaging. And the user need not go through all the navigation on the home page itself. The navigation is divided in chunks which make the novice user also move through it easily.

1.3 Research Purpose

The primary objective this research were

- Design an online educational learning environment to provide K 12 kids knowledge about financial literacy, problems they face in future if they don't have good financial start in early life.
- Know what tools are currently available to create the learning environment to facilitate the traditional classroom teaching methods.
- Make the learning environment as user friendly in such a way that kids are always engaged into it.

1.4 Hypothesis

The main hypothesis of this research is that teachers take into account that online learning environment in interactive inside rather outside the classroom but educators feel vice versa. There is no way that financial literacy can be taught in classrooms because many schools in USA don't have financial literacy in their curricula. So online learning environment in very helpful in such a case as the teacher can just help the students on what they have to do in the online learning environment and kids may go home and work on it. Also in rural areas where there are many schools which don't have laptops mobile phones come in handy. This learning environment even works on mobile phones.

CHAPTER 2: LITERATURE REVIEW

2.1 Online Learning Environments

In the present decade, there are lots of computer technologies that present new opportunities for students studying in various schools and universities to develop interactive media learning environments. By developing such kinds of environments the students can improve learning, have good knowledge and commands on the technology that they are learning.

As the number of students using computers at home and at school is increasing at a vast speed, there is a great demand for developing software applications which can help students learn better. According to the statistics given by iNACOL which is International Association for K-12 Online learning, in the year 2006-2007 school year 14.2 million computers were available for classroom use which is one computer for every four students. In the year 2009 iNACOL estimates a total of 1,500,000 K-12 students were enrolled in online learning courses. By the above statistics we can see the importance of Online Learning Environments for K-12 students especially.

In Online Learning Environments, technology plays a vital role where learning is independent of time and physical location, It is important to ensure that the student to student (Which is Online Learning Environment) interaction is not affected. There are several research projects that identified that technology is an important measure for successful development of Online Learning Environments. Usability is also one of the important criteria that is to be considered while developing Online Learning Environments, because the quality of the user's

experience while interacting with the web site is measured by Usability. The success of Online Learning Environments measures the student learning experiences and increased usability is very beneficial. To increase the level of usability in Online Learning Environments, a lot of research needs to be done on usability factors and on its evaluation factors.

2.1.1 Integrating Web into Traditional Teaching Methods

There are many new Web Technologies that provide online features that can be used while developing an Online Learning Environment: interactive demos, self-study quizzes, tutorials, distance education, animated case study scenarios, etc. Now the main question that arises is are today's students ready for all this? The present style that many of the K 12 schools follow is a very traditional in the way which a teacher gives lectures in the classroom, written homework assignments, pen and paper tests, and printed textbooks. To overcome this most of the focus must be done on the Web – based instruction. The solution to this is to prevail more self-learning and scrutiny aided by technology.

2.1.2 Levels of Integration

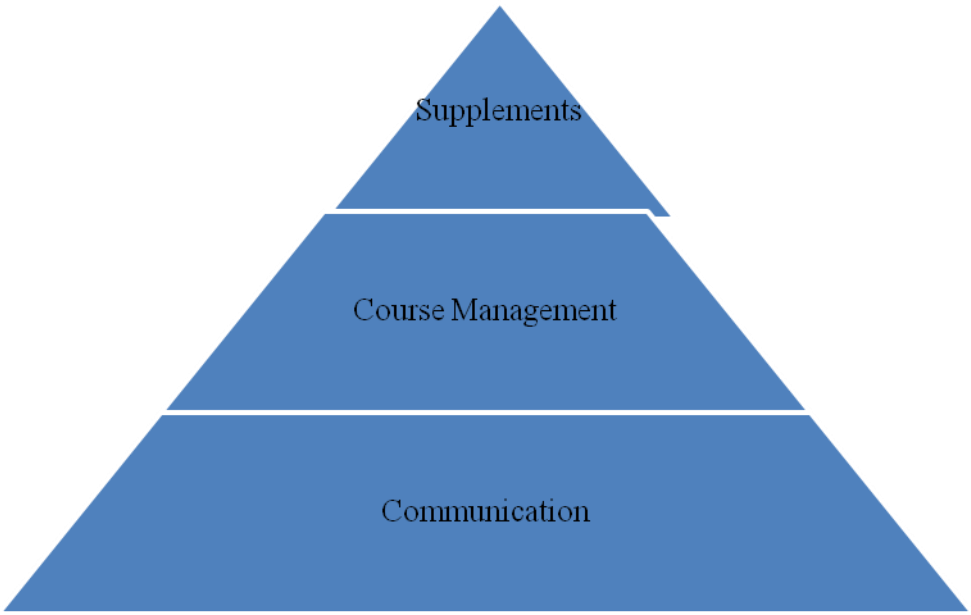

Figure1: Levels of Integration

The Integration into web based prototypes can be divided into three levels which are treated as building blocks as shown in Figure 1.

Communication Level: The first and most elemental level is communication which provides support such as group mail, online postings of syllabi, handouts and assignments. Very little amount of technological knowledge is required here.

Course Management Level: In this level the instructor skills and time are involved which is essential. Some of the features provided in the level are online quizzes, bulletin boards, chat rooms, online grade reporting.

Supplements Level: Takes the form of online demonstrations, online reading and resources, virtual or remote experiments. Demos can be passive or interactive.

2.1.3 Guidelines of Interactivity

Educational software once completely developed has many pitfalls that are common. Some of the common problems surround a confusing navigation on the home page.

- The icons that are used on the home page may be very confusing.
- The layout may not display well on small screens or the information is hard to read.
- The instruction and the interactive parts may not be viewable simultaneously.
- The means of starting the demos may not be clear.

Student may get frustrated and will not be navigating the page after three to four clicks. The navigation and the instructions on the page must be very clear not only to the instructor but also in the student point of view.

Students are more encouraged to do research on a topic on websites if they think that particular topic is useful to them. For example, all the information on credit cards is very useful for K -12 students for their financial knowledge. The Web is a wonderful means to update the

information and its related issues. Students are benefited more when their instructions provide some guidance on how to navigate the web for a particular topic instead of students being tied solely to the instructor and the textbook, the Web provides a window for them to fly out on their own.

2.1.4 Security in Online E-Learning Environments

Security is very important feature that is to be considered when an Online Learning Environment is being developed. The role of security in e-learning is to provide a secure end – to end session between the student and the e- learning network. Security is different in student's perspective and instructor's perspective in e- learning environment. In the student's view, for purpose of interaction and collaboration, more focus is done building the sense of security. A student is more confident in interacting and collaborating with others when there are mechanisms in place to create that privacy and trust.

There are three important security features to be provided in any online e-learning environment:

- Confidentiality: Assuring the students who are using the e- learning environment that the information and data is kept secret and private. It is not disclosed to unauthorized persons, processes and devices. In an e – learning environment, students are to be assured that their relative homework's and assignments that they submit online and kept private and only disclosed to their relative teachers.
- Integrity: Assuring the students that the information and data can't be modified or accidentally destroyed and also the data is not maliciously affected and is in accurate, correct and in complete original form. In an e – learning environments student should have the confidence that their assignments or homework's reach their concerned teachers in an 'unedited' state

- Availability: Assuring the students that the information and communication resources are readily accessible and is reliable in a timely manner to authorized persons. There shouldn't be problems as server problems, log in problems even to authorized users.

A good example for security in online e- learning environment is Wiki. Wiki which is a completely an interactive website driven by a specialized web server generating dynamic pages from the results. Wikis can provide an efficient, user friendly and cost- effective interface for collaboration, knowledge, creation and archiving student information.

2.1.5 Mobile Based Learning for Improving in K 12 Areas

The existing problems of traditional educational technology training

The Ministry of Education specially launched a "educational technology capacity-building project for national K -12 teachers" in April 05. Firstly, the k -12 teachers in rural areas are to be mandatorily trained. Secondly, teacher's educational technology capacity requires gradual accumulation. The rural teachers also must be gradually updated, they cannot attend training in the city which is very far away. So this kind of training programs being held in the city which is a difficult task for the teachers in rural areas to attend the training programs. They need to get the relevant information to solve their own problems anytime, anywhere.

The advantages of 3G phone based mobile learning in rural areas

Through Mobile learning anyone can learn anything at anytime .Mobile learning is based on E- Learning, a new type of learning which relies on Mobile Communication Technology or Wireless Network Technology. With the vast growth of wireless network and communication technology, mobile learning allows learners to learn and get more information and knowledge on whatever related subject they want anytime and anywhere. Mobile learning is composed of three parts: Internet, Mobile education network and mobile communication devices. The internet is

widely used and is an effective carrier of educational resources. As cellular companies are now coming up with 4G technologies, mobility is faster compared to 2G and 3G families. The Mobile education network is a platform which enables individuals and institutions to communicate through sharing information. By using mobile phones in rural areas lot of time can be saved and self improvement can be made. The educational technology in rural areas can be developed by using mobile technology. The current era of learning is mobile learning; the current rural era of learning is mobile learning.

The requirements of learning resource of K-12 teachers to improve their educational technology in rural areas.

- Educational technology related learning materials.
- Design Networks Content.
- Learning materials limited by phone screen.
- Problem based learning where the teachers don't have enough time to conduct educational technology as full time students.

Survey of 3G phone-based mobile learning feasibility in China

- Statistics of cell phone:

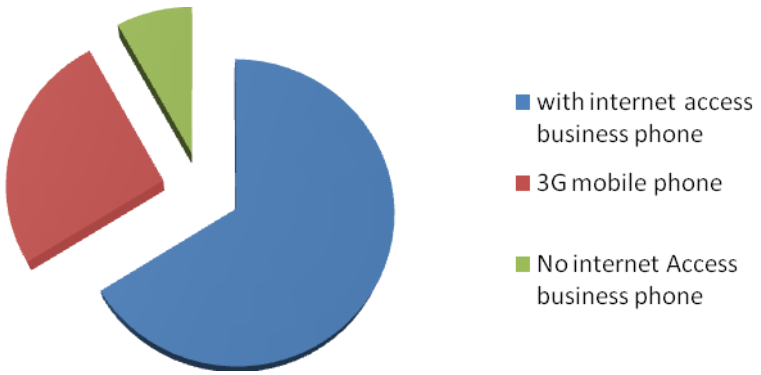

Figure2: Statistics about cell Phone

- Statistics of using mobile Phone learning:

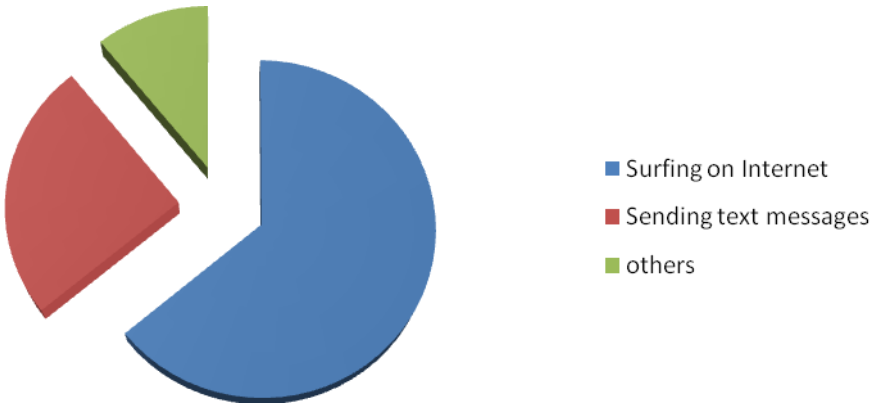

Figure3: Statistics of using mobile Phone Learning.

- Understanding of improving educational technology by mobile learning:

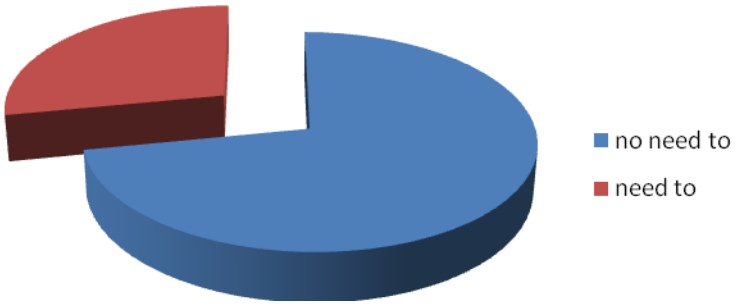

Figure 4: Understanding of improving educational technology by mobile learning

- Statistics of mobile learning device orientation

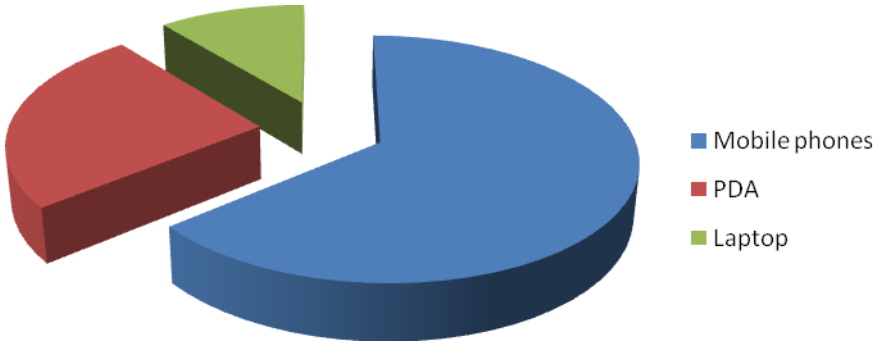

Figure 5: Statistics of mobile learning device orientation

2.2 Statistics about Financial Literacy

Financial literacy is the ability to understand finance. It is the ability of the individual to make informed and take effective decision in his/her financial understanding. The US Treasury has established an office of education in 2001 and the US Congress established the Financial Literacy and Education Commission under the Financial Literacy and Education Improvement Act in 2003. In early 1995 the Jump$tart Coalition was formed for improving persona financial literacy in United States. The Jump$tart Coalition for Personal Financial Literacy is a nonprofit coalition of national organizations that help for financial literacy of pre-kindergarten through college-aged students. The Jump$tart Coalition maintains the National Standards in K-12 Personal Finance Education which is program designed for school administration, teachers, material developers and educational policymakers.

Making a good financial decisions at a very young age in today's financial environment are very important. Any wrong financial decision can be very costly in life. There are many

young people who carry large amounts of student loans and credit card debts. To avoid such problems it is important that the younger people have good knowledge and know how to save money so that they can have a good financial life in near future. Financial literacy for kids must be taught at home, in schools and also through internet. There are many web sites online that teach how to save money, advantages of doing so, how to manage money comfortably. Such kind of programs will make the children have a bright future and financially secure. Giving training in Financial literacy focuses on providing information on topics such as banking services, budgeting, consumer protection, insurance among others.

2.2.1 Is Financial Education Necessary for Teens?

80% of teens aged 13- 18 years old think that it's important for them to have good financial status in their future. Today's youth finacial situation can be characterized by the increase in high level of debts. The average salary expected by the teens in $145,000 per year (boys expect an average salary of $173,000 where as girls expect an average salary of $114,200). There are many high school students, who use credit cards. 32% of high school students use credit cards and 53% of them use debit cards. According to the survey done by annualcredit report.com, 52.3% of the high school students don't know that they can check their free credit report once a year and 52 % of them don't know that by paying off their credit bill slowly will increase their interest rate on the card. The most interesting statistic is that 64% oh high school students don't know a house finanaced with a fixed-rate mortage is good against sudden increase in inflation. All the above facts make clear how important it is to have good financial knowledge so that they can have some money saved for their future.

2.2.2 What do teachers say?

A survey was done by Networks Financial Institute at Indiana State Univeristy in 2008 about k-12 teachers.These were the revealed facts:

- 8 out of 10 teachers think that it is important to teach financial lieracy in U.S.
- Only half of the K-12 teachers say they do teach about 'Financial Literacy' in some form or the other.
- The challenges for teaching about financial literacy to the students according to the teachers are lack of time, lack of state curriculum requirements and lack of deamnd.
- According to teachers, most the youth lack financial literacy skills in U.S .
- Most of the banckruptcy cases involved people aged 20 -24 .
- 25 to 56 million people in the U.S don't have a bank account.
- 10 % of teens aged 12-19 use a creit card.
- Balancing checkbooks, credit management, taking wise economic decisions, staying out of debt are the important topics that teachers thinks have to be taught to the students before they go into 'real world'.

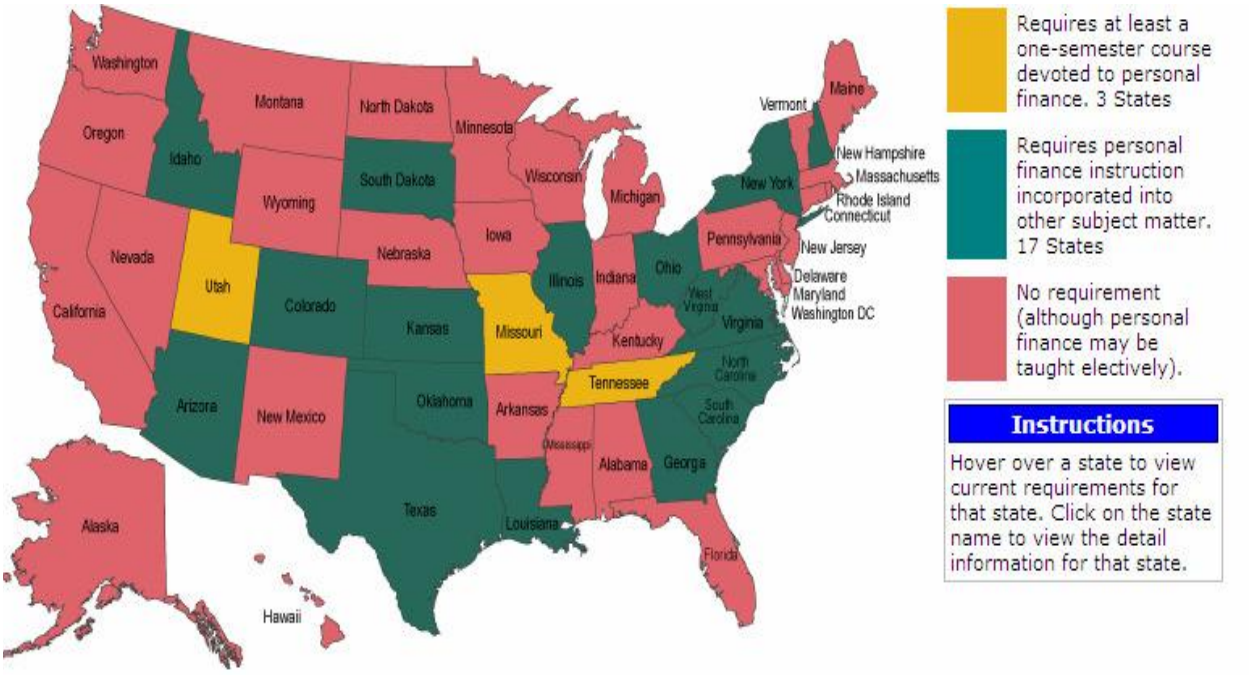

Figure6. Stats about U.S schools teaching Financial Literacy

2.2.3 What Parents have to say?

Most of the parents think that they must be role models to their children. Almost 80 % of parents see themselves as positive money role models for their kids. Parents agree that their children must undergo financial lessons in their school classroom. Only 5% of adults have learned how important money is in life during their elementary or high school which is very prostrate, 48% percent of people have learnt about money management from their parents while 41% learned in their own way. More than 50% of teens are willing to learn about money management, but only 14% have taken a class on money management topics where as 35% of the teens like learning from their parents. Parents need to discuss finances with their children at home. Currently only 36% of parents don't discuss about finances with their children.

2.3 What Is Kids Extension News Network (KXNN)

KXNN is a process used to create a content that can be used to educate youth for all ages. In KXNN there are different subjects which are connected as a network which can be utilized for

educating youth students. KXNN is a part of FYFL (For Youth, For Life). The overall KXNN project is divided into two parts: one is educational learning concept and the other being social learning concept. Figure 6 illustrates how the social learning environment can be created as a series of flow charts and diagrams depicting users, groups and groups of users.

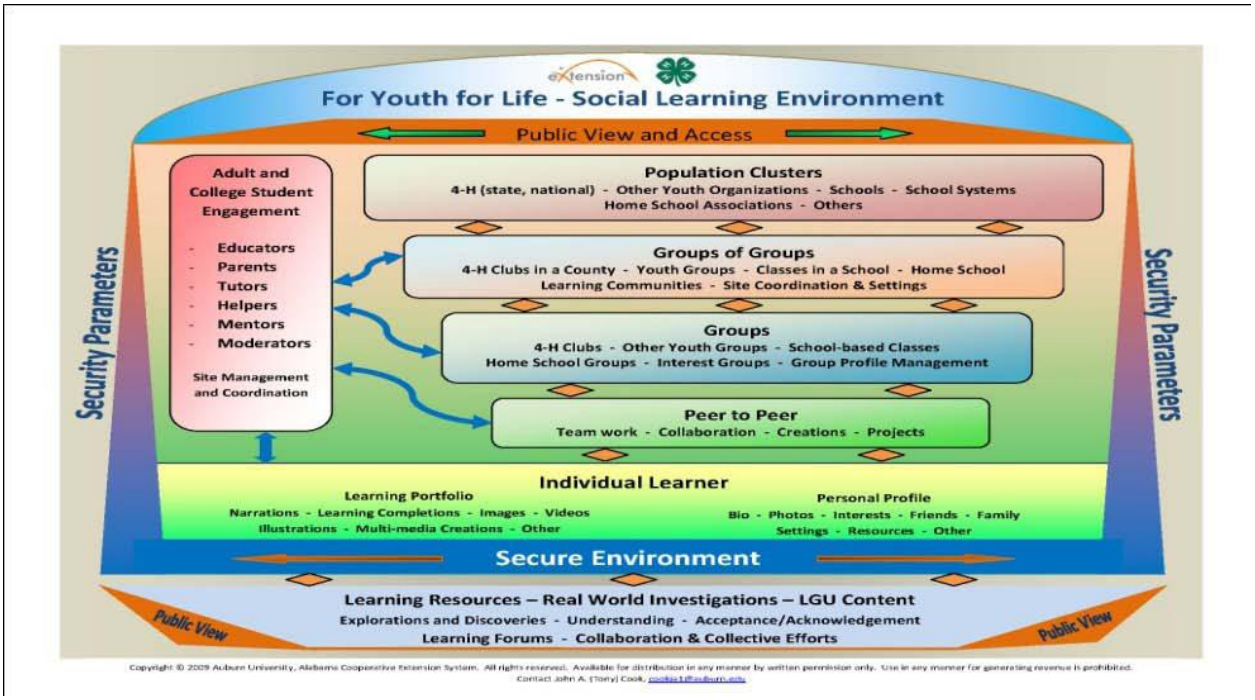

Figure 7: For Youth, For Life – Social Learning Environment: Copyright © 2009 Auburn University, Alabama Cooperative Extension System (Dr. John A. Cook)

2.3.1 What is Moneyville?

The main mission that moneyville has started is to educates the youth ages 12-18 years about their financial status so that they have good financial life in their future. Moneyville was started initially at Cornell University by a team of passionate people whose main goal was to help young people in their financial life. The project has evolving and moving around over several years and many people have added their own creativity ideas to it. The Moneyville site

has been shared with many educators throughout the Unites States. Many of their suggestions have been incorporated in the current version of the site. Moneyville is mainly concentrated for the students in the middle school or high school where they can get lot of ideas, tips, and interactive pages to increase their money knowledge and skills. It has animated case studies, quizzes. ADD IT UP is latest version of Moneyville, a part of educational learning environment in KXNN.

2.4 Educational Software

Educational software is a computer software in which the primary goal is e-learning or teaching. Kids have to put a lot of effort in the process of learning which can be very complex cognitive task. It puts a lot of pressure on them. Lot of motivation has to be given to kids to cope with it. In this way it is important to create educational software in such a way that the kids find it in an interesting way. Though a lot of research has been done and is presently going on to trying to find different ways to create educational software, it hasn't reached schools yet. Many of the educational games or software's created are not convincing for the educators and parents. One more reason is the quality of the educational software.

A question that is being widely spread in today's education is "how can learning tasks be structured to encourage creative thinking in the classroom". The process of learning and creativity share many similarities. When designing educational software more emphasis needs to be done on the creative process. It is believed that computers enhance learning. Students can get motivated and study about the relative topics deeply using educational software. Teachers also benefit using educational software. The main improvement in digital learning compared to textbook learning is digital learning has dynamic, interactive and visual features. Examples of educational software's are:

- Mind Mapping software such as MindGenius
- Language Learning software(KVerbos)
- VLE (Virtual Learning Environment)
- Educational Wikis

2.4.1 Evaluation Factors of Educational Learning

Every prototype of educational software has some related information for its use by the kids. The foremost thing that is to be evaluated is the information that is being used in the educational software.

- Validity and Authority: The content that is used in the educational software must be reliable, authors must be a reputable origin of the information.
- Accuracy: The information must be current and not out dated and must be error – free information; a grammar check has to be done.
- Appropriateness: Concepts and vocabulary must be relevant to the learners. Information must be according to the age group.

There are other factors to be considered when presentation and organization of the content into picture. Pedagogical factor is a compound factor as no one knows how humans are going to learn. Each and every person has a different style of learning. Motivation and structure are the two important factors in any educational software as they define the instructional nature of an information environment. A typical way to motivate the kids is to tell them what they will achieve at the end when a particular task or quiz is done by the student. The structure of the organizational content is again dependent on the subject matter. In hypermedia learning systems, learner's control is an important element which is elemental in interactive design learning as it allows students to know their individual needs. When there are a wide range of options in the

educational software, it is difficult for low range students to follow it. The amount and the type of information in any educational software depend on some characteristics like age, nature of which area the student is concentrated, etc.

Interface Design Factor is also to be considered on the presentation and organization of the content. Interface Design Factor can be evaluated by interactivity, navigation, feedback. Interactivity in instruction comprises the nature of the activity that is being performed by the technology and the learner. It is important to design as much meaningful interactivity into educational software. Guidelines for increasing interactivity are

- Do as much as interactions possible in every three to four screens.
- Break the content in small segments and build questions, reviews, and summaries for each segment.
- Make students apply what they have practically rather asking them to memorize.
- Give them a hint to get the information while they do quizzes because of the kid feels it tough for him he may skip it. So to make it interesting provide some hints so that the kids can get the final solution.
- Provide a glossary for complicated terms.
- Objective key for reviewing course objectives.

Feedback is closely related to interaction as any action without any feedback is unproductive for a learner. The other important factors that are to be considered are screen design, use of space, text readability, color, graphics, animation /videos and audio. The evaluation of learning can be calculated by performing tests. Three types of tests can be performed: pre tests which determine learning outcomes prior to the intervention; post tests; and delayed post test to determine learning outcomes after intervention. All these come under learning outcomes. When we

consider the usability of a product its evaluation by observing and meaningful end user attributes is called learning process.

2.4.2 Developing Educational Software Components

With the interest in educational reform, the demand for educational software is growing vastly. The educational applications must be very flexible as every school has its own way of teaching the curricula and also all the instructors don't teach in the same way. The educational components should also give importance to the cognitive aspects not only to the computational ones. Cognitive aspects include the component's fit with the mental model and thought processes of the secondary designer- the person who uses components to build the applications. The educational components are designed for the sake of having good interaction in the educational software. Components can be helpful when the students and the instructors manipulate the way they learn the information. While developing the process it can be replaced by editing processes, creating and manipulating 'editable applications', the students and educators must be encouraged and motivated in adapting to the component based products.

2.4.3 Alice

Alice is a 3D programming environment that is used to create animated tutorials, play interactive games or share a video to web easily. The software was first developed in University of Virginia and t ;ihen at Carnegie Mellon University. Alice was developed to solve the issues in educational programming. Alice allows students to immediately see how their animation programs runs. It is free software and can be downloaded from http://www.alice.org/ . The Alice team has developed instructional materials to support students and teachers in using this new approach.

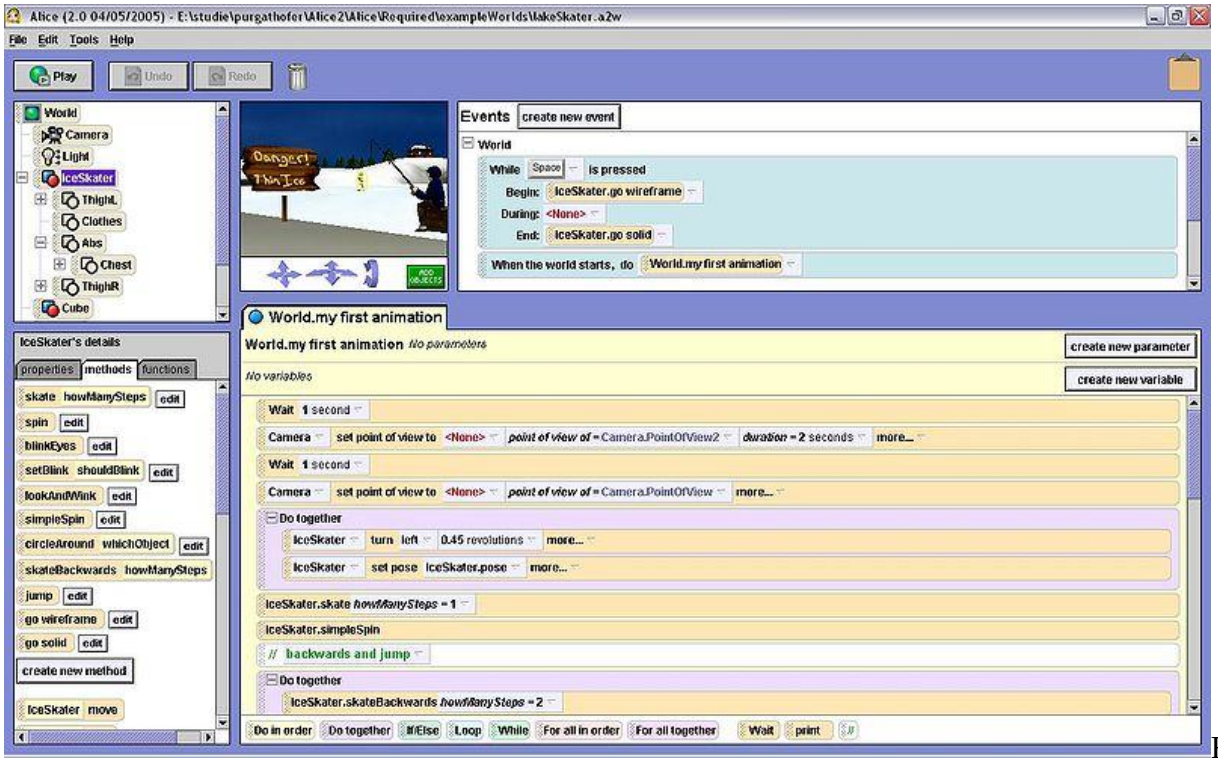

Figure 8: Screen of Alice Educational Software Environment.

2.4.4 Agent Sheets

Agent Sheets is an educational cyber learning tool to create web based simulation games. It is used to teach students on how to program through game design. Agent Sheets is supported by middle and high school curriculum called Scalable Game Design along with ISTE National Education Technology Standards (NETS). It is used as a Programming tool by high school students. Agent Sheets has received a vast recognition and the number of educators using it is growing widely. Agent Sheets 3 is the world first programming environment supporting computational thinking by providing information about the meaning of the program. It is just a drag drop mechanism which is very easy for the kids to understand.

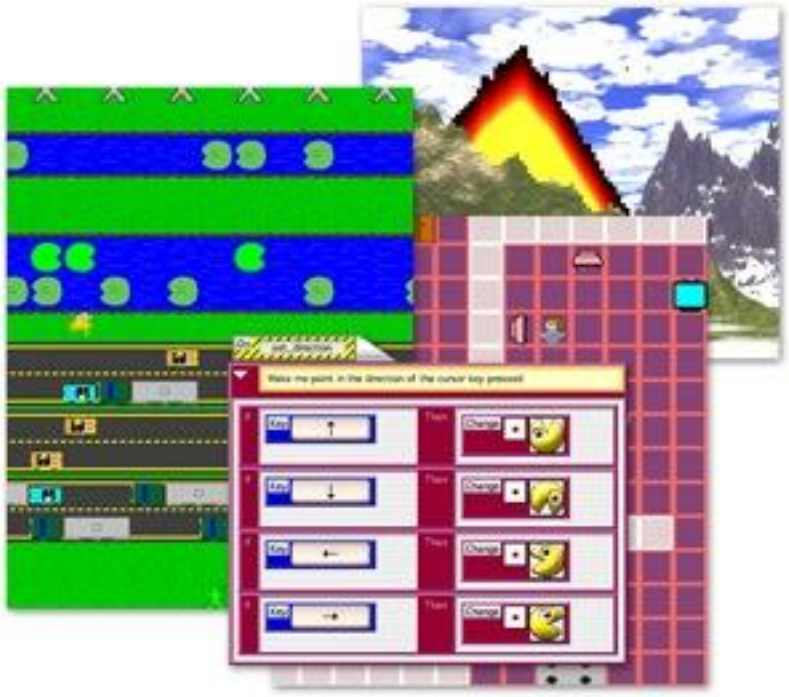

Figure9: Rule Based Visual Programming

Some of the other Educational Software's are E-slate, Lego Mind storms, Kodu, Robo Mind, Hackety Hack etc.

CHAPTER 3: METHODOLOGY

3.1 Motivation

The rate at which the technology is growing is very fast. Many new trends and technologies come up into the industry each and every day. As there are many different varieties of software available in the market, the most important thing when developing a tool is to see which software is suitable to the tool in the user perspective point of view. In many of the primary and secondary education schools, today's distance education via Online Learning Environments has become a standard offering. This research is based on a student centered point of view, and the lessons or activities in the Online Learning Environment are designed in such a way that the student will be engaged. The educational environment that we developed is for young people aged 12 - 18 to build strong financial knowledge and skills as they approach adulthood.

Most of the courses have a web page that tells what the student is going to learn when he/she browses the web site. Now when developing a Educational Learning Environment, the developer must always think from the student's point of view. One can only design a good learning environment which is simple, clear, and has good usability. Some passionate people and educators from Cornell University whose main aim is to help kids in giving them a good financial start in life, have come up with an educational environment called Moneyville. Moneyville is educational website designed for K 12 kids. Many researchers and educators have supported this learning environment in the USA. This site has various information regarding to

finances including consumer protection, insurance, banking services and how to use ATM card. However Moneyville prototype has some issues such as poor usability and unappealing look and feel.

3.2 Identifying list of Potential-Quality Indicators

CANDIDATE INDICATORS OF QUALITY IN AN ONLINE COURSE
Connection With the teachers
Connection with other students
Learner (student)- centered
Expectations clearly articulated
Immediately engages the student
Anytime, anyplace learning as the new prototype (Add It Up) works on mobile phones also
Feedback clear, timely and meaningful
Self paced schedule

Table 1: How quality in an online course can be improved

Online Distance Education plays vital role and has become one of the most important factors in K12 teaching today. Commercial course management and home grown tools continue to increase rapidly as the technology becomes more powerful and more easily affordable. The top three challenges for teaching Financial Literacy topics according to teachers are

- Lack of time.
- Lack of State Curriculum requirements.
- And Lack of demand.

According to a survey done by National Financial Institute at Indiana State University, young people in U.S lack financial literacy skills and so the students need to be exposed to basic Financial Literacy skills.

3.3 Current Environments

3.3.1 Moneyville (http://community.ca.uky.edu/moneyville/)

Moneyville was first developed at Cornell University with a team of people who were passionate about helping young people so that they can have a good financial life in their future. This project has been evolving over several years where different people from various regions have put their own creative ideas to develop Moneyville. The site was shared all across the country and many educators have provided their feedback. All their suggestions have taken into account and based on their reviews a current new version of Moneyville known as "ADD IT UP" has been developed.

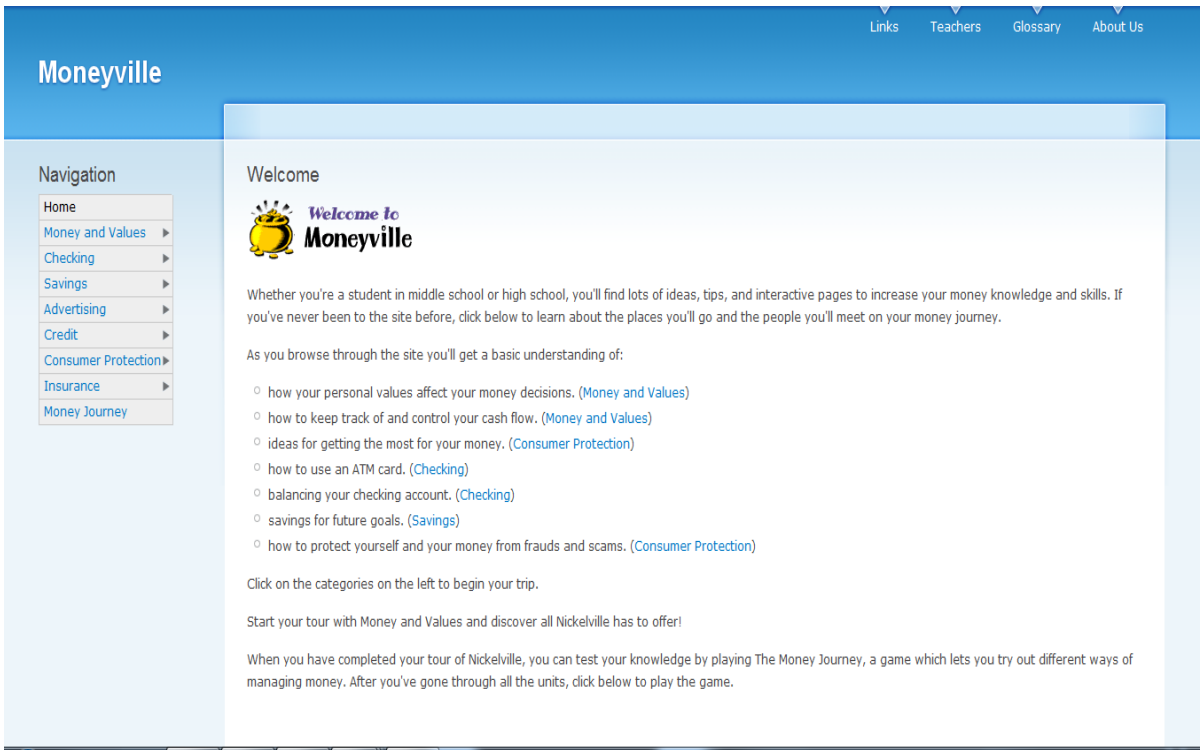

Figure10: Moneyville Home page Design

3.3.2 K-12 Company

K 12 Inc is a technology based education company which offers curriculum and educational services from kindergarten to 12th grade students. The company was founded by William Bennett and Ronald J.Packard in April 2000. The revenue of K 12 Company as of June 2007 was $140.6 million. K 12 is America's largest provider of online education for K 12 grade students. The lessons in K 12 include a combination of text, photos, animation, audio and interactivity modules given to the students as an opportunity to see examples and examine various perspectives of the world which might be out of their reach.

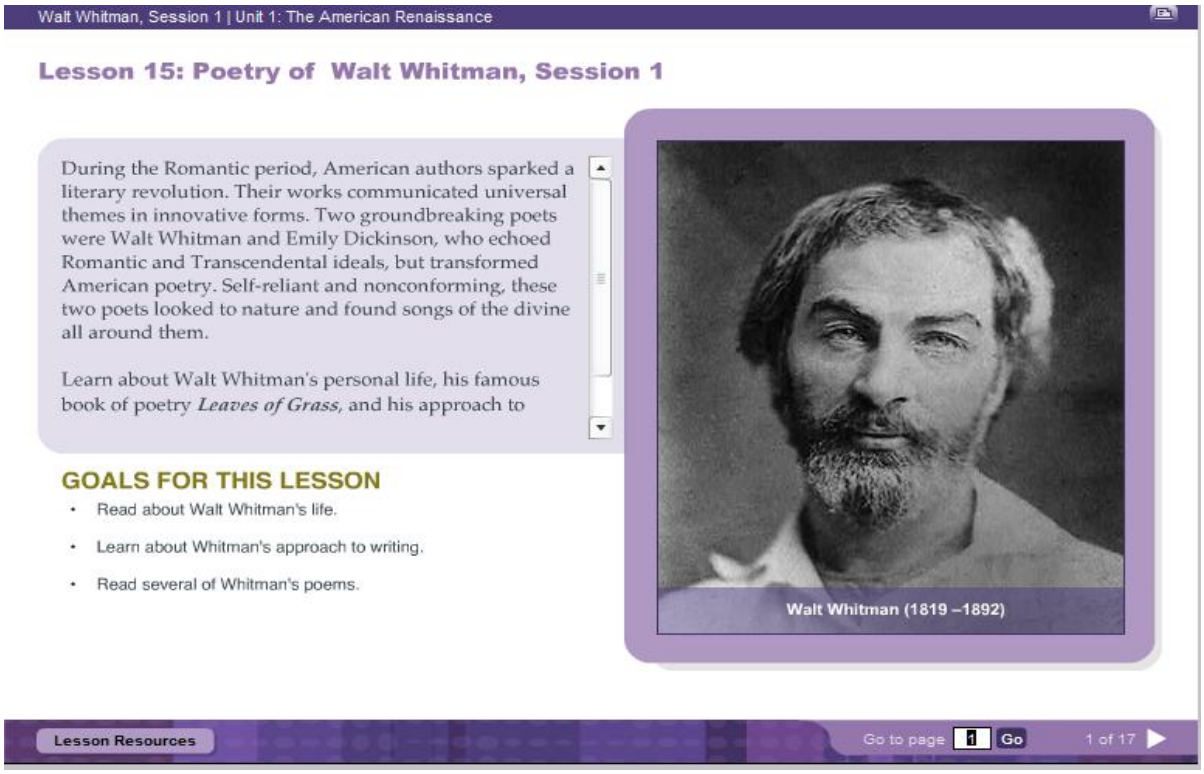

Figure 11: Example of a lesson created in K 12.com

3.4 Proposed Educational Environment

The prototype is named as ADD IT UP: FOR YOUTH FOR LIFE: A Financial Literacy Tool for K 12 Education. It is a sub part in KXNN which is the Kids Extension News Network. Based on feedback and reviews given by the educators all over the country for Moneyville, the

new Add It Up prototype was developed and to overcome usability issues with improvements to the navigation toolbar in the home page, look and feel of website and conversion of the text based scenarios to animated scenarios. There are seven topics in Add It Up, two of them. (Money & Values, Checking tabs) in addition to home page. In the next few pages we will be addressing the differences between the MONEYVILLE & ADD IT UP.

Navigation Toolbar:

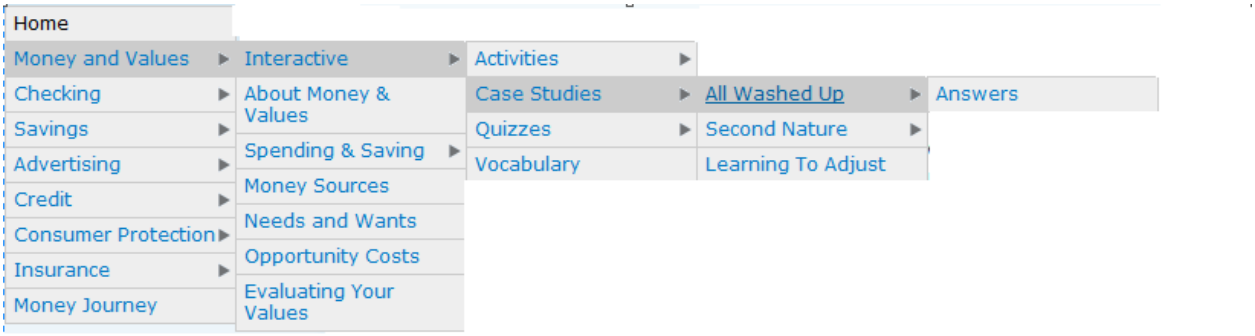

Figure 12: Navigation Toolbar in Moneyville

The above figure is the navigation toolbar of Moneyville prototype. The problem in the navigation is that it's not very appealing and the navigation on one mouse roll over an event is very long. In other words the text that's beside the toolbar doesn't appear to the user. Also if we consider figure1 there are double links for the tabs like the Money & values link is there on the home page and navigation toolbar which is not required as it's not a good usability technique.

3.5 Modeling and Life Process

Analysis: This is the phase where the requirements are defined and the prototype developer will know what kind of system supposed to be developed. It's a well defined picture of the problem statement and justifies how the developed prototype aims to solve this problem. In the Add It Up scenario, the prototype investigate's the usability of all informal learning environments for Financial Literacy. There are limited ways in which financial literacy is taught in classrooms because many schools in the USA do not have financial literacy in their curricula. Therefore

learning environments are helpful in these cases. Teacher may utilize online learning environments to structure and provide lessons about financial literacy so that students can also work on their own when they have time.

Design: This phase aims to develope a solution for the problem statement that the developer has to solve. The solution developed describes a possible way to attend the requirements to previous Moneyville prototype which is based on the feedback given by the educators all over the country. Here we will know how the problem is being solved. Like in Add It Up, the home page navigation has been made more interesting for kids by using stylish JQuery designs, long text based scenarios were converted into animated scenarios along with the audio explanation of the scenario.

Implementation: In this phase the main focus will be on coding a solution from the design phase. The code was written in PHP using Adobe Dreamweaver. As discussed we wanted this prototype to be able to work on mobile phones also, so the developer kept this in mind and has written the code in such a way that it works on mobile phones also.

Testing: This is the phase where the produced or developed code has to undergo testing to see whether the code is validated according to the requirements and design class model. However, when a system passes the tests it doesn't mean its right, it only means it passes the tests. In this way that's why tests are essential to achieving a robust system. The testing is done using a pre and post questionnaire using surveymonkey.com where the K 12 students and other users will be sent a form with all the questions and the results will be compared with the Moneyville usability and Add It Up.

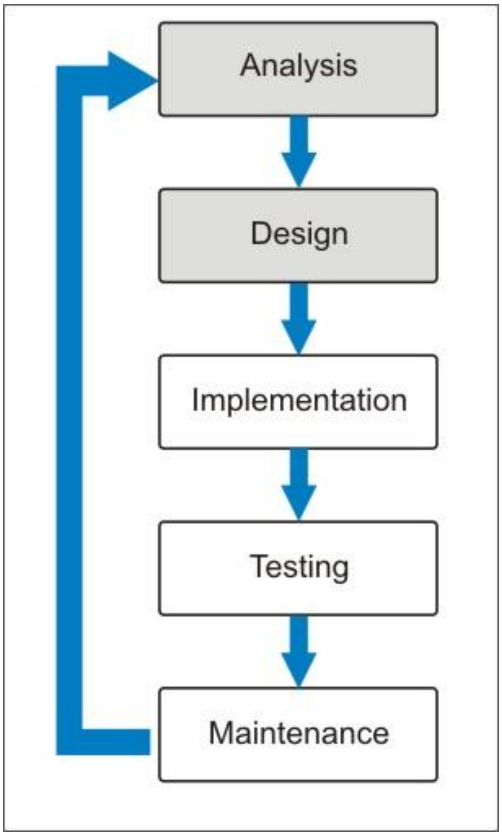

Figure13: Modeling Process used In Add It Up Prototype

Maintenance: This is most important phase because no one knows whether the system is well specified, designed, coded, tested and documented and if the software maintenance is easy to manage. The software becomes hard to maintain due to bad technology choices, bad design, dirty code and even due to bad documentation.

3.6 Add It Up Use Case Scenarios

A. Administrator

Primary Actor: Administrator/user

Secondary Actor: None

Description: This use case scenario is for new users who want to log into the cloud where all the files related to Add it Up are kept. The user can view, delete or edit the information/files related

to Add It Up. The request sent by the user goes to DB Admin, the DB Admin accepts the request and send the user the log in details.

Pre Conditions: The user should have a desktop/laptop/mobile phone in working condition with internet connectivity on any of the mentioned devices.

Post Conditions: The DB Admin must have knowledge on giving log in details to the requested users. Once the user gets the Log in details the user can log into cloud

Basic Flow:

- The user sends a requesting to DB Admin requesting user name & password.
- The DB Admin can accept/reject the request.
- If the DB Admin rejects the request then the user has nothing more to do.
- If the DB Admin accepts the request, the user will receive the log in details.
- Then the user needs to type the IP address of the cloud.
- Once the he enters to home page of the cloud, the user has to enter the log in details received from the DB Admin.
- Once the log in details enter by the user is correct, then the user can view, edit or delete the information present in the cloud which reflects on the Add It Up web page.

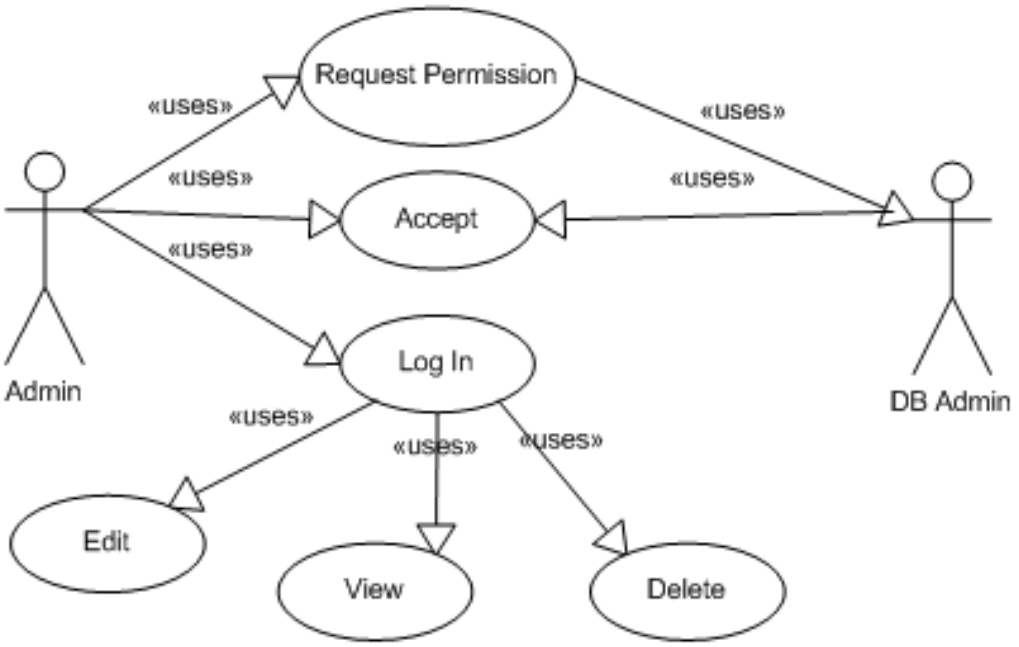

Figure 14: Use Case Diagram in User/Admin point of view

B. Use Case Scenario for K-12 Student/User (Money & Values)

Primary Actor: K 12 Student/user

Secondary Actor: None

Description: When K 12 student/user enters the IP address for the Add It Up, he/she views the homepage of the Add It Up. The K 12 student/user can navigate and go through the activities, case studies, quizzes related to finance education in any of the seven tabs.

Pre Conditions: The K 12 student/user should have a desktop/laptop/mobile phone in working condition with internet connectivity on any of the mentioned devices.

Post Conditions: After the K 12 student/user goes through all the activities, case studies in any of the seven tabs which are seven different topics related to financial education, he/she will gain financial knowledge which will be useful to him/her in their future financial life.

Basic Flow: (for example the k12 student navigates Money & values)

- The K 12 student/user goes into Add It Up by entering the Add It Up IP address in this laptop/desktop/mobile phone which has internet connectivity.
- Then he/she can navigate the Money & Values tab by rolling the mouse over to the Money and Values.
- All the tabs are created in roll mouse over an event concept, where the sub menus are automatically rolled down when the mouse is rolled over a tab.
- For the case studies, quizzes and activities, the K 12 student has to click the interactive sub menu which appears in all of the seven tabs.
- Then in the interactive a stylish Jquery designed interactive sub menus appear with four options case-studies, activities, quizzes and vocabulary.
- Then the K 12 student/user can go to any of the above mentioned options for completing the tasks.
- After completion of the tasks the K 12 student will have knowledge relating to the activities, case studies, quizzes about the financial topic he/she has gone through.

Figure 15: Use case scenario K 12 student point of view (Money & values)

C. Use Case Scenario For K 12 student/User (Checking)

Primary Actor: K 12 Student/user

Secondary Actor: None

Description: When K 12 student/user enters the IP address for the Add It Up, he/she views the homepage of the Add It Up. The K 12 student/user can navigate and go through the activities, case studies, quizzes related to finance education in any of the seven tabs.

Pre Conditions: The K 12 student/user should have a desktop/laptop/mobile phone in working condition with internet connectivity on any of the mentioned devices.

Post Conditions: After the K 12 student/user goes through all the activities, case studies in any of the seven tabs which are seven different topics related to financial education, he/she will gain financial knowledge which will be useful to him/her in their future financial life.

Basic Flow: (for example the k12 student navigates Checking tab)

- The K 12 student/user goes into Add It Up by entering the Add It Up IP address in this laptop/desktop/mobile phone which has internet connectivity.
- Then he/she can navigate the Money & Values tab by rolling the mouse over to the Checking.
- All the tabs are created in roll mouse over an event concept, where the sub menus are automatically rolled down when the mouse is rolled over a tab.
- For the case studies, quizzes and activities, the K 12 student has to click the interactive sub menu which appears in all of the seven tabs.
- Then in the interactive a stylish Jquery designed interactive sub menus appear with four options case-studies, activities, quizzes and vocabulary.
- Then the K 12 student/user can go to any of the above mentioned options for completing the tasks.
- After completion of the tasks the K 12 student will have knowledge relating to the activities, case studies, quizzes about the financial topic he/she has gone through.

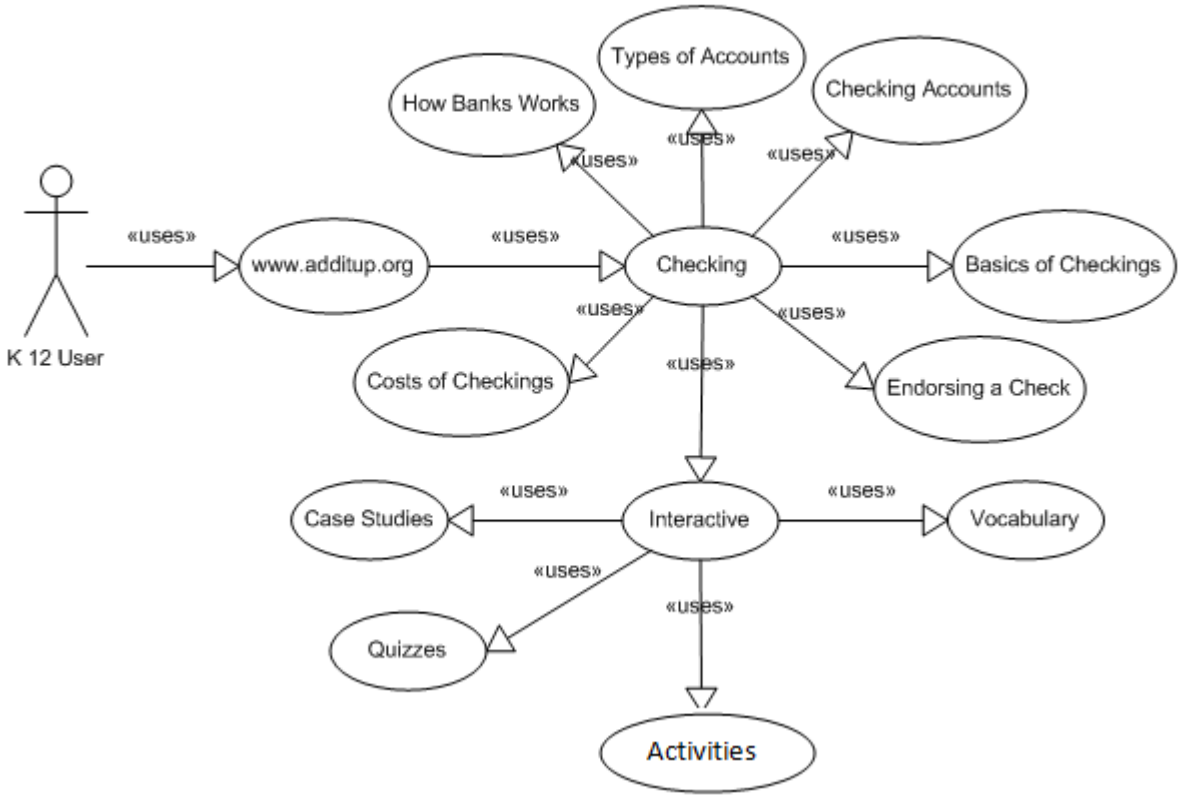

Figure 16: Use case scenario K 12 student point of view (Checking tab)

D. Sequence Diagram Admin Point of View

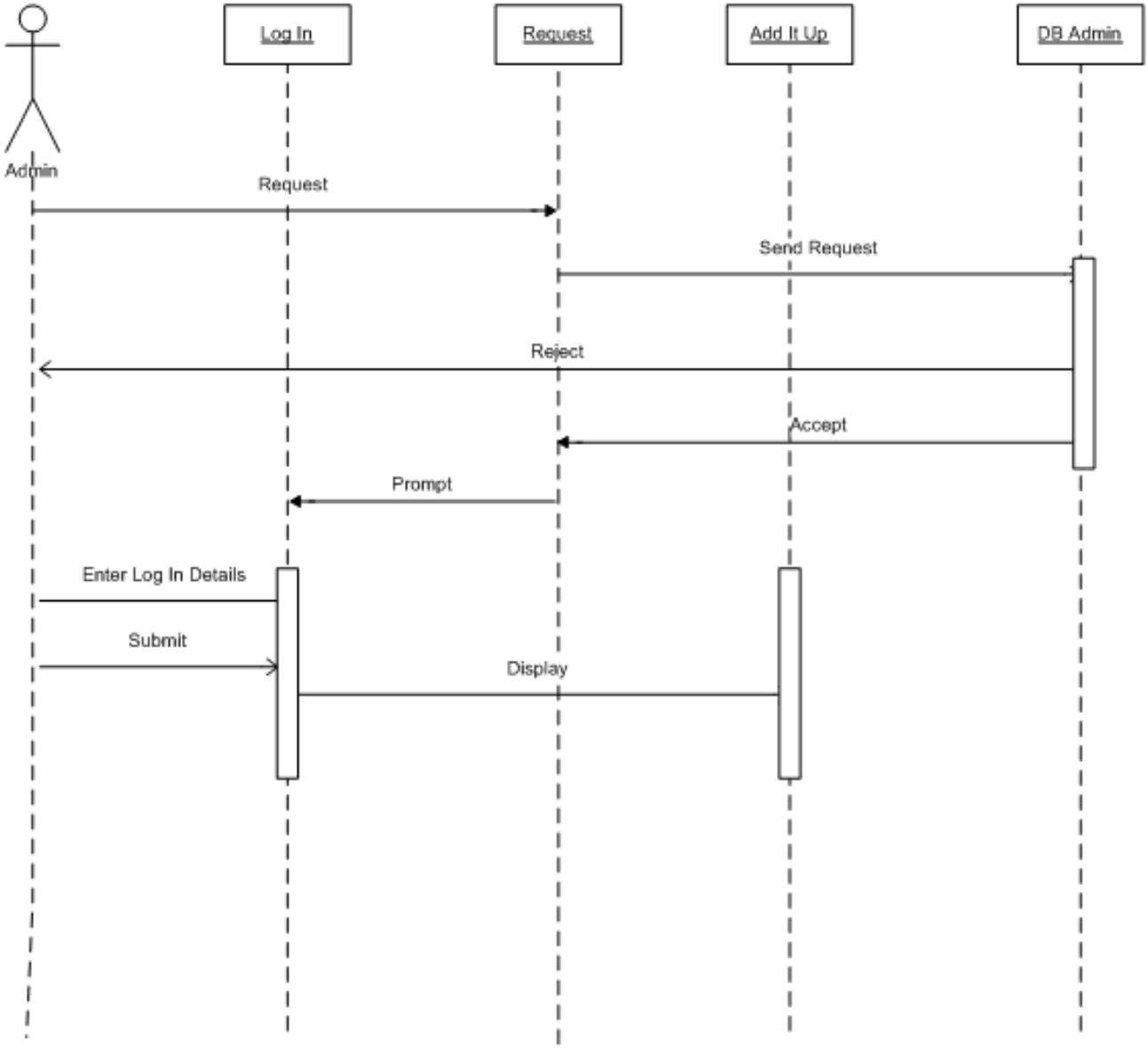

Figure 17: Sequence diagram from User/Admin view

3.7 Testing the Educational Environment

We planned to test the Financial Literacy tool ADD IT UP with the use of online survey to K 12 students, graduate students in HCI lab at Auburn Univeristy in CSSE department. The surveying will be dome with some of the K 12 students studying in high schools located at Auburn locality. The students or the teachers will compare the old Financial Literacy tool which is MONEYVILLE to the new one named as ADD IT UP and express their views and provide feedback based on their experiences. The results from their feedback are shown as surveys in Chapter 4 and 5.

3.8 Hyper Text Pre Processor

In early versions PHP was called as 'Personal Home Page' but later it was renamed to 'Hyper text Preprocessor'. It is a scripting language which was originally designed for developing dynamic web pages. So for this purpose the PHP code is implemented into the HTML source document. PHP was originally created by Ramsus Lerdorf in 1995 and has been continuously developed since. There are many tools where we can use PHP for developing web pages but we used Adobe Dreamweaver.

3.9 Description of Initial Study

The goals of the study were to (a) familiarize the K 12 students with the new ADD IT UP prototype, (b) To see if ADD IT UP has good usability features compared to Moneyville. This study mainly targets on learning of new educational environment compared to some of the existing online environments (Moneyville). Prior to the study, researcher gathered statistics regarding financial literacy in schools in the USA which was mentioned in chapter 2. The researcher a set of pre questionnaire and post questionnaire that need to be answered by each of the participant involved in testing. All of the participants identified themselves as being good

with computers or computer literate and have knowledge in COMP 6620 and COMP 7620 courses.

A series of tasks were given to the testing participants which can be done in their leisure time and once the task was completed, they were asked to do a complete brief survey which rated their experiences.

3.9.1 Test Environment and Experiment

Data collection will take place using the secure sockets layer on surveymonkey.com for pre and post questionnaire. Data collection will be done by Auburn University Graduate Student in CSSE department who are doing their research in Human Computer Interaction lab. Data is stored electronically within SurveyMonkey

Hardware:

- Servers have redundant internal power supplies.
- Data is on RAID 10, operating system on RAID 1.
- Database is log-shippped to standby server and can failover in less than one hour.

As there are traditional classroom methods, there is lot of demand for online learning environments as it can be accessed easily. Many teachers know that there are many other ways to teach a class, many of them are habituated the way it was taught instead of implementing new technology. This information is provided as motivation for this study.

3.9.2 Hypothesis and Variables

The main hypothesis of this research is to investigate the usability of informal learning environments for Financial Literacy. There are limited ways in which financial literacy is taught in classrooms because many schools in USA do not have financial literacy in their curricula. Therefore learning environments are helpful in these cases. Teacher may utilize online learning

environments to structure and provide lessons about financial literacy so that students can also work on their own when they have time. If the usability of learning, if the users (students, Educators) think that the ADD IT UP has better usability than the Moneyville by answering questions regarding to the usability point of view. We will study usability of the proposed financial literacy learning environment ADD IT UP versus the usability of the existing learning environment Moneyville by questioning students and educators about its usability theory questionnaire and survey. Also in rural areas where there are many schools which don't have laptops mobile phones come in handy. This learning environment even works on mobile phones.

Likert-type scale was used for pre and post-questionnaire. Survey Monkey was used for the online surveys. A Likert scale is a psychometric scale which is mostly used in questionnaires, and is most widely used scale in survey research. Numerical values are assigned to each potential choice and a mean figure for all the responses is computed at the end of the evaluation or survey. Bi-polar questionnaire structure is used when responding to the Likert scale. Generally the Likert scale corresponds to five rating on the scale. The main reason for using likert scale rating for this experiment is because they have odd number of possible ratings on the scale and we used seven rating scale here. The surveys are given to participants who are doing their under graduation, Master's or Doctoral degree at Auburn University in Department of CSSE. Our evaluation includes graduate students who have usability training. This will support this research in assessing the usability of the prototype. These studies will identify the positive and negative features for future requirements. The participants should have taken COMP 7620 or COMP 6620 courses so that they have usability training knowledge. The types of surveys used are related to system usability, information quality, interaction quality.

3.9.3 Experimental Procedure

Since the experiment surveys are to be taken on internet, the participant can take the surveys in their leisure time. The participants would first be given a short pre questionnaire.

- The participants are provided with links for pre questionnaire.
- Links will be provided to the participants for ADD IT UP Prototype.
- The participants will take their own time in understanding the prototype (Time is limited to the participant)
- Then the participants will answer a set of questions which is a post questionnaire. (questions based on usability)

All the links will be through online survey. The pre and post questionnaire will take not more than 10 minutes.

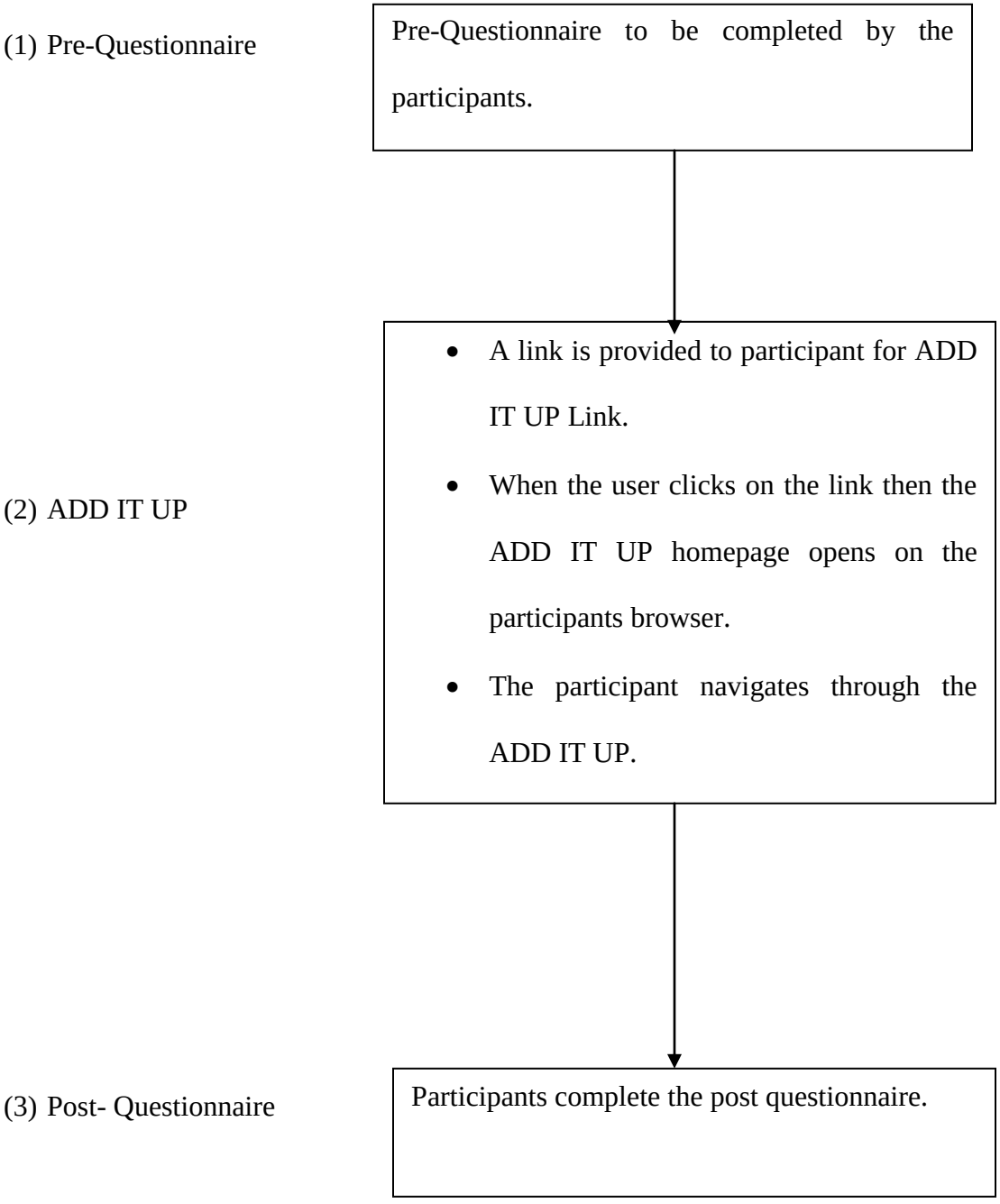

Figure 18: ADD IT UP Survey Flowchart

CHAPTER 4: IMPLEMENTATION

4.1 php Add It Up Implementation

As mentioned in chapter 3 Php is an open source scripting language which is used for developing dynamic or static web pages. We used Adobe Dreamweaver, which is a web development application tool which supports various syntaxes. We used Html and Php for developing the Financial Literacy tool Add It Up web pages.

Figure 19: Add It Up Home page

4.1.1 Domain Registration and Hosting

Before starting developing the prototype we had to register the domain name and secure host. A domain name is an identification label for getting authority or control over internet.

Domain name are nothing but host names that identify the Internet Protocol (IP) resources such as web sites. Domain names are mainly used by Individual Internet host computers as host identifiers or hostnames. Uniform Resource Locators (UPLs) are nothing but components that appear in host names for internet resources like websites. The domain name resolves to an Internet Protocol, IP, address, based on that IP address a route is determined using the host routing table that specifies the route from an end user to that of the IP address which returns the website to the browser.

4.2 Cloud Computing and Virtual Desktop

Cloud Computing is technology to maintain data and applications which is done by using internet and maintained by central remote servers. Cloud Computing allows access to the applications where the users can use the supplications without the need to installing those applications. A simple example of cloud computing is Gmail and yahoo mail where the user doesn't need any software to use them. But internet connection is mandatory.

4.2.1 Stoneware WebNetwork 6

We used Stoneware's WebNetwork 6 which is a software solution that allows organizations to deploy their own private clouds. Founded in 2000, Stoneware is in the business of developing cloud computing solutions that deliver the data center through web technologies and presented those resources through a desktop built inside a browser. webNetwork is installed inside of the data center on either physical or virtual servers and creates a secure cloud that provides users with access to data center applications and resources through a desktop built in a browser. webNetwork provides a rich set of private cloud services such as File Services, Personal Desktop, Registration, Self Service, Password Self Service, News and Alerts, Login Scripts, Forums, Calendar, External Users. This is the place where all the files like images, flash

files, everything related to the Add It Up are kept. webNetwork leverages an organization's investment in directory services by integrating all access control methods with their existing network management. Organizations can leverage their existing user management processes to control access to webNetwork cloud applications and services without creating another account management headache. As part of the security architecture, the webNetwork system manages multiple authentication methods. These methods allow users to authenticate with their network username and password, or to enhance the process and improve security by utilizing various two-factor authentication methods. Often called the "second" question, there is no corporate computing conversation today that does not include a discussion regarding security. In every business problem that we attempt to solve with technology, there is a fundamental element of security that surrounds it. This being the case, it is of critical importance that every application and service that is accessed through webNetwork is secure.There is lot of security by using this as to enter into webNetwork 6 the user needs to get the user name and password. The user name and password will be given to him only by the admin and the admin can give specific rights to the user. For example if a user just wants to view the Kxnn Cloud then he is given access in such a way that he can only view what's there is the cloud.

4.2.2 Virtual Web Desktop (webOS)

Stoneware's Virtual Web Desktop, webOS, is a desktop that runs inside a web browser. Users connecting to the webNetwork private cloud will automatically be presented with a desktop that provides access to all data center applications and resources. The Virtual Web Desktop is not a remote Windows desktop. It is built on web technologies and executes inside most web browsers. Desktop backgrounds, colors, icons, and shortcuts can be personalized by the end user. Applications and resources available from the desktop dynamically change based

on the user's organizational role, network location, device, etc. Desktop dynamically adapts to Smartphone and slate devices such as the Droid and iPad.

Figure20: For Youth For Life Cloud

4.3 Scripting For Content

4.3.1 Paper Prototyping

Paper Prototyping is a method which is used for Usability testing of Web Sites, Web Applications and conventional software. Coming into Add It Up Financial Literacy Tool: FOR Youth For Life we had to design several case studies for the K 12 students where the main goal was to make the student get involved into the activity. Also the final goal was to make the case studies in such a way that animated case study had good usability, likeliness, eases of use, and explains exactly to the point what the case study is meant for. So firstly we hand sketched each end every scenes along with the description. We hand sketched the case study scenarios in such a way that it would clearly mention

- Concepts and Terminology: Whatever terms we use it should be understandable to the target users. Do the target users understand the terms that we've chosen?
- Navigation/Workflow: When there are several processes or a sequence of steps, paper prototypes must be drawn in such a way that it reaches to what the user expects. Does the target user have keep flipping back or forth between the screens?
- Content: The interface must provide the right information so that the users can make some decisions at the end of the case studies as each and every case study ends with a set of questions where the student has to solve them by understanding the animated case study. Does the interface has extra information which the user needs to know or is it anonymous to the target user?
- Page Layout: Paper prototypes must be drawn considering the page layout its size, platforms that it is going to be deployed in the final stages etc……

Paper prototypes are very easy to draw. The paper prototypes were initially tested and checked by Dr.Cheryl D. Seals and by Dr. Tony Cook. Once when the paper prototypes were Okayed we thought of the tools to convert the paper prototypes into animations. We used Microsoft Power point and Adobe Captivate, Adobe Flash to convert the paper prototypes into complete animated case scenarios. The animated case studies were designed in such a way that

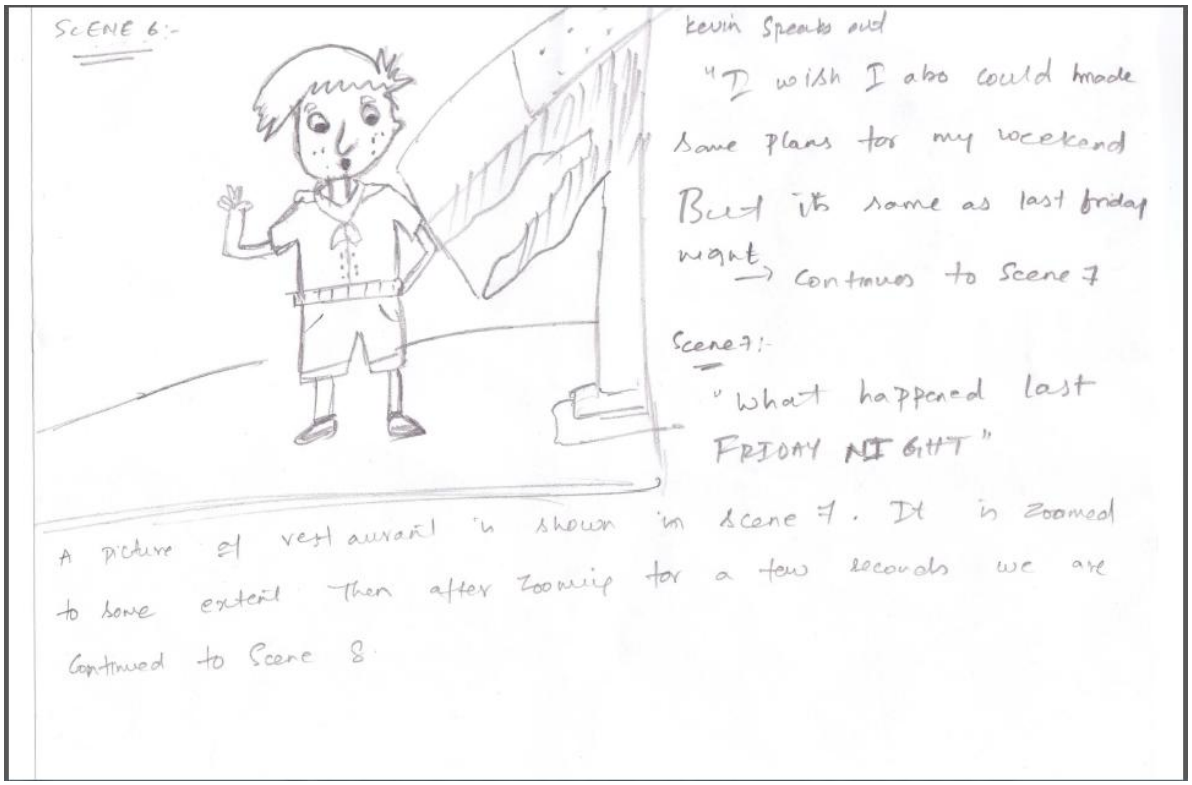

Figure 21: Paper Prototype of one of the animated case study scenario

they also work on mobile phones which have different operating system like Android, Iphone Os, Blackberry (RIM).

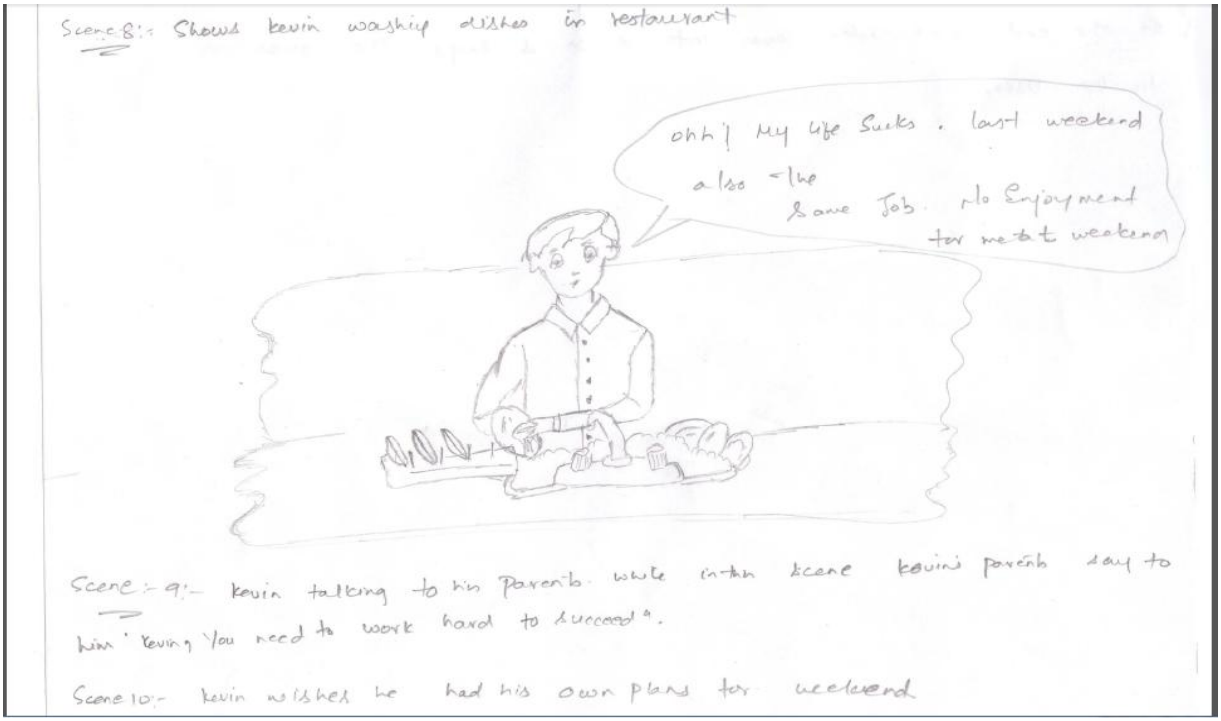

Figure 22: Paper Prototype of one of the animated case study scenario

As said earlier we used php using Adobe Dreamweaver tool to develop the web pages and make and interesting as possible. The layout the website provides pleasant experience for the user and directs users to specific actions. We have place the navigation toolbar on the top of each and every page and it increases the number of times the user sees the navigation toolbar. User friendly navigation is what we thought of and implemented. The navigation toolbar has been developed using jQuery. jQuery is a cross browser java script library which is designed for simplifying client side scripting of HTML. jQuery's syntax is designed to make the navigation easier, create animations etc…. As social media is growing day to day and lot of information is being gained through social media we thought of incorporating KXNN YouTube channel, KXNN face book page, twitter in the bottom right side. As this prototype also works on mobile platforms it would be easy for the user to have a look on any of the social media pages and get updates from there also.

Figure 23: Navigation toolbar for Money and Values done using jQuery

Figure24: Another type of jQuery navigation style used

Figure25: Social media links kept in Add It Up

We Used Adobe Captivate software tool to convert the storyboards into a single animated video which explains the user about the case study. Each and every scene is explained with audio format also. A clear visual navigation is provided through the animated video. Adobe Captivate is software designed to develop e-learning courses. Captivate generates Adobe Flash compatible content without requiring the user to have any prior knowledge of Flash, and publishes the courses as .swf or .avi files that can be uploaded to sites with video hosting. Microsoft PowerPoint slides can be imported into Captivate, making upgrading existing content to e-learning courses less labor intensive. Adobe Photoshop files can be imported into Captivate without losing the integrity of the imported image's layers.

Figure 26: Animated scenario screenshot done using Adobe Captivate

CHAPTER 5: RESULTS AND ANALYSIS

As stated in chapter 1, the primary objectives of this study were to address the following research questions:

Research Question1: Will an online learning environment support financial literacy training?

Answer: Design and improve an online educational environment to provide K-12 students knowledge about financial literacy for their good financial future.

Requirements:

- Conversion of all the text based scenarios to animated scenarios.
- Integration of social media tools in the ADD IT UP environment.
- Design and develop a web based mobile application that can be accessible across different mobile platforms and can provide the educators and learners the ability to use the mobile system that is interactive, easy for educators to post their content, easy for the learner to access the content and accessible anytime and anywhere.

Research Question 2: Do users feel the developed online learning environment is user friendly?

Research Question 3: Does this tool provide good introduction to financial literacy?

Research Question 4: Is ADD IT UP acceptable from the user interface stand point?

To address the above research questions post and pre questionnaires were taken by the students at Auburn University CSSE lab. The students have good knowledge on user interface as we have chosen the participants who have taken usability related course which are COMP 6626 and

COMP7620. An online educational environment named ADD IT UP was developed using PHP, j Query, HTML 5.

5.1 RESULTS OF USABILITY FOR ADD IT UP:

There were around 30 participants who have tested the applications and gave their opinions by doing the survey online. 93.1%of the participants believe that teaching K-12 should involve more online teaching tools as a method to supplement traditional classroom lessons. 100% of the participants told that they would online educational forum to teach lesson if it were available to them. So by this we can say how important online learning educational tools. 95% of the participants believe that online financial tools can be helpful in gaining financial knowledge. 89.3% believe that online teaching is more useful compared to classroom teaching as only 55.5% voted for classroom teaching. Figure 27 shows the percentage of the participants who believe online learning is better than classroom teaching.

13. 13) Do you think Learning Financial Literacy through online learning is better or classroom teaching ?

	Yes	No
Classroon teaching	**55.6% (15)**	44.4% (12)
Online Learning	**89.3% (25)**	10.7% (3)

Figure27: Classroom learning vs. online learning

7. 7) Would you use an online educational forum to teach lessons if it were available to you?

Create Chart Download

	Response Percent	Response Count
Yes	100.0%	29
No	0.0%	0

Figure 28: Participant response to online educational tool

Figure 29 shows the number of participants who believe that K-12 teaching should involve into online teaching tools. By this it is clear that many of the people believe that financial literacy can be taught through online learning environment rather than classroom teaching.

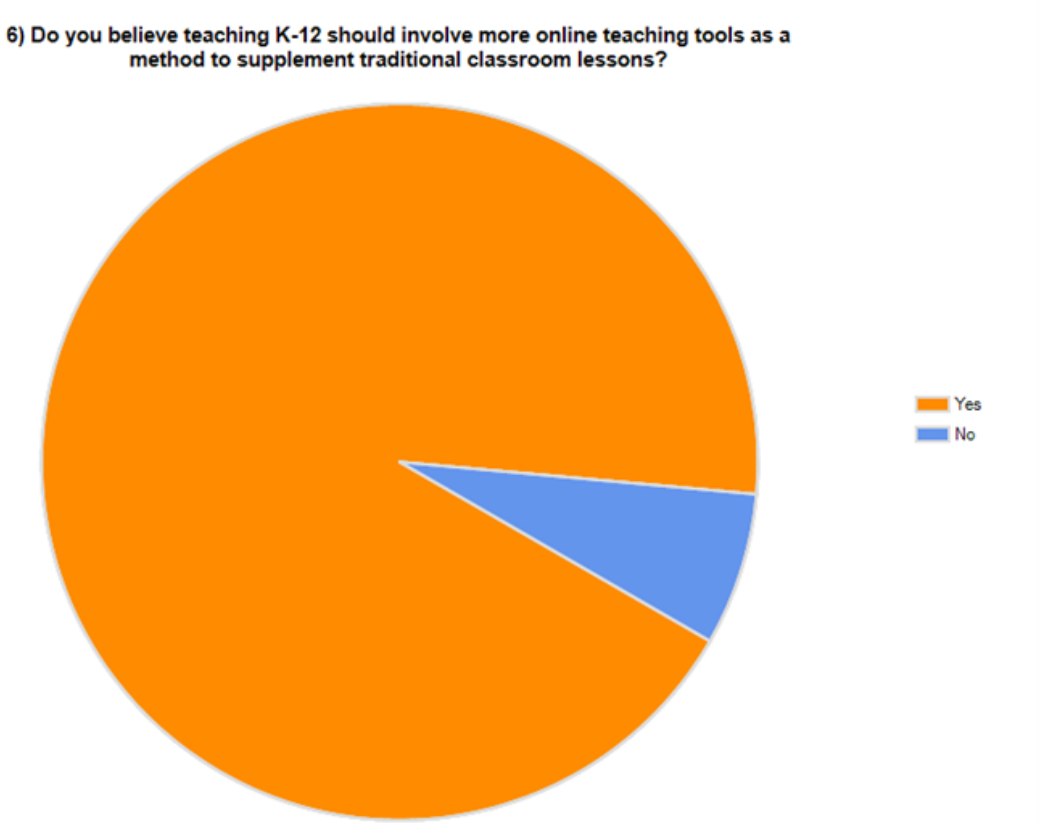

Figure 29: Pie chart showing the percentage of people who believe that online learning environment is a supplement to classroom teaching.

Table 2 represents the summary of data reported by the student participants. Overall their responses denote that most of them are not novice online learning. These results indicate that the students believe that online financial literacy tools are better to gain knowledge compare to traditional classroom environments and they believe that it improves access to educational information and will use the environment if it is available to them.

Question	Response
Have you ever used online financial literacy tools?	Yes-67.3% No-32.7%
Do you believe teaching K-12 should involve more online teaching tools as a method to supplement traditional classroom lessons?	Yes-93.1% No-6.9%
Would you use an online educational forum to teach lessons if it were available to you?	Yes-100% No- 0%
Do you think Online Financial Literacy tools are useful?	Yes-95% No-5%

Table2: Pre Questionnaire results

The above results clearly show the need of online educational forums. It also clearly states that financial literacy knowledge can be gained through online rather than classroom teaching. So an online learning educational tool named ADD IT UP was developed which works on mobile phones also. 72.4% of participants use internet on mobile phones. So as this application also works on mobile phones, it can be accessed anytime and anywhere. There is no way that financial literacy can be taught in classrooms because many schools in USA don't have financial literacy in their curricula. So online learning environment in very helpful in such a case

as the teacher can just help the students on what they have to do in the online learning environment and kids may go home and work on it. Also in rural areas where there are many schools which don't have laptops mobile phones come in handy.

On a scale of 1-7, the average rating in each of the satisfaction categories is nearly 6. Their response to the system was better than expected by the researchers. We anticipated that the response would be closer to 5. The responses for the all others questions will be shown in table below. 78.6% of the users gave a rating of 7 for overall reaction to the system. Figure 30 shows the users responses for overall reaction to the system.

7. 7) It was easy to learn to use this system. Create Chart Download

	Strongly disagree						strongly agree	N/A	Rating Average	Response Count
Overall reaction to the system.	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	10.7% (3)	10.7% (3)	**78.6% (22)**	0.0% (0)	6.68	28
								answered question		**28**
								skipped question		**0**

Figure 30: Percentage of participants view on overall reaction to system.

Now we will see the user's responses for the ADD IT UP. The post questionnaire was divided into three different usability aspects. System usability, information quality and interaction quality were the usability aspects that this application was tested. Firstly, let us see the overall reaction the system. Figure 31 shows the results given by the user's while they were navigating through the application.

8. 8) Please give us your reflections on learning while using the system. Create Chart Download

	Difficult	2	3	4	5	6	Easy	N/A	Rating Average	Response Count
Getting Started	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	7.1% (2)	25.0% (7)	**67.9% (19)**	0.0% (0)	6.61	28
Learning Advanced Features	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	21.4% (6)	25.0% (7)	**53.6% (15)**	0.0% (0)	6.32	28
Time to learn to use this system	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	7.1% (2)	28.6% (8)	**64.3% (18)**	0.0% (0)	6.57	28

Figure 31: Users responses while using the application.

Rating Weight	Strongly disagree	2	3	4	5	6	Strongly agree	N/A	Rating Average
Overall, I am satisfied with how easy it is to use this system?	0	0	0	0	3	4	21	0	6.64
It was simple to use this system	0	0	0	0	2	9	17	0	6.54
I can effectively complete my work using this system.	0	0	0	0	2	7	19	0	6.61
I am able to complete my work quickly using this system.	0	0	0	0	3	8	17	0	6.5
I am able to efficiently complete my work using this system.	0	0	0	0	3	6	19	0	6.57
I feel comfortable using this system.	0	0	0	0	3	6	19	0	6.57

Table 3: Post Questionnaire results for System Usability

Rating Weight	Strongly disagree	2	3	4	5	6	Strongly agree	N/A	Rating Average
It is easy to find the information I needed	0	0	0	0	3	5	20	0	6.61
The information provided for the system is easy to understand	0	0	0	0	2	11	15	0	6.46
The information is effective in helping me complete the tasks and scenarios.	0	0	0	0	2	10	15	0	6.39
The organization of information on the system screens is clear.	0	0	0	0	4	10	14	0	6.36

Table 4: Post Questionnaire results for Information Quality

As we can see from the above tables, a high rating of 6.64 was given to how easy it is to use the system. Based on the user responses more emphasis has to been done on information quality. Even though all the rating were above 6 which is pretty good, least rating were given for organization of content in system screens. In interaction quality, high rating of 6.61 was given to pleasantness of the system. If the students do not find the system easy and comfortable, they will avoid using the system. We wanted the students to feel that the system worked for them and not against them, it seems that the students received the system well.

5.2 PARTICIPANTS COMMENTS

Some of the participants made specific comments, in regard to the system, in the comment section of the post questionnaire; below are the few participants comments.

“Have seen many online learning tools, but none of them are related to financial literacy, good job”

“Topics clearly explained related to finance education”

“Provides information vital to Financial Learning”

“Nice animation for easy understanding to kids”

“Simple, clear to understand and also can be accessed on mobile phones”

“Nice layout and interface. Interactive”

CHAPTER 6: FUTURE WORK AND CONCLUSIONS

6.1 FUTURE WORK

Many online features are provided by new web technologies for use in any courses like interactive demos, self-study quizzes, tutorials and distance education etc. The ADD IT UP: For Youth For Life A financial tool for K 12 Education is developed to enhance financial literacy education across the USA. As this project has been evolving all across the USA for several years, many educators have shared their views and opinions. At present the prototype is static and in future plans are going on to make the prototype dynamic by adding discussion boards, RSS news feeds, forums etc…. To enhance student learning interactive demos and web features are deployed into the prototype. All the case studies were animated using Adobe Flash, Microsoft Power point animations. Adobe Captivate was used to convert all the scenes into a single animated video along with the audio but the files were not yet ready. So all these animations will be available future versions of the prototype. As this prototype works on mobile phones, the researcher should work on future versions of ADD IT UP prototype so that it supports several mobile operating systems. As mentioned in chapter 1 there aren't many schools in the USA where financial literacy is taught. According to the statistics given in chapter 2, we can observe how important it is for K 12 kids to have a good financial knowledge. It would be great if ADD IT UP prototype would be introduced in middle and elementary schools around Auburn. Students are more apt in accepting new challenges once they realize what they would gain and why is it beneficial to them.

Finally Does the new technologies facilitate learning by the students?

6.2 CONCLUSION:

ADD IT UP is a better tool for aiding K 12 environments to facilitate the financial knowledge to K 12 kids in a way that is interactive and engaging without losing the knowledge of finances. By this tool financial literacy knowledge can be gained easily as it is very accessible because it works also on mobile phones. As many students use social networking, social networking has also become one of the means of gaining knowledge. While performing this research many students found that technology would be more beneficial for gaining knowledge through online learning environments. The flexibility of the workspace was intriguing, K 12 kids were open minded about using a new technology and once they found out they did not need to learn a new language unlike most wiki environments, they were more open to the idea of using this structure. Interactive content is a key when developing for students and developing with not only students, but teachers is not an easy task to accomplish. We believe this tool balances the creation of interactive content to support both students and their teacher.

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APPENDIX A

AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD for RESEARCH INVOLVING HUMAN SUBJECTS

RESEARCH PROTOCOL REVIEW FORM

For Information or help contact **THE OFFICE OF RESEARCH COMPLIANCE**, 115 Ramsay Hall, Auburn University
Phone: 334-844-5966 **e-mail:** hsubjec@auburn.edu **Web Address:** http://www.auburn.edu/research/vpr/ohs/

Revised 03.26.11 – DO NOT STAPLE, CLIP TOGETHER ONLY. Save a Copy

1. **PROPOSED START DATE of STUDY:** Jul 15, 2010

PROPOSED REVIEW CATEGORY (Check one): FULL BOARD ✓ EXPEDITED EXEMPT

2. **PROJECT TITLE:** ADD IT UP: For Youth For Life A Financial Literacy Tool For K 12 education

3. Cheryl D Seals	Associate Professor	CSSE	(334) 844-6319	sealscd@auburn.edu
PRINCIPAL INVESTIGATOR	TITLE	DEPT	PHONE	AU E-MAIL

Shelby Center for Engineering Technology Suite 3101M	(334) 844-6329	
MAILING ADDRESS	FAX	ALTERNATE E-MAIL

4. **SOURCE OF FUNDING SUPPORT:** ☑ Not Applicable ☐ Internal ☐ External Agency:_____ ☐ Pending ☐ Received

5. **LIST ANY CONTRACTORS, SUB-CONTRACTORS, OTHER ENTITIES OR IRBs ASSOCIATED WITH THIS PROJECT:**

6. **GENERAL RESEARCH PROJECT CHARACTERISTICS**

6A. Mandatory CITI Training

Names of key personnel who have completed CITI:
Ram Bharat Reddy Bontha
Dr. Cheryl D. Seals

CITI group completed for this study:
✓ Social/Behavioral ☐ Biomedical

PLEASE ATTACH TO HARD COPY *ALL* CITI CERTIFICATES FOR *EACH* KEY PERSONNEL

6B. Research Methodology

Please check all descriptors that best apply to the research methodology:

Data Source(s): ✓ New Data ☐ Existing Data
Will recorded data directly or indirectly identify participants? Yes ✓ No
Data collection will involve the use of:
- Educational Tests (cognitive diagnostic, aptitude, etc.)
- Interview / Observation
- Physical / Physiological Measures or Specimens (see Section 6E)
- ✓ Surveys / Questionnaires
- ✓ Internet / Electronic
- Audio / Video / Photos
- Private records or files

The Auburn University Institutional Review Board has approved this document for use from 6/28/11 to 6/27/12
Protocol # 11-142 EP 1106

6C. Participant Information

Please check all descriptors that apply to the participant population.
✓ Males ✓ Females ✓ AU students

Vulnerable Populations
Pregnant Women/Fetuses ☐ Prisoners
Children and/or Adolescents (under age 19 in AL)

Persons with:
☐ Economic Disadvantages ☐ Physical Disabilities
☐ Educational Disadvantages ☐ Intellectual Disabilities

Do you plan to compensate your participants? Yes ✓ No

6D. Risks to Participants

Please identify all risks that participants might encounter in this research.
- ✓ Breach of Confidentiality*
- ☐ Deception
- ☐ Psychological
- ☐ None
- ☐ Coercion
- ☐ Physical
- ☐ Social
- ☐ Other:

*Note that if the investigator is using or accessing confidential or identifiable data, breach of confidentiality is always a risk.

Do you need IBC Approval for this study? ☐ No ☐ Yes - BUA #_____ **Expiration date** _____

FOR OHSR OFFICE USE ONLY

DATE RECEIVED IN OHSR: revisions 6/27/11	by GB	PROTOCOL #	11-142 EP 1106
DATE OF IRB REVIEW: 6/28/11	by Correia	APPROVAL CATEGORY:	45 CFR 46.110(7)
DATE OF IRB APPROVAL: _____	by _____	INTERVAL FOR CONTINUING REVIEW:	1 year

APPENDIX B

AUBURN UNIVERSITY
SAMUEL GINN COLLEGE OF ENGINEERING
DEPARTMENT OF COMPUTER SCIENCE AND SOFTWARE ENGINEERING

INFORMATION LETTER
For a Research Study Entitled
---ADDITUP: For Youth For Life A Financial Literacy Tool For K-12 Education---

You are invited to participate in a research study to explore your past experiences with online financial educational tools and introduce yourself to financial educational tools that could be used in K-12 environments and to compare the prototype environment to your past experiences with other financial educational tools. This study is being conducted by Ram Bharat Reddy Bontha as a part of his thesis work, under the direction of Dr. Cheryl D.Seals in the Auburn University Department of Computer Science and Software Engineering. You were selected as a possible participant because you are an Auburn University student who has taken Auburn University COMP 7620/COMP 6620 courses.

What will be involved if you participate? If you decide to participate in this research study, do a pre questionnaire before evaluating the prototype. Once the pre questionnaire is completed, the participant will be provided with the link for ADD IT UP prototype. By clicking on the link the participant will able to see the usability or design feature of the developed prototype. Then a set of questions relating to overall satisfaction, likeliness and usability of the prototype will be given to the participant where he/she needs to select an answer from a list of answers for each question. The approximate time for doing survey will be 10 to 15 minutes. An E-mail will be sent to the participant with all the above instructions explained clearly in the mail. By agreeing to participate in this research study you are consenting to allow the use of data collected from you for research purposes.

Are there any risks or discomforts? There are no perceived risks associated with this study

Are there any benefits to yourself or others? Information collected during this study will help us identify how effective and intuitive the prototype environment is and how it rates in comparison to other financial educational tools and also to assist in further development of the prototype.

Will you receive compensation for participating? No compensation for participation will be given.

Are there any costs? There are no costs associated with participating.

If you change your mind about participating you can withdraw at anytime during the study by simply closing your browser. Once you've submitted anonymous data, it cannot be withdrawn since it will be unidentifiable. Your decision about whether or not to participate, or to stop participating, will not jeopardize your future relation with Auburn University or the Department of Computer Science and Software Engineering.

Any data obtained in connection with this study will remain anonymous. Data will be collected through a questionnaire. Your name, email and other identifiers are not collected during the survey and will not be associated with the data provided. Information collected through your participation may be used to publish in professional journals, conference submissions, thesis and dissertations and/or presented at professional meetings.

If you have any questions about this study, please ask them now or contact Ram Bharat Reddy Bontha at rzb0008@auurn.edu (334 707 1768) or Dr. Cheryl D. Seals at sealscd@auburn.edu (334 844 6319)

If you have questions about your rights as a research participant, you may contact Auburn University office of Human Subjects Research or The Institutional Review Board by phone (334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu

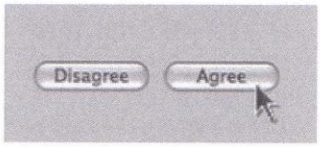
The Auburn University Institutional Review Board has approved this document from June28, 2011 to June 27, 2012. Protocol #11-142 EP 1106.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. IF YOU WISH TO PARTICIPATE IN THIS SURVEY PLEASE SELECT YOUR CHOICE BELOW

Clicking on the "agree" button below indicates that:

- **You have read the above information**
- **You voluntarily agree to participate**
- **You are at least 19 years of age**

If you do not wish to participate in the research study, please decline by clicking on the "disagree" button.



The Auburn University Institutional Review Board has approved this document for use from 6|28|11 to 6|27|12 Protocol # 11-142 EP 1106

APPENDIX C

Pre Questionnaire for ADD IT UP: For Youth For Life A Financial Literacy Tool for K-12 Education

Exit this survey

1) Identify Your gender.

- Male
- Female

2) What is Your age group?

- 20-30
- 30-40
- 40-above

3) What is your Highest level of education?

- Master's Degree
- Bachelor's Degree
- Doctoral Degree

4) Have you ever used Online Financial Literacy Tools?

- Yes
- No

5) If the answer for the above question is Yes Please mention below the Online Financial Literacy Tools used by you.

6) Do you believe teaching K-12 should involve more online teaching tools as a method to supplement traditional classroom lessons?

- Yes
- No

7) Would you use an online educational forum to teach lessons if it were available to you?

- Yes
- No

8) How often do you use social networks?

- Hourly
- Daily
- Twice or Thrice a week
- Not at all

9) If the answer for the above question is yes please mention what social networks do you use?

- Facebook
- Twitter
- Myspace
- LinkedIn
- Digg
- Other

10) Do you Know what Cloud Computing is?

- Yes
- No

11) How often do you use internet on mobile phones?

- Hourly
- Twice or thrice a week
- Not at all
- Once a day
- Once in a month

12) DO you think Online Financial Literacy tools are useful?

If yes Why?

If No why?

Do you think Learning Financial Literacy through online learning is better through classroom teaching?

- Yes
- No

14) If the answer for question 13 is Yes then Please give justification to your answer in few words?

15)If you know any online learning tools please mention below?

Done

APPENDIX D

Post Questionnaire for ADD IT UP:For Youth For Life A Financial Literacy Tool for K-12 Education

Exit this survey

SYSTEM USABILITY

1) Overall, I am satisfied with how easy it is to use this system?

	Strongly disagree						strongly agree	N/A
Overall reaction to the system	○	○	○	○	○	○	○	○

2) It was simple to use this system.

	Strongly disagree						strongly agree	N/A
Overall reaction to the system	○	○	○	○	○	○	○	○

3) I can effectively complete my work using this system.

	Strongly disagree						strongly agree	N/A
Overall reaction to the system.	○	○	○	○	○	○	○	○

4) I am able to complete my work quickly using this system.

	Strongly disagree						strongly agree	N/A
Overall reaction to the system.	○	○	○	○	○	○	○	○

5) I am able to efficiently complete my work using this system.

	Strongly disagree						strongly agree	N/A
Overall satisfaction to the system.	○	○	○	○	○	○	○	○

6) I feel comfortable using this system.

	Strongly disagree						strongly agree	N/A
Overall reaction to the system.	○	○	○	○	○	○	○	○

7) It was easy to learn to use this system.

	Strongly disagree						strongly agree	N/A
Overall reaction to the system.	○	○	○	○	○	○	○	○

8) Please give us your reflections on learning while using the system.

	Difficult	2	3	4	5	6	Easy	N/A
Getting Started	○	○	○	○	○	○	○	○
Learning Advanced Features	○	○	○	○	○	○	○	○
Time to learn to use this system	○	○	○	○	○	○	○	○

Next

Post Questionnaire for ADD IT UP:For Youth For Life A Financial Literacy Tool for K-12 Education

Exit this survey

INFORMATION QUALITY

1) It is easy to find the information I needed.

	Strongly disagree						strongly agree	N/A
INFOQUAL	○	○	○	○	○	○	○	○

2) The information provided for the system is easy to understand.

	Strongly disagree						strongly agree	N/A
INFOQUAL	○	○	○	○	○	○	○	○

3) The information is effective in helping me complete the tasks and scenarios.

	Strongly disagree						strongly agree	N/A
INFOQUAL	○	○	○	○	○	○	○	○

4) The organization of information on the system screens is clear.

	Strongly disagree						strongly agree	N/A
INFOQUAL	○	○	○	○	○	○	○	○

Prev Next

Post Questionnaire for ADD IT UP:For Youth For Life A Financial Literacy Tool for K-12 Education

Exit this survey

INTERACTION QUALITY

1) The interface of this system is pleasant.

	Strongly disagree						strongly agree	N/A
INTERQUAL	○	○	○	○	○	○	○	○

2) I like using the interface of this system.

	Strongly disagree						strongly agree	N/A
INTERQUAL	○	○	○	○	○	○	○	○

3) This system has all the functions and capabilities I expect it to have.

	Strongly disagree						strongly agree	N/A
INTERQUAL	○	○	○	○	○	○	○	○

4) Overall, I am satisfied with this system.

	Strongly disagree						strongly agree	N/A
INTERQUAL	○	○	○	○	○	○	○	○

List the most positive aspect(s):

1. _____
2. _____
3. _____

List the most negative aspect(s):

1. _____
2. _____
3. _____

Prev Done