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Babson College MCFE team presents...

Sugar Deployment in US Schools

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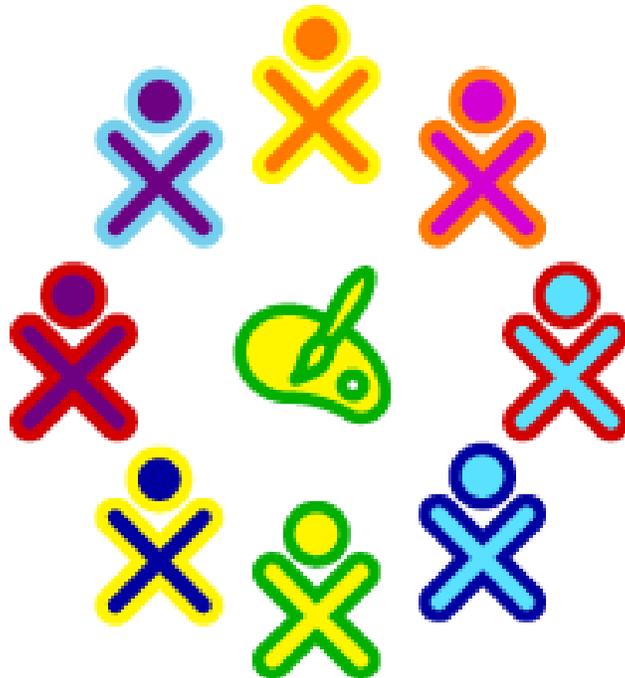


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I. Executive Summary

1.1 Introduction

Sugar Labs is a non-profit organization that has developed an award-winning educational software platform, called Sugar, to provide children ages 5-12 with supplemental education tools and now plans a broad level of implementation in the US.

This Babson MCFE consulting team has completed the following tasks:

- Understand the targeted audience and create a model for Sugar implementation
- Understand the barriers currently limiting Sugar software adaption in elementary schools
- Study the impact of Sugar software implementation in several initial pilot school programs
- Recommend a general strategy for effectively implementing Sugar software in US school systems

1.2 Methodologies

The team has conducted primary research by interviewing superintendents, principals and technical education teachers in school systems where Sugar has already been introduced. The team also conducted secondary research that identified teacher types, sources of funding, previous software implementations, and the business framework of new product development cycles. The feedback has created groundwork for recommendations to improve the existing framework for implementing Sugar.

1.3 Findings and Conclusions

Based on our research, Sugar's most prominent strengths are:

- the breadth of integrated content
 - that it is flexible and customizable to broadly meet teacher's needs and curriculums
 - the collaborative and interactive learning experience tailored for children
- On the other hand, challenges facing Sugar include:
- the necessity for heavy introductory training
 - a lack of a centralized support system for educators using Sugar
 - the software's lack of certain advanced features important in American school systems
 - the current form of Sugar on a Stick is unreliable.
 - the largest obstacle for Sugar is the teachers' lack of free time as well as pressure to uphold mandated testing standards. Resistance to innovation and change in the school systems creates additional obstacles for Sugar implementation.

Based on our analysis, the team recommends four points for improving Sugar implementation:

1. Sugar Labs should enable greater educator support and collaboration using an online web-based support center) for educators and end users.
2. Sugar Labs should centralize and standardize introductory training. This implies that Sugar Labs should provide more tangible guidelines for teachers during their first exposure.
3. The best initial point of contact with the school market should be targeted at educational technology teachers and superintendents.
4. Sugar Labs should have a standardized program to present its introduction to school systems.

The following report contains a detailed implementation plan as well as an analysis of the consequences of each step. Additional research on sources of funding exemplifies how the plan can become reality.

II. Introduction

Sugar Labs is a non-profit organization formed in May of 2008. The company distributes Sugar software, an award-winning educational software platform that provides children ages 5-12 with an alternative to traditional education. The program reinforced and enhances teacher's curriculums to serve as a learning tool uses its easily customizable format. Furthermore, aside from the learning enhancing activities, Sugar can educate children in simple computer programming. Sugar Labs, originally working in close collaboration with the One Laptop Per Child initiative, began distributing the Sugar software operating on XO laptop computers to underdeveloped countries including Uruguay, Peru and other global location.

In May 2008, Walter Bender formed Sugar Labs, giving the Sugar software capability to run off a USB memory stick without the use and expense of an XO laptop. Mr. Bender's focus was to bring the software into the US and create a standardized implementation framework for Sugar software on a broad scale in elementary schools nationwide. To help facilitate a broad deployment of Sugar, the Babson MCFE team has created a coherent introduction plan with recommendations.

The team's research provides not only a business framework of the new product development cycle, but also a 360-degree evaluation of Sugar's capabilities in relation to needs of the target market. The feedback has created groundwork for recommendations to improve the existing frameworks for implementing Sugar.

III. Methodologies

III.1 Secondary Research

To begin, the team conducted secondary research on the existing environment, the demographics of the school systems included in the project's focus, and the software's target market. Research included general feedback on the product, different teacher types and their approaches to education, case studies on Logo — a software similar to Sugar in its design and purpose, and a general background on the Sugar software and activities Sugar offers.

The initial research laid the groundwork for areas to pursue in primary research.

III.2 Primary Research

Primary research involved interviews with elementary school and high school employees of different ranks and from schools with different levels of exposure to the Sugar software. The research included the Meadowbrook School in Weston, MA and Rising Tide Charter School in Plymouth, MA — schools with no previous exposure to Sugar, the Watertown School System in Watertown, MA — currently piloting the program for the first year, the Pierre Van Cortlandt Middle School in Croton, NY – one and a half years into their implementation, and finally the Birmingham School System in Birmingham, AL— actively using the One Laptop Per Child laptops running the Sugar software since 2008.

The interviewees included individuals who ranged from superintendents to Technology Education teachers, both with previous familiarity with the Sugar software and without. The different perspectives offered a full-picture of the strengths and weaknesses of Sugar and identified a number of recurring problems in a majority of the implementations.

III.3 Meeting Observations

The team attended several meetings with educators to observe the first hand the reactions of the attendees and their degree of receptiveness to the software. Walter Bender’s introductory meeting with the principals, technology education teachers and educators of the Watertown schools systems also provided exposure to his introduction methods allowing the team insight to give specific recommendations on the introduction from an “outsider’s” perspective.

III.4 Financial Research

The team has conducted cost of ownership research and pinpointed an approximate cost of professional development in the US elementary schools to present the cost of Sugar to the schools.

Research on funding available to support Sugar Labs in their implementation identified two national funding programs: the No Child Left Behind Act--targeting technology integration--and the Race to the Top federal grant targeting innovation in new teaching method. (Find further information in 5.6 Funding Section)

IV. Findings and Groundwork

IV.1 Secondary Research

IV.1.1 Existing Market

David Farning, a Sugar Labs representative, stated there was “no established market for computers in early childhood education” in Jul 2009 IAEP Market Analysis notes (Farning). This is because the market has “not yet proven financially viable for existing software or hardware vendors to build a business” while the existing, large vendors have the market power to “drive out individual smaller competitors who threaten their existing markets” (Farning).

Based on the findings, Sugar Labs should encourage vertical collaboration to promote for-profit firms, like Caroline Meeks’s backup system for the USB, to build a market around the Sugar platform and Sugar on a Stick technology. An interview with Caroline Meeks in the later sections of the report discusses her for-profit business idea to back up the Sugar on a Stick USBs. Creating a collection of firms and a package of services that support the product will solidify and broaden its standing as developmental education software.

IV.1.2 School System Demographics

To examine the demographics for potential Sugar deployment, the team examined the Boston city schools for statistics on student teacher ratios and computer availability crucial to Sugar's implementation. The Massachusetts Department of Elementary and Secondary Education lists a total of 56,168 students enrolled in kindergarten through 12th grade; 25,887 of these were enrolled in Boston's elementary schools during the 2007-2008 school-year. This district also offers one "modern computer" for every 4 students in the district (99% of which are already connected to the internet), as well as the attention of one teacher per every 12.8 students. Given Boston's prestigious academic system and relatively wealthy residents, the high ratios give Sugar on a Stick the accessibility necessary to reach children through computer access and teacher involvement.

The breakdown of the students in the district also aligns with Sugar's deployment strategy. During the 2009 school year the population of students Kindergarten through 5th grade was 25,850 students or 50% of the students enrolled in the district. With the addition of the 11,340 enrolled in 6th through 8th grade, this number climbs to 66%. The statistics show elementary schools hold the largest number of students in the district.

These facts support Sugar's aim to reach elementary school children, as it gives access to the largest percentage of the school population in the Greater Boston area. More importantly, when examining the Boston schools, a general problem in retaining students becomes evident. Although the retention of students is high in elementary and middle schools, by high school the dropout rate hovers around 20% according to the Focus on Children 2006/2007 statistics. Introduction of alternative teaching methods at the elementary level can help, over time, retain more students to the middle school and high school, ultimately lowering these dropout rates. Sugar's interactive quality as an alternative education method may help ameliorate the retention problem directly (see interview with Robert McKenna, administrator of the Birmingham School system).

IV.1.3 Teacher Types

The secondary research on teaching styles identified two types of teachers: instructivist and constructivist teachers (Niederhauser, 2001).

Teachers of the first type include those with “traditional beliefs about teaching and learning tend to use didactic instructional methods” (Niederhauser, 2001). These teachers are more resistant to change, and less likely to alter their teaching style to incorporate new educational technologies. They also do not trust the decision making of the system that would be controlling teaching time in their classroom.

Constructivist teachers allow students to explore different strategies in targeting a problem. The teachers allow the students more freedom to expand their way of thinking outside of the conventional. Their methods are more inquiry-based and align better with the philosophy and framework of the Sugar software.

In a study of the two teacher types, “teachers with more constructivist beliefs tended to use student-centered inquiry based methods [while introducing a concept]. In contrast, teachers with a more didactic perspective directed their students to use manipulative methods [to learn the discipline] in specific ways. Students were instructed to arrange the manipulative objects in groupings to provide a concrete representation of standard mathematical algorithms” (Niederhauser, 2001)

These studies suggest two main findings. First, both styles of teachers require educational software to adapt to some degree to their teaching style. Since Sugar is primarily oriented toward constructivist and inquiry-based teaching, there may be a barrier to appealing to teachers with traditional instructivist teaching methods. Second, Sugar will need a strong and thorough introduction of its abilities to educators to give them control of the software through knowledge of Sugar’s capabilities.

IV.1.4 Sugar Activities

In the Sugar platform, Activities are the subset of individual programs that are directed toward specific learning skills (such as math, language, the arts, etc.) Research of the Activity database within Sugar showed a wealth of different activities but few explanations of each Activity's functions and previous uses in a school curriculum. A better organization system for the Activities would add to the user-friendly nature of the software, allowing the teachers to search for Activities based on their discipline and offering possible applications of the activity in standard curriculum (See Implementation Plan section on Activities Database)

IV.1.5 LOGO

Research on previous similar developmental software implementations led us to the Logo software. Developed in the 1960's by Seymour Papert and first implemented in the 80's, the software greatly resembles Sugar's Turtle Art and aims to improve developmental education and computer programming skills in middle school children (Papert). Many case studies have been conducted documenting steps of Logo's implementations in the US and globally. "Logo —Philosophy and Implementation" describes Logo's implementation in Saint Paul, Minnesota recorded by Seymour Papert himself and draws many parallels to help guide Sugar's implementation (Papert).

First, the study noted the significance of a state's involvement in software implementation. Logo began targeting specific schools in the Saint Paul School system to serve as beta sites for Logo. Papert comments "without [the] state support, the Saint Paul Logo Project would have proceeded in essentially the same manner, but [the state] did make things easier for us, especially in our outreach beyond the Saint Paul Public Schools themselves to other Minnesota districts" (Papert, 27). State involvement simplified Logo's broader level of implementation.

Second, training structure was key to Logo's success in the school. The training methodology Logo implemented was the summer Institute. The Institute constituted a "week-long intensive workshop [that served as] the starting point for new teachers in

[creating a] project [for their classroom]. [It] provides a periodic renewal for experienced teachers, some of whom have attended four or five Institutes over the years” (Papert). The introduction included “groups formed . . . to address areas of interest or teach[ing] skills” with teachers collaborating with software experts (Papert). Then the teachers completed an initial discipline-specific project “designed to give people an overview of the major features and capabilities of the Logo environment” including drawing tools, writing text, and using “turtles as characters in an animated sequence” with basic Logo programming (Papert, 30). The weeklong immersion gave teachers the confidence and basic skills to control the Logo environment and mold it to their curriculum.

Third, the study confronted teacher reactions to the alternative learning experience the software provides. The exploratory way of learning may not work well in a structured environment as “[teachers] may see students for only one or two periods per week,” so a pilot or charter school environment may leave more flexibility for exploration (Papert). Also, since the software favors child exploration, many teachers struggle with the concept that “they must always know everything and must always be fully in charge” (Papert, 35). The instructivist teaching style clashes with the freedom the Logo software gives to the students, so Papert offers “instead of using [Logo] as instructivist software [to quiz children], present it to the children as a model of what they could do [and] they can then write quizzes of their own” (Papert, 34).

Finally, this study describes preliminary cases completed “in 1984 [by] Peter Fire Dog of the University of Minnesota Sociology Department [finding] that in the judgment of teachers, students working with Logo had improved performance in school and that the benefit was available to all children¹” (Papert). Later studies corroborate the claim and aid Logo’s eligibility for additional funding due to its proven beneficial effects. (For further information on necessary progress measurements find the Funding Section).

¹ 1 Fire Dog, P., *Exciting effects of Logo in an urban public school system*, Educational Leadership, 1985. 43: p. 45-47.

IV.2 Primary Research

The team has conducted one face-to-face interview, seven phone interviews, one e-mail questionnaire, one library visit, and two meeting observations. The list of interviewees includes:

- Ann Koufman — former teacher and current superintendent of the Watertown, MA school system
- Caroline Meeks — a member of the Sugar Labs deployment team
- Gerald Ardito — a science Teacher at the Pierre Van Cortlandt Middle School in Croton, New York
- Michael O’Keefe — Assistant Head of the Rising Tide Charter Public School in Plymouth, MA
- Robert McKenna — member of the administration of the Birmingham, AL school system
- Barbara Vincent — the Assistant Head of **Meadowbrook** School in Weston, MA
- Rob Stergis — ESL Coordinator in the Watertown, MA school district
- Anne Sudbay — Technology Integration Specialist at the Lowell School, Watertown, MA school district
- Michael McDermott —Omega House Master at the Watertown, MA High School.

In addition, the team participated as observers in two Watertown school administration meetings – one with technology education teachers and another with school principals and innovative teachers. All the phone interviews lasted for approximately 45 minutes and included a series of 20 questions on the advantages and disadvantages of Sugar software, teacher training necessary, potential obstacles of implementation, the implementation process, implementation cost, and so on. The team varied its questions based on the interviewee’s background, the schools’ involvement with Sugar, and the interviewee’s role in the Sugar implementation process. A list of questions and answers for each interview can be found in Appendix I-IX.

The team was able to gather information from educators, superintendents, technology education teachers, principals, librarians, and Sugar volunteers. All the

primary research was helpful for the team’s understanding of different mindsets towards the software. The interviews compensated for the little experience we have had previously regarding educational software and its deployment.

IV.2.1 Sugar’s Advantages

Addressing the question on Sugar’s advantages, Caroline Meeks and Ann Koufman admitted to liking the flexibility of Sugar working for different disciplines, in different languages, as well as for students with disabilities. In the meantime, Gerald Ardito and Barbara Vincent emphasized Sugar’s ability to enable students to collaborate with each other. Michael O’Keefe, Robert McKenna, Anne Sudbay, and Michael McDermott strongly favored Sugar’s fit into a classroom as a teaching tool.

IV.2.2 Sugar’s Disadvantages

Addressing Sugar’s disadvantages, Caroline Meeks noted Sugar needed more traditional content in addition to its creative activities. Gerald Ardito and Barbara Vincent would have liked Sugar to be more advanced in its capabilities for their students, especially for functions such as video recording and uploading files. Michael O’Keefe, Robert McKenna, Rob Stergis, and Michael McDermott worry about teacher training being too long and too complicated to give teachers full capability of the software.

IV.2.3 Insights

The MCFE team asked about the successes and flaws of the current teacher training that educators undergo to familiarize themselves with Sugar. Ann Koufman and Michael O’Keefe replied that they would like to see teachers share experiences with each other and teach one another about incorporating Sugar into their lesson plans. Caroline Meeks, Ann Koufman, Rob Stergis, as well as participants in our first observed meeting with the Watertown school district liked the idea of building an online community — a common hub where all teachers using Sugar could compile useful data including lesson plans, “Top Ten Dos and Don’ts of Sugar implementation,” Q&A on activities and their functionality, and technological support. Gerald Ardito prefers one-on-one training with teachers; however, Michael O’Keefe, Robert McKenna and Barbara Vincent prefer a workshop to counsel the teachers as a group or involving them in a weeklong professional development session similar to the one used during Logo’s implementation.

Michael McDermott thinks that a 2-hour introductory demonstration, similar to Walter Bender's meeting with the Watertown principals, will be enough if it includes the level of detail to explain the basic functionalities of the software.

One of the most important questions asked of interviewees was to identify potential obstacles for Sugar implementation in the school systems. All interviewees mentioned the importance of teachers – their attitude and engagement with the software, their training, effective use of their time, and the support available to them during the implementation process. Furthermore, Caroline Meeks, Robert McKenna, and Ann Koufman raised the question of making sure that Sugar aligns with the teachers' curriculum. Instead of having classroom curriculums work around Sugar, Sugar must be adaptable to school curriculums to ensure teaching is more efficient and easy. As a superintendent, Ann Koufman is concerned with the size of the pilot program in a school system. She questioned what grade Sugar should pilot in and what activities the pilot program should focus on. As a private school teacher, Barbara Vincent worried how Sugar competes with the other software available to her school including both paid software like *Fractionation* but also unpaid software like the collaborative features of *Google* and *YouTube*. Michael McDermott worried about sources of financing Sugar implementation. He noted that Ann Koufman had provided active support and set aside budget for Sugar. Other school systems around the country, however, may not have the same, well-established computer system, that Watertown does.

IV.2.4 Opinions on Implementation

Along with questions about teacher involvement the MCFE team wondered, “What would it take to implement Sugar?” The response was quite varied. Caroline Meeks thought that Sugar needs to have sufficient market share and brand recognition. She believes that parents and principals might be a great entry point to market the software. Ann Koufman thought that the third grade would be a good level to pilot the software, and due to this Sugar needs to be constructive, fun, and subject relative. Gerald Ardito thought that Sugar needs to be sensitive to two things – professional development and the equipment available. Sugar should adapt to diverse schools, students, and

teachers across the country and be simple enough and robust enough to function flawlessly under a variety of conditions. Michael O’Keefe believes that charter schools are great places for Sugar to start. Unlike Ann Koufman, O’Keefe thought 6th grades to be great to introduce Sugar. Robert McKenna emphasized that standardized training methods are key to a successful implementation– easy enough to introduce teachers to Sugar, but with enough variability to allow teachers to customize the software once they understand the program. Barbara Vincent suggested that Sugar might not be suitable for US private schools as it may be more appropriate for “underdeveloped areas without resources.” The four educators from the Watertown principals meeting expressed great interest in Sugar and full confidence in its implementation in their district.

Although many interviewees could not gage the cost of Sugar implementation, all noted that teachers must be compensated for their time during training. The compensation method can be monetary or acquisition of college credit to serve as professional development. Watertown typically pays teachers \$35 per hour for summer program training, while the **Meadowbrook** Private School in Weston typically pays \$100 per day to compensate summer professional development.

Throughout the interviews, the team received additional comments unique to the interviewee’s perspective.

Caroline Meeks commented on the Gardner Pilot Academy in Allston, MA and acknowledged that Sugar’s failure there was probably the result of five key factors: 1. Sugar was brought into the school by a non-profit organization (allowing the school to not completely invest in the project as they are not monetarily invested), 2. The schools’ resistance to change to adapt to Sugar, 3. The problems with the Strawberry version of Sugar on a Stick, 4. The lack of support provided to teachers by both the school and Sugar Labs; and finally 5. Teachers’ other priorities and lack of time embedded in their system for Sugar.

Meanwhile, Ann Koufman shared her ideas for Sugar implementation in Watertown. She noted: 1. Sugar could work very well in foreign language classes (in both elementary and high schools); 2. During the first introduction of the software to superintendents, Ann suggested having students do a demonstration of the software’s

capabilities; and 3. The focus of implementation should target only the teachers interested in the software instead of persuading others that are resistant. The teachers who are resistant will either eventually get on board due to the mass implementation of the software school-wide, or will never have ownership of the software to ensure its success. Sugar Labs should not be spending energy trying to convince them.

Gerald Ardito would like to see Sugar used for afterschool programs as well as a homework tool. Michael O’Keefe endorses the software’s use in afterschool programs as teachers there are under fewer time constraints and are therefore more willing to try new technologies. The afterschool programs also often have enough funding for appropriate training of the software.

V. Analysis

V.1 Secondary Research Analysis

Based on analysis of the secondary research findings on the LOGO software, teacher types, school system, and Sugar Activities, the MCFE team presents four points addressing the software’s implementation plan.

First, teachers must feel *comfortable* using Sugar. The experience LOGO had with school implementation demonstrated the importance of teachers’ role in the implementation process. Because there are two types of teachers – traditional and constructivist — it is important for Sugar software to identify and target constructivist teachers first. This will insure that Sugar Labs uses its limited resource efficiently and won’t spend too much time trying to convert traditional teachers who do not trust new technologies and may be resistant to adapt.

Second, since there are pilot schools and charter schools in each state, they are an attractive initial primary market for Sugar. Meanwhile Massachusetts acts as a good implementation site because the student-to-computer ratio in Massachusetts is 1 to 3.8 and Sugar Labs does not need to worry about the computer supply in Massachusetts and states of similar standing.

Third, since 37.7% of students' in Boston (or 15.1% in Massachusetts as a whole) primary language is not English, Sugar's foreign language features can be very attractive. Sugar should consider targeting foreign language classes to use the software in the respective language as a learning tool.

Finally, through researching and exploring different Sugar activities, the MCFE team realized the extent of Sugar's customization. The software actively should market to teacher's and, more importantly, to student's ability to design their own math, language, and art quizzes and homework. To ensure success, however, Sugar requires clear instructions on how to use different activities.

V.2 Primary Research Analysis

In addition to secondary research, the MCFE team spent most of the time focusing on primary research, including interviews and observing meetings (see Appendix I-IX). The six key conclusions that were reached focused on piloting the software, measuring results, teacher opinions, Sugar's adaptability, teacher training, and the school's ownership of the software.

First, for piloting the software, Sugar Labs should consider specific schools, such as charter schools, and grades, for example 3rd to 6th grades. In addition, consistent with previous research, interviewees noted that Sugar Labs could introduce the program into foreign language classes. This setting is well suited to Sugar and offers the software a better chance of success. With successful pilots in charter school and the measurements of Sugar's influence, Sugar Labs can then move on to a broader implementation within the general school system.

Second, according to several interviewees, teachers and schools face standardized testing pressures that have an influence on Sugar's implementation. If Sugar can demonstrate its ability to improve students' standard test scores, its chance of success in US school systems will increase dramatically.

Third, similar to our secondary research data, information from primary sources indicates that Sugar needs to make sure teachers are comfortable using the software. Many interviewees recommend having a uniform online support community that would

unify a written manual/guide book, provide examples of previous experimented teaching plans, and provide clear, simple instructions on how to start Sugar activities. Users would value a centralized hub where all this information is presented. Teachers also need to trust the Sugar product — it must be reliable and perform consistently under varying conditions. Although many teachers create their own instructions, it is helpful to have detailed, easy-to-follow instructions available along with blogs and articles on “What to do, and not to do with Sugar” all in a centralized place. Teachers want Sugar to be simple and relatively easy for them to dedicate time to using it.

Third, Sugar needs to adapt to the varied hardware found in American education systems — equally user-friendly for both PC and Apple computers and more advanced platforms. Many interviewees pointed out the difference between American students and students from developing country — American students are more likely to have previously used computers. It is important that Sugar software matches students’ ability and classroom needs. One example, American students would like to be able to upload videos on Sugar.

Fourth, Sugar Labs needs to find resources and incentives to enhance teacher training. Both monetary and credit-based compensation require outside funding that will be discussed in the funding section. A large-scale implementation will require standardizing the currently varied training system individual to each school.

Finally, many interviewees pointed out the importance of having appeal to and support from different groups – superintendents, teachers, and principals. While Superintendent Ann Koufman would argue that Sugar should first be introduced to superintendents in conferences, science teacher Gerald Ardito suggests Sugar should approach teachers first. Because Sugar introduction is a key to success, it is important to most sure that Sugar Labs finds the right approach to teachers that will be further discussed in Section 6 on the Implementation Plan.

V.3 SWOT Analysis

From the primary and secondary research, the MCFE team performed a SWOT analysis (Figure 1), which outlines Sugar's strengths, weaknesses, opportunities, and threats.

Figure 1: Sugar SWOT Analysis

According to the SWOT analysis, Sugar reinforces a schools' need for technology integration and has many competitive advantages that have attracted a lot of attention. On the other hand, Sugar needs to watch out for competition as well as create a more systematic way of approaching schools and supporting teachers.

V.4 Approaches to the School System

In addition to a SWOT analysis, the MCFE team also developed a graphical structure representing different ways of approaching a school system (Figure 2).

Figure 2: Pyramid of Approaches to School Systems

As illustrated by the Pyramid (Figure 2), there are six individual routes of introducing Sugar into a school system. Due to the limitations in resources, Sugar Labs must consider each approach and come up with the best point of introduction.

The advantage of approaching the state (top down approach) is that it can mandate that all schools implement Sugar on a Stick. However, purely mandating software without appealing to the teachers does not always work. It can be difficult to

generate trust and collaboration among teachers [as Gerald Ardito mentioned on October 21, 2009].

The advantage of approaching superintendents is that the interactions are more personal and more targeted. Superintendents are influential; they are the leaders. Superintendents and principals view the program from a high level and evaluate the benefits and cost. However, they may not appreciate the program from an operational point of view. Without fully understanding how Sugar can be integrated into each specific school or district, the program will fail.

Technology education teachers are an attractive entry point because they connect with both superintendents and teachers. Not only do they train and support teachers with technology, they also participate in the decision making process of choosing applicable technology with principals and superintendents. Because teachers are Sugar's final customers/implementers, appealing to teachers increases Sugar's likelihood to succeed in a sustainable way.

Although targeting teachers will be optimal for the software's success, there are so many teachers that it is hard for Sugar Labs to market solely to teachers within a reasonable timeframe and with limited resources.

Finally, students and parents represent the largest numbers and can be very influential in a school system's decision-making process. However, the size of this group will require significant marketing costs for Sugar Labs. The approach is not efficient and probably too time consuming.

V.5 Financial Analysis

V.5.1 Cost of Ownership

The team broke down the cost of ownership of Sugar software into the following categories:

1. USB sticks
2. Professional Training and Development
3. Maintenance
4. Logistics and Overhead

The MCFE team has recognized that most of the cost of ownership of the Sugar platform for schools will come from professional training and development. During the Watertown principals meeting that the MCFE team attended, a Watertown teacher mentioned that Watertown pays \$35 per hour of professional training during the summer. In comparison a private school like **Meadowbrook** School of Weston pays \$100 per day for professional training during the summer program. Since most interviewees believe that Sugar on a Stick will require at least one week of intense training (40 hours), applying these prices as standard across the nation, professional development will cost between \$500 and \$1,400 per teacher.

For a state as the size of Massachusetts (which has student/teacher ratio of 13.6 to 1) [according to the Massachusetts Department of Elementary and Secondary Education] the cost of implementing one Sugar on a Stick/student, therefore, is approximately \$80 US.

Assuming that one in every five teachers will get trained on using Sugar, for a state like Massachusetts, which has 425,350 K1-6th grade students, Sugar Labs will need total funding of \$6.8 million.

V.6 Funding

According to our research, there are three potential sources of funding for Sugar Labs – federal grants, non-profit grants, and district annual budgets. Based on interview results, the most feasible funding source are federal grants. There are two grants that the MCFE team has discovered – *No Child Left Behind Title II, Part D*, and *Race to the Top*.

V.6.1 *No Child Left Behind*

No Child Left Behind Title II, Part D is a grant that aims to “enhance education through technology” (Massachusetts Department of Elementary and Secondary Education). The goal of this grant is to “help districts improve student achievement through the use of technology in their schools and assist students in becoming technologically literate by the end of eighth grade.” The fund also targets students below the eighth grade, which matches the target demographic of Sugar on a Stick.

Massachusetts has been awarded \$2,031,379 through this fund for the 2010 academic year. Because the fund requires recipients to use at least 25% of the money for professional development, the money could be used (by Sugar Labs) to train teachers. Once a state receives funding from the federal government, it allocates funding by:

1. Spending up to 5% on state activities
2. Formula grants (eligible LEA (Local Education Authorities) submit applications to the State)
3. Competitive grants (local entities submit applications to the State)

In order to apply for the “No Child Left Behind” grant, a state must submit a new or updated strategic plan to the government that includes:

- Strategies for improving academic achievements
- Goals
- Steps to increase accessibility
- Accountability measures
- Innovative delivery strategies
- Non-supplant assurance
- Professional and curriculum development
- Technical assistance
- Technology resources and systems
- Strategies for financing technology
- Strategies for parental involvement
- Competitive grant description
- Integration of technology with curricula and instruction
- Incentives
- Support

In order to apply for competitive grants, an LEA or eligible local entity must submit a new or updated long-range strategic educational technology plan that is consistent with the objectives of the statewide

technology plan and that addresses the statutory local plan requirements. This plan should include:

- Strategies for improving academic achievement and teacher effectiveness
- Goals
- Steps to increase accessibility
- Promotion of curricula and teaching strategies that integrate technology
- Professional development
- Technology type and costs
- Coordination with other resources
- Integration of technology with curricula and instruction
- Innovative delivery strategies
- Parental involvement
- Collaboration with adult literacy service providers
- Accountability measures
- Supporting resources

A key requirement in both the federal and the state funding are the “accountability measures.” This is defined as:

A description of the process and accountability measures that the applicant will use to evaluate the extent to which activities funded under the program are effective in integrating technology into curricula and instruction, increasing the ability of teachers to teach, and enabling students to reach challenging state academic standards.

Therefore Sugar Labs needs to be able to produce measurements/metrics that evaluate the result of Sugar's implementation.

V.6.2 Race to the Top

Similar to the *No Child Left Behind Title II, Part D* grant, *Race to the Top* is a federal grant that aims to “encourage and reward States that are creating the conditions for education innovation and reform; achieving significant improvement in student outcomes, including making substantial gains in student achievement, closing achievement gaps, improving high school graduation rates, and ensuring student preparation for success in college and careers; and implementing ambitious plans in core education reform areas (Massachusetts Department of Elementary and Secondary Education).” The American Recovery and Reinvestment Act (ARRA) provides \$4.35 billion to the *Race to the Top* fund. If successful, Massachusetts expects to receive more than \$100 million from the fund for the 2010 fiscal year. In that case, 50% of the funding will be passed on to participating LEAs via Title I formula and the other 50% will be allocated to districts.

In order to apply for the grant, a state must submit a high quality plan to the government that addresses the following issues:

- Offering a rigorous course of study in mathematics, the sciences, technology, and engineering
- Cooperating with industry experts, museums, universities, research centers, or other STEM-capable (Science, Technology, Engineering, and Mathematics) community partners to prepare and assist teachers in integrating STEM content across grades and

disciplines, in promoting effective and relevant instruction, and in offering applied learning opportunities for students.

- Preparing more students for advanced study and careers in the sciences, technology, engineering, and mathematics, including by addressing the needs of underrepresented groups

Similar to the *No Child Left Behind Title II, Part D, Race to the Top* places a huge emphasis on standards and assessments. It requires states to develop and adopt common standards, develop and implement common, high quality assessments; and support the transition to enhance standards and high-quality assessments. In order to participate a district must “explicitly agree to implement[] the plans in the State’s proposal” (Weiss).

In summary, both the *No Child Left Behind Title II, Part D* and the *Race to the Top* grants are good sources of funding for schools to support Sugar. Sugar Labs or the local school systems need to contact the state with a proposal that contains results and measurements from existing pilot programs.

VI. Sugar on a Stick Implementation Plan

The MCFE team has compiled all the findings and conclusions to create the following implementation plan from a generic System Implementation Plan template. This generic plan is from the New York State Project Management Guidebook that includes a common methodology for managing projects in New York State government organizations. It provides guidance and advice to Project Managers throughout the life cycle of a project. Since Sugar-on-a-Stick implementation is a big project with the potential to be nationwide, we recommend that Sugar Labs consider using a similar pre-set plan of implementation to ensure a smooth, flawless and reproducible process.

This plan contains seven steps of the implementation process (Figure 3). It guides the user through: the initial exposure of the system, the validation of the received feedback, pilot testing and problem identification, the refining process, preparation of the wide system implementation, system deployment and finally-transition of ownership. According to our observations, Sugar Labs is currently in the third step of implementation— performing pilot testing and problem identification for the Sugar product.

Figure 3: Sugar on a Stick: Implementation Plan

| Steps | Purpose |
|--|--|
| Step 1: Initial Exposure | <ul style="list-style-type: none"> • Create knowledge • Spark interest • Receive early feedback |
| Step 2: Validate and Receive Feedback | <ul style="list-style-type: none"> • Analysis and validation of data • Prepare for Pilot Testing |
| Step 3: Execute Pilot Testing and Identify Problems | <ul style="list-style-type: none"> • Execute pilot testing • Observe process • Identify Problems • Collect data |
| Step 4: Refining the Process | <ul style="list-style-type: none"> • Analyze data from pilot testing • Fix problems • Make changes • Perfect the process |
| Step 5: Prepare for Wide System Implementation | <ul style="list-style-type: none"> • Gather necessary resources (team) • Establish environment • Prepare the community • Start Marketing |
| Step 6: Deploy System | <ul style="list-style-type: none"> • Introduction • Set-up • Train teachers |

| | |
|---|--|
| Step 7: Transition of Ownership to the Performing Organization | <ul style="list-style-type: none"> • Prepare the performing organization • Provide long-term maintenance and support |
|---|--|

VI.1 Step 1: Initial Exposure

The main purpose of this step is to spark interest about the software the target market and create awareness. At this first stage of implementation, Sugar Labs presents the Sugar software to somebody who does not have any prior knowledge of the software. It can be a teacher, principal, superintendent or even a parent. A brief demonstration of the software should present the main functions of Sugar.

This demonstration will familiarize the user with the program and its main features and benefits. It should not go into much depth to make the software appear user-friendly. The initial presentation of Sugar software should show only a few activities on the main screen. This step offers valuable feedback from the initial reaction of the first-time user that can be used in the next steps of implementation. Sugar Labs has begun utilizing this method, as Walter travels around the country presenting the software to different groups.

VI.2 Step 2: Validate and Receive Feedback

This step represents the analysis and validation of the early data from the first time exposure of the user (teacher, principal, parent, or superintendent) in order to improve the implementation process. If the initial exposure was successful and there is enough interest to continue, both parties should prepare for a pilot introduction of the software. From the primary research we have done, this step was successfully carried out

in the Watertown school system. After first-time exposure to Sugar, Ann Koufman was interested enough to continue with a pilot program. Ann Koufman then conducted several meetings with Walter as well as technology education teachers and principals, in order to discuss further steps of implementation. The feedback received from Ms. Koufman was important to understand the needs of this particular community and the main requirements from the Sugar software.

VI.3 Step 3: Execute Pilot Testing and Identify Problems

After careful review and planning, the Sugar system will be piloted in the school. The best way to pilot is to introduce Sugar to one grade at a time. According to feedback that we received from Ann Koufman and Gerald Ardito, the best grade for introduction is the third grade for elementary schools or the sixth grade in middle schools. Since this stage of the process requires a lot of involvement and time from the teachers, leadership should be given to only a few teachers who are truly passionate about spending time with Sugar. During this initial step they will identify the glitches and pitfalls of the system before it is implemented school wide. The process must be overseen by the technology education teacher, in collaboration with the Sugar Labs Deployment Team, who will remain in close contact with the school, monitoring the progress and receiving feedback from teachers, students and administrators. This information will help identify problems and potential obstacles, which will serve as guidance for future deployment. As observed by the MCFE team, Sugar Labs is currently at this stage in the process. Sugar Labs has run several pilot programs and needs to collect as much information as possible from these sources in order to move to the next step.

The main advantage of pilot testing is a smaller range of exposure and extra opportunity to test the system before releasing it to other school systems. The main disadvantages to this approach are: having to maintain and coordinate parallel processes, stretching out the deployment process, and tying up Sugar Labs' Project Team resources

for a long period of time. However, those disadvantages are offset by the greater advantages.

VI.4 Step 4: Refining the Process

This step is necessary preparation for a full implementation of Sugar in other US school systems. After the system has been tested, the data collected is used to refine the implementation process and fix the obstacles met in the Pilot Testing.

At this time there is a lot of data and introduction material that needs to be collected and centralized from the NYC, Allston, Watertown and other pilot programs. The pilot program in Birmingham, AL will especially offer important information, since research studies have been done by the University of Alabama on the effect of the Sugar on grades and overall improvement of school attendance in the pilot schools. The Sugar Labs Deployment Team will collect all data received from the schools where Sugar has been piloted as well as the data from any consulting teams that have been involved in the process; like the G8 Four consulting project completed for the Birmingham school system. According to the sources interviewed by the MCFE team, the main areas where Pilot Programs have seen problems with Sugar have to do with reliability of Sugar on a Stick and the program interface.

VI.5 Step 5: Prepare for Wide System Implementation

To prepare for Wide System Implementation, Sugar Labs must take into account all the recommendations that are generated by the previous step. At this stage of System Implementation it is important to take all steps needed before deploying the system on a large scale. It is key to ensure that the system's deployment runs smoothly, efficiently and flawlessly.

The previous step included gathering data and feedback from pilot testing. After receiving feedback from some of those pilot schools, the MCFE Team found the main areas of focus in preparing for the Wide System Implementation. Of course, there is

much more data available that is outside the reach of the MCFE Team, including other pilot programs, but from the data analyzed so far, the team identified preparing both the program and the consumer communities, and establishing the team and environment for system implementation as areas for focused improvement.

VI.5.1 Establishing the team and environment

Communication System: First of all, Sugar Labs must create a centralized system that will ensure that all processes are synchronized and standardized. This centralized system will include a forum with access to the Sugar Labs Deployment Team, the volunteer community, the school system community and other participants in the deployment process. It is crucial to create a strong communication system between all parties involved. Currently, Sugar Labs has involved a large number of volunteers in the US and around the world, but better collaboration is possible. These parties need to be aware of each other's roles and activities. They need to communicate not only by phone or online, but also in person to ensure a smoother process.

Online hub: Before Sugar can be implemented on a large scale, the team of volunteers needs to gather all data existing on the internet about Sugar, including blogs and training material and combine it in one centralized hub that will represent a so-called Sugar server or an intra-net of all websites. A lot of websites and articles that exist right now are scattered on the Internet and only confuse the user. A more centralized repository of all of these will serve as a more efficient and user-friendly collaboration space for the Sugar Team as well as for the educators using Sugar. It will include lesson plans, course materials, introductory videos, a teacher community with customer service and IT support. During the interview process, the MCFE team discovered that many educators, who have had exposure to Sugar, share a common desire for such a resource.

VI.5.2 Prepare the program and consumer communities

Training: To prepare for a broad implementation, it is important to schedule and coordinate all training activities. At first, Sugar Labs will need to standardize the teaching curriculum and create teaching manuals as well as an online course for Sugar introduction to teachers. The online course will serve as an introductory course on the main functions of Sugar and the teaching manuals will compliment the teacher training by providing support. This can be done involving a team of professionals in the field of education in collaboration with IT professionals.

Support Materials: Another important preparatory step is to create a database of activities with a detailed description of the various Sugar activities and their possible uses in the curriculum. It will be provided to every school using Sugar in print form as well as an online version in the online hub. This will serve as a guidebook and will provide the savvy technology education teacher with a consulting guide, as well as for teachers at the stage of customizing Sugar to their curriculum. The creation of such support materials will ease the final step of Transition of Ownership to the performing organization.

VI.5.3 Marketing

As all steps in the preparation for large-scale implementation are completed, the system is ready for roll-out, the resources needed are available and the communication is arranged, it is time for the last step before implementation. Sugar Labs should utilize all possible free marketing tools in order to create “buzz” in the community, or in other words create interest in the target market. The Sugar Labs Marketing Team will utilize free marketing tools such as, Facebook, Twitter, Linked In, and Digg.com. With an existing knowledge about Sugar in the market it will be much easier to penetrate the market and introduce Sugar on a large scale. The interview with Caroline Meeks reinforced this recommendation, as she expressed the need for more brand recognition.

VI.6 Step 6: Deploy System

In this stage of the process, the full deployment plan developed in the previous stage is executed. The Deployment Team will begin introducing the Sugar software to schools, perform training for educators and provide samples and necessary copies of Sugar on a Stick.

VI.6.1 Introduction

The rollout of Sugar on a Stick will start with a bottom-up top-down approach. This approach will appeal to school systems by focusing on the top — the superintendents — and the bottom — the savvy technology education teachers) (see the pyramid of school system in Figure 2). As the first step of the roll-out process, it is very important that the first exposure to individuals is conducted as professionally and as competently as possible. This promotes the customer's acceptance and ensures the right perception of the system. This step is different for the very first stage of Initial Exposure, because at this step we assume that the user is somewhat familiar with Sugar.

Superintendents: Initially, the superintendents will see a brief demonstration of the qualities and features of Sugar. They need to be shown how Sugar software benefits and compliments school education, especially how it fits into the Math, English, Science and History curriculum. Math is an especially significant subject since all school districts in US strive to improve their Math scores. From our primary research Ann Koufman suggests that the best way to present to superintendents is to have children demonstrate the program so that the superintendent gets sold on the software working. This friendly and hands on exposure may create interest in a superintendent, who might not be technologically savvy.

Tech Ed: To approach another level of the target market — the technology education personnel — Sugar will visit technology conferences and seminars in the US. Every school generally has at least one technology support person in the building that is dedicated to helping teachers incorporate technology effectively into the classroom. Technology support personnel usually attend various technology conferences. A few of

such conferences are The National Educational Computing Conference, International Society for Technology in Education or Technology in Education for the Real World. Sugar Labs should “market” themselves at these conferences to target the Tech Ed teachers.

The bottom-up approach will be a good base target for implementation, because a technology savvy professional is likely to be interested in Sugar on a Stick and will be able to influence the principal of the school. The top-down approach, focusing on the superintendent, is important because the superintendent has the power to implement something new into the school system. Combining the two as routes of approaching the school system is ideal.

VI.6.2 Training

At first, all educators will receive the same basic standardized training using manuals and online courses. Then, in collaboration with Tech Ed Teachers, the educators will work on customizing the software to their specific curriculum. We do not recommend Sugar Labs to develop a plan of how to use Sugar in different subjects, but leave it up to educators to tailor the system to their needs. It is important to schedule the training at the right time. Performing training too far after the system has been rolled out to the consumers may cause them to form poor perceptions of the system due to the difficulties associated with an unnecessarily lengthy learning curve. Premature deployment brings the challenge of having to recall what was taught, leading to frustration and unhappiness of the system.

VI.6.3 Communication and Synchronization

It is essential that everyone is synchronized with the Deployment plan. The Deployment Team needs to take into account how the System Deployment will impact the Performing Organization’s normal business operations. This means that the training

and the set-up process will interfere with the normal school activities, such as class schedule and teacher's personal time. The Team needs to reduce that impact as much as possible. They need to perform installation of new hardware, increased network, capabilities, and configuration of Sugar on a Stick as smoothly as possible and according to the plan that was created in advance. Thus, it is recommended that the operational activities be completed prior to the start of the school year. While the new system may provide overall benefits to the school, those benefits may come at the expense of additional work responsibilities to some of the individuals who interact with the system. Those extra responsibilities include the time that educators spend on training and customization of the material. Thus, the compensation system for the teachers needs to be set up. The feedback received from the teachers that we interviewed reinforced the necessity of compensation and the value of time for educators.

VI.7 Step 7: Transition of Ownership to the Performing Organization

Finally, after the Deployment has been run in full force it is time to successfully prepare the transition of the responsibility and ownership of Sugar from the project team to the performing organization (the school). At the successful completion of this process we assume that the Tech Ed personnel in the school possess extensive knowledge of the software and are able to provide system maintenance and support. The teachers are comfortable in using the software and have developed curriculum-tailored program.

To help achieve this, Sugar Labs needs to provide the school with technical documentation, training and hands-on assistance. A Technical Services Personnel Team created within Sugar Labs will provide long-term support and will serve as "customer support service" for Sugar users. In addition, schools should be given a Sugar Labs guidebook that consists of a detailed description of the program and an activities database, which can serve as a user guide for the Tech Ed teacher. While the Tech Ed teacher will assume control and main support of the software in the school, he/she will be able to refer and consult the user guidebook, available in paperback or online. If there is

a problem, we recommend the use of a centralized hub to contact Sugar representatives about technical queries. In the case that the Tech Ed teacher requires more help, he/she will be able to contact the Technical Services Personnel- “customer service”.

VII. Timeline of Implementation



The above chart represents a timeline of the seven steps of Implementation described in the previous section. Every step represents a different color and length. Initial exposure is the shortest step as it represents just a quick presentation to a first time user. It is directly followed by the next step, Validate and Receive Feedback. Pilot Testing is a long process that goes along with Refining the Process, because the Deployment Team should constantly monitor the piloting of the program and collect data. The Preparation for Wide Implementation starts while the Refining is still taking place. Also, the Pilot Testing will still be occurring until Wide System Implementation. When The Preparation for Wide Implementation is concluded, the Deployment of the System starts. The Deployment cannot be started until all preparations are done. The Transition of Ownership overlaps with the Deployment reflecting the gradual process of the

Transition of ownership. It reflects how in the beginning of Deployment the control of the Sugar system is in the hands of Sugar Labs. Then, as teachers get trained more, the ownership is gradually transitioned to the school and the control of technology educators as well as teachers.

VIII. Conclusion and Recommendations

Our team has conducted a thorough study of pilot introduction of Sugar software in several US schools. The team has created a seven-step implementation plan that outlines how Sugar Labs could accomplish its goal of rolling out in elementary schools across the nation. The steps include:

1. Initial Exposure
2. Validate and Receive Feedback
3. Execute Pilot Testing and Identify Problems
4. Refining the Process
5. Prepare for Wide System Implementation
6. Deploy System
7. Transition of Ownership to the Performing Organization

The key recommendations include:

- A centralized online support website (online hub) that has lesson plans, curriculum materials, introductory videos, professional support, and most importantly, a teacher community.
- A more reliable Sugar software – whether that includes making sure the software is robust and bootable on a variety of hardware platforms using the USB drives, or switching to a different medium for the software. (for example downloading Sugar from the web)
- Work on the user-friendliness of the Sugar platform to include features such as an automatic reboot and automatic exit for the program.

- Reaffirming the functionalities with help of guidelines and explanations
- Introduce software by marketing to both technology education teachers and superintendents.

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Appendix I – Interview with Caroline Meeks

Member of Sugar Labs Deployment Team, November 11, 2009

The Sugar Labs deployment team voices the needs of Sugar deployments to the Sugar community, finds ways to support those needs, organizes forums for the exchange of experiences between Sugar users and Sugar developers, and builds local Sugar Labs organizations worldwide. Caroline Meeks is the main person who focuses on Sugar on a Stick based deployment in the United States.

Q1. Describe your work and involvement with Sugar.

Caroline Meeks is a volunteer for the US school deployment. She is working closely with Allston Gardner Pilot Academy and New York Pierre Van Cortlandt Middle School. In addition, she talks to teachers in other schools on a regular basis.

Q2. As we all know, *Sugar on a Stick* is being used at Allston Gardner Pilot Academy and New York Pierre Van Cortlandt Middle School. What is going well and what problems do you see?

Meeks identifies three main issues. One is that a lot of the schools want a more traditional content, such as Flash games. Although these games are not effective, they tend to work very well with the school curriculum. Sugar on the other hand supports project-base learning. Most of the Sugar tools are not traditional teaching tools, because they are creative and require a lot of planning and time spent on incorporation into the classroom. Therefore, according to Meeks, “it is important to lower the floor for teachers.” In addition to adding more project-based activities, Sugar on a Stick should also include more traditional learning tools. The second issue is that, even though Sugar on a Stick has the benefit of allowing students to bring it home, neither Allston nor New York has done it yet. In fact, it is a difficult process to get peoples’ computer set up at school, let alone at home. Finally, programs on Sugar are designed for high level training and require a lot of skills from teacher side. Therefore, it requires a considerable amount of training--more so than many other software programs.

Q3. In your opinion, what would it take for *Sugar on a Stick* to be successfully implemented in the school system?

Meeks thinks that it is important to make Sugar on a Stick “comfortable” for students and teachers. For example, it should be easy for students to take the sticks home. Second, Sugar needs to have a sufficient market share. It is important to have people know about Sugar. Finally, Sugar on a Stick should be easy to be implemented and should align with teachers’ curriculum. It is crucial to have technology integration - support from top (state and/or superintendent level) and bottom (teacher level).

Q4. What do you think of having guides or manuals?

Meeks thinks that a manual like the one made by the woman in Peru is great. Manuals exist in many places and should be continued.

Q5. The deployment team has a five step deployment plan on the website. Can you break down in detail?

Meeks thinks that the plan is not realistic. It was written long time ago and is not being used anymore. Right now, she is waiting for the next release. Once the release comes, she will evaluate classroom readiness.

Q6: In your most recent meeting on September 2nd, your team talked about feedback. Could you please briefly describe the feedback you got from teachers, students, and volunteers?

Most of the feedback comes from the Gardner Pilot Academy. One big lesson is that the content on Sugar is too hard to align with teachers' curriculum. Because there is not a linkage, teachers are not using Sugar effectively.

Q7: What is the cost of ownership for *Sugar on a Stick*?

Schools have different ways for measuring the cost of ownership. In a traditional school, the major cost is maintaining computers. However, computers at many schools are not used frequently. Therefore, most measurements generated by different organizations are inaccurate because they measure the cost of ownership per computer but not per hour of usage by students. There is very limited computer usage in many schools. One advantage of Sugar is that it reduces the cost of maintaining, especially if Sugar can be extended and expanded beyond normal classroom usage. For example, Sugar on a Stick can be a tool for homework assignments. Students can download the web page onto the stick and use the right tool to write their paper.

Meeks feels strongly about changing the conversation from talking about total cost of ownership per computer to total cost of ownership per hour of learning time.

Q8: How many hours of training time are needed for Sugar?

Meeks thinks that it really depends on the situation. She is curious to find out the training hours in Birmingham. When she designed a presentation, she assumed one day of personal, face-to-face workshop and 12 - 14 weeks of online training. This is based on 10 hours for every 2 weeks.

Q9: Which level to start: state, superintendent, principal, teachers, students or parents?

No one knows the answer. Meeks thinks that parents plus principal approach can be very effective. She would like to create a parent community. Parental support is a very effective means for change. It takes away the burden of working with schools. Parents push behind Sugar on a Stick could make it more successful.

Q10: Why is it that the Allston pilot program is not going well?

Meeks thinks that the non-profit approach is completely non sustainable. First, education research shows that non-profit never have a result. Second, the Allston school is very resistant to change. Sugar comes in as a non-profit is already a bad start. There are a lot of problems with the Strawberry version. But most importantly, there isn't much

administration support. Non profit is the least important thing on the school and teacher's agenda.

Meeks also mentioned that teachers are very hard to work with. Time is very important for teachers. One thing Sugar lacks is access to teachers. Teachers are the customers, but it is extremely difficult to reach them.

Because of that, Meeks thinks that it will be important to focus on supporting teachers who are actually excited about using technology, even though this may be 5% of total teacher population.

Q11: How can the Babson consulting team be helpful for you?

Meeks wants the Babson consulting team to investigate in the funding for "race to the top." She talks about the strategy of the new federal education department. The department has a competitive contest for states to "race to the top." This program has a big technology component. She wants to know the people in MA who Sugar can reach out to. She mentioned that working with the state education departments will generate a much better result than working as a non-profit organization.

Meanwhile, Meeks would like the team to investigate ways to translate the success with Ann Koufman (top 10%) to other superintendents. She realizes that it will be too time consuming to reach out to all superintendents. But she would love to get the top 40% of superintendents. Things that are important to superintendents are: total cost of ownership/learning time; Sugar's differentiation and classroom experience; capability to work with disability and different learning styles; extending time spent on homework by students; assisting teachers on teaching standards and tests; providing students 21st century skills.

Appendix II – Interview with Ann Koufman

The Superintendent of Watertown, MA, October 12, 2009

Ann is a superintendent of the Watertown School System with a background in education technology. Watertown is implementing Sugar in their 4th grade classes for the first year.

Q 1: What training system do you have in place?

Teachers are required to participate in professional development programs that are job embedded. 80% of the teachers at Watertown are willing to try new technology, are not resistant of integrating technology into their classrooms. Principals take risks and support new things. The administration has a strong vision to improve technology.

Watertown is conducting the TIP (teaching in practice) program. The program is one year long and consists of 15-20 mini courses online. Teachers choose courses depending on their technology level. TIP meets throughout the year face-to-face, as well as online using software called First-Class. During the training teachers utilize free software such as Google dot and Topbox for file sharing and video emails. At the beginning, teachers usually show what they have done in the previous year (student works). By the end of TIP, every teacher has a website, which serves as a digital space for classes. TIP is a “two for one” deal, because teachers get credit for participating and in the meantime, they design a project for their students in class.

Q2: What do you think about Sugar?

The main strength of Sugar is its ability for students to network and play educational games. Ann liked the Journal and the different languages that Sugar can be used in. The Scratch game is great for middle school.

Ann recommended letting K-4/K-5 teachers know what Sugar is and support them with time and resources. Ideally, all K-4/K-5 students will have a thumb drive. It is not known how much training is needed. Teachers can decide on their own whether and how they would use Sugar in their classrooms. She as well recommended that it is better to start small and do a pilot program than a big project and have not enough resources to support it. It is preferably to start at K-3, because K-1 and K-2 focus on elementary learning, K-4 and K-5 focus on writing and social skill and K-3 is left out. However, K-3 is now a pilot on Fabor Vision in Watertown. Within this pilot program, teachers meet at least once a month to discuss progress. It is also not done in summer because of budget!

Q3: What kind of computer resources do the Watertown schools have?

All schools are equipped with Dell Mini. There are 25 laptops for every 4 classrooms and a computer room in every school, Watertown is seeing trouble with the biggest elementary school, because it needs upgrade for the wireless system and hardware. Good things about Sugar: it is constructive, fun and subject related. It makes math, programming fun, kids love it. It makes kids write, ask hard questions and “figure things out”.

Q4: Steps for Sugar Implementation in Watertown

1. *Introduction to Superintendents*

It is recommended to bring kids to present to superintendents.

2. *Intro to Sugar for innovative teachers*

The meeting will involve twenty teachers, including an admin, an education technology teacher, a math teacher, and a savvy elementary school teacher. The meeting will also be attended by school principals.

3. *Walter and Ann meeting*

4. *Small planning*

Sugar software will be downloaded and planning will be conducted involving the elementary school principal and education technology teacher.

5. *Overview for principals: October 27/28*

The meeting will be attended by the curriculum coordinator, K-12 teachers (tech ed, math, science, English, social studies, ELL and other foreign languages)

6. *In depth investigation by technology education teachers*

The main objectives will be to figure where to start. The meetings will take place monthly and will start in November.

7. *Develop a Plan*

8. *Begin “messaging around” with the technology (students and teachers)*

Q4: Ideas for Sugar in the Watertown School System

1) Start training next year with the TIP program; 2) Use Sugar in after school programs (ELL) starting this year; 3) Start a summer teacher institute with grad credit next summer 4) Involve college students to co-teach; 5) Create task forces this year and have math teachers teach at grade level meetings; 6) Possible use in Advanced Armenian class at high schools this year; 7) Possible use in other foreign languages; 8) Emerging models of profession development, a course Ann teaches at Harvard Grad School; 9) Possible use of Sugar in the robotic/engineering class; 10) TIP for music teachers.

Appendix III - Interview with Gerald Ardito

Science Teacher, Pierre Van Cortlandt Middle School, New York, October 21, 2009

Q1: How did you hear about Sugar? And why did you want to try Sugar software?

Gerald heard about Sugar one and a half years ago when Gerald was a 7/8 grade science teacher. He is also the technology support person in the building. One parent got a XO laptop as a part of “get one-give one” program. He immediately fell in love with the small laptop. He especially liked the organization of games and the idea of having more collaboration among students.

Gerald talked to the principle of the school. The principle agreed to write to a local education department and share their idea of having everyone in middle school use it.

The school got some “grass money” and they ordered 140 XO laptops. The laptops arrived one year ago. Each teacher of the 5th grade class picked 4-5 students. The students learned to re-image the laptops and take them apart. Ideally, everyone would get training. But in reality, 5th grade teachers didn’t get enough training. Instead, Gerald decided to train the students. The result of training students was good.

Two months ago, all 5th graders received an XO laptop. The tech team was there to support the students. Students were taught by Gerald, outside of the class time. Gerald also decided to hire a consultant from Teaching Matters Company. The company has been working with 3-4 schools in NY. They have done more training with XO than any other group in the US.

One difficulty of training is that, “it is one thing to work on your own and another thing to bring 140 people with you”. It requires a lot of time and enthusiasm for the teachers who need to be trained.

Teachers don’t consider themselves great with computers. One problem with the school is that they haven’t worked out what teachers need to do and what they don’t need to do. On the other hand, students did a good job. This year they reimaged all machines and upgraded them to Sugar 8.2.

Gerald was interested in what Sugar is trying to accomplish. Kids love little laptops. However, kids cannot take laptops home. Gerald prefers kids to take Sugar home, but cannot. Sugar on a stick is a solution.

In addition, kids relate to XO like they relate to iPod. They do not seem like computers or like cell phones. They are something that belongs to them. It makes a “huge difference”. Gerald likes how kids interact with the XO laptops.

Last year, there were five 5th grade classrooms. This year, there are six 5th grade classrooms. The last classroom doesn’t have XO laptops. Instead, they use Dell laptops and are running on Sugar on the Sticks.

Q2: What is the difference between XO laptops and Sugar sticks? Have you run into difficulties when working with Sugar on the Stick?

Gerald has already burned thirty to forty sticks by now. He has not run into trouble with the sticks. Sticks have all benefits of XO laptops. In addition, it runs much faster!!! “Sugar on a stick flies!!!!” Unlike XO laptops, students can now take their sticks home. The school principal and Gerald himself look at sticks as the model for the future.

Q3: Is Sugar appropriate for 12, 13, 14 year olds?

Gerald does not think that student outgrow Sugar.

Originally, Sugar has been used in developing countries. Here in NY, students have been using different platforms, such as Windows and Mac. In a certain sense, Sugar is a step down. For example, now in Gerald’s classrooms, he can’t use Sugar for video and audience podcast. He can’t import video on Sugar. And certainly, there are things that kids want to do and Sugar doesn’t offer.

On the other hand, the education games: Turtle Art, Etoys, Scratch are very challenging. They are incredibly deep and hard. Even Walter and Gerald play with them.

In general, software in Sugar has to evolve and more activities need to be designed.

Q4: How has Sugar been used in the classroom?

The first thing Walter said when he visited the school few weeks ago was, “This [Sugar] is not the curriculum, this is a tool.”

Last year, the way technology was pushed in classrooms was that technology becomes curriculum. It created a burden on teachers. Teachers have time strain and standard test strains. It was a painful process.

This year, teachers use Sugar:

1. The program *Write*. Students open XO, go to Sugar, create a word problem, and use skills in math.
2. Gerald and other teachers leave responses on the program, like a walk-around blogging.
3. One teacher who teaches social studies and government studies, wanted to form a class government based on constitution. She tried to find a way to teach kids this topic. Kids

took notes and had them set up in rows and columns. They wrote what they have learned, and what qualities someone in each branch needs to have. Then they walked around and commented on each other's work. This way kids collaborate and are learning.

4. The class spent an entire class period on Sugar.
5. Last year, 5th grade studied immigration. Students brought family and friends who emigrated from other countries. They used Sugar to document the interviews. One class did a silence fair. They experimented and presented their finding using Etoys. They created a book using picture and words. Although they didn't use script, they did a nice job.

Sugar serves as an assignment tool. It's an affective and engaging way of teaching.

Teachers want students to create their own game, things like flashcards. Teachers have millions of ideas on how to use Sugar.

Q5: Is Sugar a good fit for afterschool?

Sugar can definitely be used in afterschool programs. Gerald planned it once. Six out of the 140 students came to the program. It was not because they didn't want to, they just don't have time. They have other activities like music, sports, and play.

Sugar can be a good program to do during lunch. It's informal and fun. However, students will need to give up their lunches.

Ideally, 3 days a week Gerald could go to afterschool programs. But he really doesn't have time.

Q6: Describe the teacher training in your school?

Ideally, Gerald will want to have a lot of training with teachers. However, right now Gerald is basically *the* teacher. He doesn't have that much time for training. Every week, he sits with teachers one on one or two on one during their prep periods. Teachers ask what to do for some ideas and Gerald provides a technological solution. Gerald also goes to classes to be the extra adult.

Teachers' time is split into three parts: time with students, time with other teachers planning, and time alone doing their own teaching period.

Gerald has nine classes, three prep periods, meetings and classes. Right now, he has been working with the 5th grad team during the prep period.

Gerald has been paid very little for going to the prep periods. He is doing Sugar for his dissertation.

Q7: What is the biggest problem in scaling?

There are two things that people need to be aware of: professional development and equipment. This is a small district. It will be even more difficult to implement Sugar in a large district with thousands of students. Questions to ask the schools are: do they have computers? Do kids have a computer at home? Do kids know how to boot up the stick at home?

Professional development is a time issue. During the school, who pays for substitute? Outside the school period, who pays for the training?

It is hard to force teachers to use Sugar. Mandatory does not work well with anyone.

Technology initiatives are to have teachers decide whether they want to do it or not.

1. Find who wants to do it
2. Make it possible for them to train
3. Have them do it

Potentially, teachers can be trained through:

1. Give them professional development credit
2. Actually compensate them

Q 8: Do schools have budget or find grants?

Many grants don't pay salaries. It is not impossible for teachers to volunteer. The teachers that Gerald works with are passionate about Sugar. However, one needs to keep in mind that: they teach four core subjects, they are with students on average for six hours a day and they have a standard test strain. As a result, spending one hour a week on Sugar is a lot of time!

Q9: How feasible is it to incentivize?

It would be a local decision for the district, not a global issue. Elementary schools are local. Sugar needs to start from the bottom up.

For example, the NY state mandates a certain number of hours of profession development time. Teachers can decide whether they want to be trained to use Sugar or take courses for credit.

Q10: Recommendations for Sugar?

What is fundamentally different about Sugar is that: it is incredibly customizable to one's need. With Sugar, first question is "what do I want to do" "what am I interested in" "playing with it is a part of the design". What comes to mind is: "I have this curriculum and how can I marry the two".

Sugar could improve by: "reflecting and walking around", having a collection of best practices, as well as lesson plans. The Peru teacher's book on Sugar, "that's IT"!!! Thus, it would be better if Sugar could explain each application and what it does. Another idea is to find a grant to host a conference for people who use Sugar. During this conference, a group of educators with developers would spend a weekend creating a lesson plan and best practices. It would be beneficial to have teachers take ownership of Sugar: ask teachers what they need and empower teachers with an ability to modify and customize Sugar to suit individual needs. For schools it would be useful to know what teachers can do and what they shouldn't do. Here comes also the idea of a guide. The guide shouldn't be too specific because each activity can be used in different classes. All tools are integrative.

Q11. Have you come into contact with the blog?

A blog would be great. If a teacher needs to find a way to teach multiplication next day, it would be good if he could find a specific plan in the blog written by another teacher. Otherwise the blog is inefficient. Because Sugar has only been used a year and a half, the blog could help teachers form relationships and help each other. The website would be used as a repository for teachers, including lesson plans, kind of like a task based blog. The social piece matters, but conferences come before.

Papert is the best person to work with, he started Logo. Walter walked in with background, "he is very smart, he has been developing this for many years and sugar is an expression of everything that has been worked in the last 20 years". Now there are "Sugar parties" all over the place, could be adults and kids, that represent bundles of people interested in Sugar and are passionate about it.

Q12: What do you think of targeting the principals as the first step of an implementation plan?

That model is wrong, because in Gerald's opinion the targeting should start with the teachers. They are easy to reach, from bottom up! Starting that way, rather than the "Soviet approach", will produce results for them.

Q13: How do you reach teachers like you?

They can be reached through mailing lists and through conferences, where Sugar can target those teachers that are interested. For example the NECC (National Education Conference) held in Denver in June. All those teachers like Gerald go there. There is another Canadian conference called “EDUCAN”, held in Philly.

On the other side, Sugar can advertise in magazines (ISTE members of ISTE organization, The National Society of Technology Educators) and through publications, not scholarly journals.

The reason why it is good to target conferences is because the teachers who attend go there on their own time. “These are the people you want! Bring 100 sticks and LET THEM PLAY, invite students to play, or go to a school and videoconference it directly to NECC.”

Gerald already proposed a presentation at NECC in June of next year, where he is going to talk about his dissertation. They invite you to submit a long abstract and then the committee decides whether it is important and worth being a part of the conference.

Q14: How much is Sugar known right now?

“Right now there is Buzz like a good restaurant, teachers buzz a bit about Sugar. It is more like a large party, but not a town, not a society YET!”

“I know teachers would like to participate, get with other teachers”

Appendix IV – Interview with Michael O’Keefe

The Assistant Head of Rising Tide Charter School in Plymouth, MA, October 28, 2009

Rising Tide Charter School in Plymouth, MA is an elementary school for grade 5-8. Students are age 10 to 14. There are three hundred students in the school. Most areas in the US have charter schools. This school started in 1998. The major difference between a charter school and a public school is that charter school doesn’t run off a traditional model in which students go to local schools where they live. In addition, charter schools operate independently. It has its own district. It reports to the state like a district.

Q1. How does the charter school purchase software?

It depends. Although the charter school operates independently, the State can still mandate certain programs. For example, they still follow the State standards for teacher qualification and for standard testing. Sometimes states will provide new technology, but often times those technologies are less than desirable. For example, a few years ago the states implemented math-related software as an online data warehouse. The problem was that it was too basic. It’s not easy to use and therefore the teachers did not see it being beneficial.

Q2: Does a charter school follow MCAS?

Yes, in fact, the charter school is held accountable for the same or even stricter standard than the average district.

Q3: What software or technology does the school use now and why?

As a small organization with about 300 students, we listen to what teachers need and provide resources they need. That may not be the case for bigger school. The technology director is usually the person that comes up with software and tells us what to do with them.

One Laptop Per Child share many philosophies with the school such as be engaged, be curious, be willing to explore. The first thought on One Laptop Per Child is that it is a wonderful supplement to classroom. It is highly individualized.

Q4: What staff development system does the school have now?

The biggest challenge in any business is that there is never enough time. The Charter school is already focusing so much trying to structure things and to provide time. Our staff development is a lot of collaboration with one another. One teacher may initiate ideas related to curriculum/technology/software.

If Sugar were to be implemented, the school will run workshop internally after the school. Either Michael or the technology director will run it.

The staff development is very structured. Teachers get together twice a month for 2-3 hours. Sometimes the training will be as a group. Sometimes it will be split up by academic disciplines, grades, technology, etc.

One thing about implementing new software is to plan far in advance. The school can’t implement anything right away especially once the school year starts.

Another difference between a small and a big school is that a small school has a faster turnaround time. It responds faster to changes than big schools. If Sugar requires tons of

training, it will take longer to be implemented. But if teachers or students can play around on their own, Sugar is more likely to be implemented.

It is important that a teacher takes initiatives. For example, a teacher came up with brain pop (a website) and introduced the website to other teachers. Another example is the type-to-learn. Fifth and sixth graders have a direct instruction on typing once a week. Type-to-Learn is a great program for it.

Q5: What do you think of the idea of having workshops during the summer?

It's definitely possible. We use summer time for some professional development. It is on a volunteer basis. We get people together one week before school. Everyone is involved. We do not have a big budget for it however many teachers are very supportive. On the other hand, we can compensate teachers for a week long institute or workshop. If Sugar only needs a one-week workshop, we can compensate a teacher for it.

Q6: Are teachers encouraged to go to technology conferences?

There are so many conferences out there and we can't afford to have all teachers go. The technology director can definitely go. And a math teacher just went to the math conference in Boston. Teachers have opportunities.

Q7: Which grade is the best to pilot?

For our school, it is the 6th grade because the 5th graders just had the transition from elementary schools where they all sit in one classroom.

Q8: Who should Sugar target, principals, teachers, education technologists?

The answer is different for different schools. For this school, it can be any. Teachers can have this conversation and they will report to us. We will check Sugar out. However, the best way is to go after the technology directors. They have more leadership, specifically technology leadership. The school always listens to their technology director. Teachers are hard because they can be discouraging. Teachers can buy in the idea but feel powerless because schools may not pay for it.

Q9: Does the school have enough computers?

Yes, certainly. There are 150 computers in the school and 2 full labs. Many classrooms have computers. There are no laptop carts. The school only desktop PC's because 1). Laptops are hard to maintain; 2). There is no need to have laptops because there are enough computers in classrooms. Some classrooms have 10 computers. The average class size is 20 students. Meanwhile, the two full class labs are used in a regular basis.

Q10: What do kids do with the computers?

Mostly students have very little independent time in the computer labs. The teachers always have students work on something that is more directly related to the subject. Computers are integrated parts of teaching. Most tools used are Microsoft and web-based games.

Q11: What do you think of afterschool programs?

The Charter school does not have an afterschool program everyday because students have a much longer school day than students from public schools. Students get out at 3:10pm instead of 2:30pm. If they were to expand school hours by adding afterschool programs, parents won't like it.

Michael recommended Citizen Schools. They are afterschool programs in a lot of Boston public schools.

Michael used to run an afterschool program. This kind of program allows students to explore and is extremely desirable for an afterschool setting. There are many teachers who want to work with kids. There are enough budgets for training.

Q12: What classes do you see Sugar being used in?

Michael sees Sugar being used in science and math classes. He sees that the American education system needs to improve on math. The State-average for English is 80% pass rate but only 40-45% for math. Any tools that allow students to practice and engage in math will be great.

Q13: Do you see any pluses and minuses of this program?

Michael needs to really play around and get familiar with the software. He believes that teachers will be able to figure out the software pretty quickly. Unless Sugar is very complex, they can implement it with only some internal training. They will only need one or two people in the school that is professionally trained by experts.

Q14: What do you think of the idea of having college students involved in the training process?

That will be great! Any extra support will be cool. It answers my question on what might be available for ongoing support.

Appendix V- Interview with Robert McKenna

Coordinator of the XO Sugar Implementation, Birmingham, AL, November 3, 2009

“The Birmingham Schools' XO laptops are 15,000 laptop computers designed for collaborative education which are being purchased from the One Laptop Per Child Foundation for use by first- through eighth-graders in ~~Birmingham City Schools~~. In February 2008 Langford created the ~~Birmingham Education Initiative~~, a non-profit foundation that would receive the city's program funds and solicit private donations in order to purchase and distribute the laptops to students and administer the laptop program on behalf of the city. After Councilor ~~Valerie Abbott~~ protested the involvement of former ~~Computers for Kids~~ chair ~~John Katopodis~~ in the foundation, Langford dissolved the group and encouraged the Council to form an independent agency to solicit private donations. In approving the purchase of the laptops in its ~~March 11~~ meeting, the Council declined to do so, instead transferring the \$500,000 from its previously-accepted \$3.5 million budget to the ~~Birmingham Board of Education~~ for technology improvements needed for the new laptops to have internet access.”

(Taken from http://www.bhamwiki.com/w/Birmingham_Schools%27_XO_laptops)

Q1: Describe Birmingham's history and involvement with Sugar?

Robert has been involved with XO because of Caroline. The project was brought to the city by the Mayor at the time who had great enthusiasm for the cause. He was watching 60 minutes and thought Birmingham had similar demographic to developing nations. The town is known for its civil right and the Mayor wanted Birmingham to be the first American city to have XO laptop. He came in the office and convinced the team that everybody needed laptop. In reaction to the presentation, \$3.5 million was budgeted into this program for the first year by the city council out of local taxes fund/city budget. The budget split into \$3mil to purchas15, 000 laptops and \$0.5mil into deployment, training and students. (Get breakdown from Robert)

Everyone had hoped the Mayor would be the spokes person for the XO program in the US. The matter is out of the question now that the Mayor has been convicted for bribery and is no longer the boss.

Q2: How big is your school system? How many students?

The schools involved are all elementary schools in Birmingham. This year, implementation moves to the incoming 1st grade and every new student in the school.

Q3: Please describe the process of implementation of Sugar in your school system? What steps did you go through? What stage are you at in the program?

The implementation took place in one school 1st through 5th grade. Robert did not want to deal with the jealousy of one child having the laptop and another not having it. The XO's were implemented in the spring semester, followed by a full year deployment.

Q4: How much time do you spend using Sugar software per class/per week? Why?

The results have not come in for those metrics yet. During the first year, teachers received out of the box training and not all implemented Sugar regularly. This year, Birmingham will have to create standards organized by the superintendents and principals.

Q5: How many teachers buy into the idea of Sugar initially?

Teachers exhibited some hesitance towards using the software at first until the first day of school when students started asking, "Are you going to give us more homework on the XO?"

Q6: Why do you think some other teachers may not want to try Sugar?

Robert believes some teachers see the computers as a distraction and expect the test scores to go down.

Q7: Has the training changed?

Initially, last year, Birmingham hired Gate 4 Consulting (g8four.com/keep). Julian Daily from the company worked on OLPC implementation from Cambridge and eventually moved down to Birmingham. During the first wave teachers only got 2 hrs of training each.

This year more training is incorporated so that teachers can implement Sugar better into the class.

The second wave of training includes a National Science Foundation grant of \$2mil as well as collaboration with the University of Alabama to track the changes in study patterns.

Training upgrades are still in progress, however, as the school just received the money and hasn't hired a consultant yet. Robert believes Birmingham needs to figure out how to use the money wiser and change training to save teachers time, incorporate better incorporation of Sugar into the curriculum that will leave students more prepared.

Benefits of Sugar should be highlighted: that the homework is pre- corrected saving teachers' time. Training should promote interaction. Teacher can email students help so that feedback doesn't have to wait till next day.

Birmingham has been working with David Zarowin from the Harvard School of Education program WIDE World to help will help Birmingham tailor Sugar to subject. \$850,000 of the second wave money was dedicated to training with David Zarowin and other trainers to develop programs, alter existing curriculum, put it in the computer-computer at home tutor.

Q8: Is there a way to standardize the training methods you have discovered to implement in all elementary school in the US?

Robert believes that that would be ideal. Using their methods they have learned allows the teachers to teach more flexibly and, most importantly, add their own personalities and teaching style to the use of the technology. This will bring them across from the pre-computer mentality to the second-nature of computers their students feel.

Q9: What process do you use to measure the success of Sugar software?

The metrics to come are being tracked by University of Alabama (UAB.com). Another grant allowed them to conduct a study of student and teacher behavior before the XO implementation with set criteria. The effect of Sugar on study patterns, parent/student interactions, and homework time should be witnessed later on in the study.

Appendix VI – Interview with Barbara Vincent

Assistant Head of the Meadowbrook School of Weston, MA, November 13, 2009

[Introduction to Sugar]

The school is currently integrating social networking.

Q1: How did the school start XO?

The Meadowbrook School was involved with the first generation XO. One of the teachers instituted it. In fact, several students designed a video. There problem with Xo is that there is no power. There are so much free software out there right now that the school don't for any more. The XO software cannot provide many functions such as videos.

Q2: What kinds of schools would Sugar fit in?

Barbara envisions schools in third world countries, such as Israel and Afghanistan. Sugar is a cheap and relatively easy way to start students. A good marketing for sugar is to become a place with cheap access to the Internet.

Q3: Did you remember the cost of owning the XO laptops?

The laptops cost \$200. Barbara does not remember the exact cost. But it did take hours of training. For example, even though she is quite technology oriented, Barbara could not open the XO. It was a student who showed her how to open it.

Q4: How do teacher react to new software in general?

There is a huge difference between independent school teachers and public school teachers. At Barbara's school, teachers go to summer school program and get pay \$100/day (limited to 10 days). There will be a program starting this summer that pays teacher a lot more than \$100/day. However, teachers have to apply with a proposal on how they look at 21st century skills as well as new ways to teach school curriculum. It is a one week long program. Teachers collaborate with others. They are also encouraged to bring in experts from outside.

Q5: How does new software get introduced in your school? How do software companies approach the school?

Everything at the school come from bottom up not top down. They have tried the top down approach and didn't work. In terms of how software gets implemented, Barbara gives an example of a new program call "Fraction Nation." She will probably look at the program and evaluate the cost. She will introduce the software to her class (she teachers 5th grade). Then she will go to 5th grade teachers and say to them, "oh my god, you are not going to believe this." Otherwise, she will send the software back and do nothing with it.

Q6: Why didn't the top down approach work?

Especially in independent school, the top down approach won't work because teachers have control. In terms of change, if a teacher doesn't want to change, she will not. For example, there is a teacher who is terrible at adapting. It took Barbara two years to get a new program to the teacher's classroom.

Q7: What do you think of a misconception that young kids are not good with technology?

That is wrong. There is program called “Jelly Frog” that every letter has a signal. “S” is snake. When they go to computer room, the teacher says, “let’s do your name”. For a student name Sally, she will be “s” and she will know to draw a snake.

Q8: How is technology integrated in curriculum?

It’s a moving target. For JK 1-2 students, they only use computers during computer classes. For JK 3-5 students, the technology is semi integrated. There are 40 apple laptops that can be used in class periods to take test and do word processing (typing). The school itself provides dual platforms (Apple and Windows).

Q9: Why dual platform?

The school believes that they have no idea in the next 5 years which platform will dominate -Apple or Windows. Therefore, they prepare kids for both. When kids do real database work, they use Windows. When they do arts, they use Apple.

Q10: How is the social networking implementation?

The reason that the school decided to start integrating social networking software is that they see a need for a more effective communication between teachers and parents. Right now, they are figuring out the consequences of open communication between parents, students and schools. The school definitely wants to use social networking software but don’t know how. Next Friday there will be a dialogue among teachers.

The school tries not to introduce software but instead, listen to faculties and their frustrations. Social networking is brought up because there have been a lot of concerns expressed by faculty in communicating with parents. The school wants to do it right and safely. Barbara thinks that this particular software may be right, so she goes to the faculties. She asks, “what do you think of this?” Because the request comes from faculties, it is a lot easier for the software to be implemented.

Q11: How long does it take for implementation?

If software is as good as it claims, it can be implemented over night. She would start with a pilot for 2 weeks.

At the school, it is usually the case that teachers will people come to her and drop articles on her desk. Teachers are anxious to find a better way to teach their students.

Appendix VII – Interview with Rob Stergis

ESL Coordinator in Watertown, MA school district

Q1: What was your first impression on Sugar?

My first impression was that the program has considerable educational potential.

Q2: What would it take for *Sugar on a Stick* to successfully implemented in the Watertown school system?

Successful implementation in Watertown Public Schools would involve sustained professional development and carefully planned implementation.

Q3: What would be the three biggest potential obstacles for *Sugar on a Stick* to be implemented?

Obstacles would be insufficient training and follow-up support, perception of staff that the program is not valuable or worth the time and commitment to learn and implement.

Q4: What kind of training do you think teachers at your school need?

Staff who will use the program will need a series of workshops, online support and follow-up assistance in the classroom.

Q5: Any additional comments and suggestions?

I am interested in learning more.

Appendix VIII - Phone Interview Cold Calls

Anne Sudbay: Lowell Instructional Tech Teacher, Watertown, MA, November 13, 2009

Q1: What was your first impression on Sugar?

She liked the applications and the amount of resources sugar is able to give. The Watertown school system has a lot of hardware, but not so much software. She like that Sugar is free and is customizable for students.

Q2: What would it take for *Sugar on a Stick* to successfully implemented in the Watertown school system?

The Watertown people need to first get familiar with the program, and most important find ways to connect Sugar with the curriculum.

Q3: What would be the three biggest potential obstacles for *Sugar on a Stick* to be implemented?

Any implementation is hard. Sugar is so different. Finding the right curriculum connection is crucial. Second, although Sugar doesn't require a lot of financial support, it is important to make sure all students have a stick. Finally, the school needs to make sure that Sugar has all the technical supports. All technical issues need to be addressed.

Q4: Any additional comments and suggestions?

Nothing is done since the Lowell Library meeting. At this moment, Superintendent Ann Koufman is putting together a team of teachers to do more research on Sugar.

Michael McDermott: *Vice-Headmaster, Watertown, MA, November 13, 2009*

Q1: What was your first impression on Sugar?

Sugar is very interesting. It is certainly a tool for young students. He is not sure how Sugar will work for secondary schools.

Q2: What would it take for *Sugar on a Stick* to successfully implemented in the Watertown school system?

He is not sure the overall plan, but he thinks that Superintendent Ann Koufman will put the plan together.

Q3: What would be the three biggest potential obstacles for *Sugar on a Stick* to be implemented?

The biggest obstacle is financing the program. But Watertown will be fine because Superintendent Ann Koufman is very supportive. He is not concerned about teachers because he believes if teachers get enough professional training, they will be fine.

Q4: What kind of training do you think teachers at your school need?

He values the 1 / 2 / 3 hour training that demonstrates Sugar, similar to what Walter did few weeks ago. He is not sure how much training teachers will need because he is not a user.

Q5: Any additional comments and suggestions?

N/A

Appendix IX – **Summary of the Lowell School Principals’ Meeting**

Watertown School Principals Meeting: Walter Bender’s Demonstration for School Principals in Watertown, MA
3pm – 5pm 10/27/09
Lowell School Library

Ann Koufman, Walter Bender, 17 School Principals and teachers and technology educators; Wei Lin and George Lee (observers from Babson College)

Attendee introduction:

There were 18 people attending the meeting from the Watertown School District. There were nine Principals in the meeting, one Director of Athletics, one Music teacher, one Headmaster, one Director of Business Service, one Second Language teacher, and two technology educators.

Walter’s Pitch:

“Computation should be on every child’s low shelf.” His goal for Sugar Labs is to give everyone the opportunity to live a rich life. This can be accomplished through a free software platform that facilitates exploring, collaborating and reflecting. The dream is to have high school kids write programs for elementary kids. In a few years, elementary kids may be able to write these programs themselves.

Sugar empowers students to “learn to learn,” “a creative society” (for example the music program), “guided discovery,” “get kids to debug and problem solving” and “modifying physics.” Sugar is easy, cheap, and low risk. It also allows students to collaborate (similar to Google dots).

Walter then demonstrates turtle art. It came from Logo.

The latest version of Sugar on a Stick is called “Strawberry”. In a month, the Blackberry version will be introduced. By the spring of next year, another new version will come out.

Attendees’ Exploring Sugar:

Walter then encouraged all meeting participants to begin “playing” with Sugar to explore its features. Some of the activities that attendees tried were the Journal, the Puzzle, Turtle Art, Speaker, a math game, and a basketball game.

They were all interested and were very engaging.

Walter talked with three teachers about how Sugar can be used in a language class. There is a team in Sugar that translates languages. Walter suggested that the students from different language classes can be part of the team. Meanwhile, students can play with the memory game (teachers create them on their own). They can also play with turtle art.

They could use turtle art to create a map of Watertown.

One high school teacher thought that Turtle Art was too complicated. Especially for high school students when they have been using Microsoft. Walter responded by saying that it is not an “either-or” – Sugar Labs and Microsoft can be used together. They are both tools for students. In fact, if students master Sugar activities, Microsoft will be easier to manage.

Teachers’ Feedback:

They thought Sugar is very inspiring. These different games gave them many ideas for classroom teaching. They especially liked the story recording, MaMaMedia, Puzzle Maker, Scratch and Journal.

The group discussed possible next steps. First, they need to find a small group of teachers to play with it and further explore its possibilities. Then Sugar can be run as a server for students to log into. Sugar can also be run inside Windows but it will not run as efficiently. In addition, Watertown can make Sugar as *the* server on the computer (as a side note, there are 22 Apple computers in the nearby computer lab).

For Mac system, the newer computers will run Sugar just fine. But the older versions (based on the PowerBook Motorola chips) can’t. However, Sugar can be run in a CD (with a drawback of no journal entry for students).

The software update aspect of Sugar is very easy.

Walter also demonstrated the Calculator. He showed how the calculator can be used to plot graphs.

Ann Koufman discussed with one language teacher, Rob Stergis, about whether Sugar will be good for K-6, K- to 12, or grades 8-12. Sugar is essentially replacing the wide, large screen with small, personal computer screens.

Later during the meeting, a teacher approached me and told me that he was very impressed by Sugar. However, he and the rest of the team needed more time to learn about Sugar.

Ann also suggested first introduce Sugar to the Summer School (K-12) program. There will be 40 teachers, many of whom also teach during the regular school year. They are the ones that are willing to try new things.

Good Follow-Up Contacts

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Appendix XI - Excel Spreadsheet Analysis of Interviews

| | Caroline Meeks | Ann Koufman | Gerald Ardito | Michael O'Keefe |
|------------------------|--|--|--|--|
| Sugar Advantage | 1. Sugar's differentiation and classroom experience; 2. Capability to work with disability and different learning styles; 3. Extending time spent on homework by students; 4. Assisting teachers on teaching standards and tests; 4. Providing students 21 st century skills. | 1. Its ability for student to network and play educational games; 2. Journal and different languages | 1. The organization of games and the idea of having more collaboration among students; 2. Interested in what Sugar is trying to be accomplished; 3. Sugar on a Stick is a solution-kids can take Sugar home; 4. Sugar on a stick flies; 5. Education games: turtle art, Etoy, scratch are very challenging; 6. Sugar serves as an assignment tool. It's an affective and engaging way of teaching. | 1. A charter school shares the same philosophy: be engaged, curious, exploring; 2. Sugar is a great supplement to classroom; 3. Sugar can improve science and math scores. |
| | Robert McKenna | Barbara Vincent | Rob Stergis | |
| | 1. Efficient Interactive Process; 2. Kids come to class more prepared; 3. Computer becomes a learning tool rather than an electronic writing device; 4. Pull out your XO and kids are focused immediately. Great way to keep kids interested and so they do their assignment. | 1. Integrated Social Networking; 2. Good platform for using; 3. Involved with first version with OLPC. | 1. The program has considerable educational potential | |

| | Caroline Meeks | Michael O'Keefe | Gerald Ardito |
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| Sugar Disadvantage | 1. Sugar lacks of traditional content; 2. Sugar requires much longer training than other programs; 3. It is hard to get students use Sugar on a Stick at home. | 1. Sugar is complicated. It will take a long time to train teachers. | 1. Kids seems to love laptops more than the program itself; 2. Teachers can't use Sugar for video and audience podcasts - can't import video-in certain sense it is a step down; 3. Sugar is missing a collection of best practices and lessons plans. |
| | Robert McKenna | Barbara Vincent | Rob Stergis |
| | 1. Teachers are afraid that computers distract students and take away class time. Teachers' biggest priority is to keep students' test grades up. | 1. There is no power in the XO's because it does not have video or advanced features. 2. There is so much free software out there right now. | Obstacles would be 1. insufficient training and follow-up support, 2. perception of staff that the program is not valuable or worth the time and commitment to learn and implement |

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| Teacher Training | Caroline Meeks | Ann Koufman | Rob Stergis |
| | 1. A manual such as the one made by a woman in Peru is great; 2. One day of personal training, 12-14 weeks of online training (10 hours every 2 weeks); | 1. Teachers have one year long TIP training that has 15 to 20 mini courses. 2. Teachers at Watertown meet face to face and online and have been using online technologies; 3. Teachers should teacher each other. | 1. Staff who will use Sugar will need a series of workshops, online support and follow-up assistance in the classroom. |
| | Robert McKenna | Barbara Vincent | |
| | 1. First year, Birmingham spent 2 hours of training on each teacher. This year, teachers will get more training. 2. Kids and parents are enthusiastic and ask teachers to do more. | 1. At my school, teachers are paid \$100 per day during the summer; 2. There is a program this summer, and will pay teachers a lot more; 3. Teachers need to apply with a proposal. 4. Schools look at 21st century skills and new ways to teach; 5. Trainings are usually one week long. | |
| | Michael O'Keefe | Gerald Ardito | |
| 1. Teacher development is based on collaboration with one another; 2. Staff development is very structured. 3. Teachers get together twice a month for 2-3 hours. Sometimes it will be split up by academic disciplines, grades, technology, etc; 4. It will be good to run a workshop internally after school by Michael or the technology director; 5. Summer training is on volunteer basis, but school can compensate teachers for a one-week workshop. | 1. Students learned to re-image laptops. 2. Gerald decided to hire a consultant called Teaching Matters. The company has been working with 3-4 schools in New York. They have done more training with XO than any other groups in the United States; 4. He sits with teachers one-on-one or two-on-one during their prep periods. Teachers present problems and Gerald provides technology solutions; 4. Gerald also goes to classes and acts as an extra adult. | | |

| | Caroline Meeks | Ann Koufman | Gerald Ardito |
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| Biggest Potential Obstacles | 1. One biggest lesson from Gardner Pilot Academy is that content on Sugar is too hard to align with teachers' curriculum. Because there is no linkage, teachers don't use sugar effectively | 1. Things to figure out before implementation are: what activity should the Pilot program focus on? What is a good pilot subject or grade? | 1. Sugar requires a lot of enthusiasm from teachers. Teachers don't consider themselves great with technology; 2. For now there is no structure in the training; 3. Kids can't take laptops home; 4. Last year, the way technology is pushed in classrooms was that technology dominated the curriculum. It created a burden on teachers. |
| | Barbara Vincent | Robert McKenna | Michael O'Keefe |
| | 1. Teachers are ready for technology, but there's a lot of free technology already in existence. | 1. Sugar needs to show teachers how to integrate Sugar into curriculum; 2. This is going to be a challenge. Sugar has to integrate because students have to meet test scores. | 1. The charter schools follow stricter standards regarding MCAS scores; 2. There is never enough time; 3. Schools can't implement anything once the school year starts; 4. Teachers are good entry points for Sugar. However, they can be powerless in the school system. |

| What Would It Take to Implement Sugar? | Caroline Meeks | Ann Koufman | Gerald Ardito | Rob Stergis |
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| | 1. Sugar needs to be comfortable for students and teachers to use; 2. There needs to be a sufficient market share and brand recognition; 3. Sugar needs to align with teachers' curriculums; 4. Sugar needs support from top and bottom of a school system; 5. Parents and principles are good ways for Sugar to approach a school system | 1. Third grade is the best grade to do pilot on; 2. Sugar needs to be constructive, fun, subject related, make math and programming fun. | 1. There are two things that people need to be aware of: professional development and equipment; 2. It is difficult to implement Sugar in a large district with thousands of students. 3. Questions to ask the school are: do they have computers, do kids have computer at home, do kids know how to boot up the stick at home? 4. Professional development is a time issue. 5. Sugar needs to figure out funding. | 1. Successful implementation in Watertown Public Schools would involve sustained professional development and carefully planned implementation |
| | Robert McKenna | Barbara Vincent | Michael O'Keefe | |

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| | 1. Sugar needs to standardize the training methods; 2. Teachers need to be able to add their own personalities and teaching styles to the use of Sugar. | 1. Sugar is only good for an underdeveloped area that does not have resources. | 1 Charter schools listen to what teachers need; 2. Teachers are good approaches to a school system; 3. Plan in advance; 4. Besides training, teachers can teach other teachers; 5. For our school, it is the 6th grade because the 5th graders just had the transition from elementary schools where they all sit in one classroom. | |
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| Additional I Comment (a) | Caroline Meeks | Ann Koufman | Gerald Ardito | Rob Stergis |
| | Allston Gardner Pilot Academy doesn't go well because: 1. non-profit approach is not good; 2. the school is resistant to change; 3. there are a lot of problems with Strawberry; 4. teachers are not given administration support; 5. teachers don't have time to use Sugar. | 1. 80% of the teachers at Watertown are willing to try new technology and are not resistant to integrate technology into their classrooms; 2. Ann does not know how much training is needed for Sugar. | 1. Teachers have millions of ideas on how to use Sugar. They have a blog on line. | 1. Rob is interested in learning more |
| | Michael O'Keefe | Robert McKenna | Barbara Vincent | |
| | 1. Michael recommended Citizen schools. They are afterschool programs that allow students to explore. There are many teachers in afterschool programs who are willing to try new things and have enough budget for training. | 1. It is important to measure progresses. | 1. There is a huge difference between independent school teachers and public school teachers. Sugar will have a hard time selling to US private schools. | |

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| Additional | Caroline Meeks | Ann Koufman | Gerald Ardito |
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| Comments (b) | 2. Sugar needs to find a way to translate the success with Ann Koufman to other superintendents. | 1. Implementation steps: a. intro to Superintendent; b. intro to innovative teachers; c. Walter and Ann conspire; d. small planning; e. overview for principles. F. in-depth investigation by education technologists; g. plan; h. begin messing around with the technology (students and teachers) | 1. Sugar can definitely be used in afterschool programs. Gerald planned it once. Six out of the 140 student came to the program. It was not successful because students have other after-school activities. Sugar can be a good program to do during lunch. It's informal and fun. However, students will need to give up their lunches. |
| | Michael O'Keefe | Barbara Vincent | |
| | 1. Charter schools respond faster to change than normal public schools and therefore, are easier to target; 2. It is best to go after teachers, especially technology education teachers. | 1. Philosophy: so often people say kids are not developmentally ready. That is wrong. If we find way to educate students by using different technology, we can speed up curriculums. | |

| | Ann Koufman | Gerald Ardito | Michael O'Keefe |
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| Additional Comments (c) | Ideas for Sugar: 1. TIP; 2. After School; 3. Summer program; 4. Task Forces; 5. advance Armenian class; 6. Foreign languages; 7. a class that Ann teaches at Harvard. 8. Robotic and engineering class; 9 TIP for music teachers | 1. Sugar should start by targeting teachers and going to conferences; 2. Teachers' time are split into three parts: time with students, time with other teachers planning, and time alone doing their own teaching period; 3. Potentially, teachers can be compensated by professional development credit and salary. | 1. American education system needs to improve on math. Any tools that allow students to practice and engage in math will be great. |