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Proposal for the Creation of Roadmaps and Training Materials for Free and Open

Source Transitions Among Public Schools

1. Introduction

1.1 Background.

      In lieu of the recent economic downturn, public schools throughout the country are

suffering. Now, more than ever, schools are faced with heavy budget cuts that cause

districts to find new ways to "trim the fat." The traditional ways of cutting public school

budgets include laying off teaching professionals or cutting the arts, sports or other extra

curricular programs. However, there is one expense the majority of school boards don't

consider when thinking about ways to save money: software licensing. Schools today spend

millions of dollars to license software from proprietary vendors such as Microsoft and

Apple (*3, 5, 8)*. These expenditures go to paying for individual copies of products like

Microsoft Windows, Microsoft Office and Mac OS X for computers in labs and classrooms.

By moving to free and open source software (FOSS) public schools can redirect vast

amounts of precious funds to important expenditures like funding teacher's salaries, the

arts and sports programs.

      To exemplify the vast sums of money being spent by public school districts on

proprietary software products, refer to the Douglas County School District's technology

budget. This district, located in the South Denver suburbs, consists of more than seventy

schools and has a total budget of about $15 million (*3*). Of that $15 million, about $8 million

is reserved for technology and software licensing costs (*3*). Simply put, the Douglas County

school district spends *over half* of its budget on technology and software licensing. These

expenditures do not cover software upgrade fees, only maintenance of systems that are

already in place. Take, as a secondary example, the public school system in Portland,

Oregon. This district disclosed that the cost of software license upgrades district-wide

equaled more than the annual salary of ten full time teaching professionals (*6*). Especially

in the current economic climate, the trend of spending exorbitant amounts of money on

proprietary software must change sooner rather than later (*2*).

1.2 What is FOSS and will it still prepare students for computer use in the 'real world'?

Free and open source software is typically created by a community of programmers

who believe high quality software should be available to the public for little or no charge.

Free and open source software developers also believe that software should be malleable –

that is that the code of the program can legally be altered to fit the individual needs of the

end user or users (*10*). These communities of programmers volunteer their time working

on projects like Edbuntu (a free operating system tailored for educational uses) and

OpenOffice (an office suite similar to Microsoft Office.) The projects are then distributed at

no cost to the end user. While the free software might look somewhat different than their

proprietary counterparts, their general functionality is largely the same and cross

compatibility is usually standard (e.g. OpenOffice documents can be opened in Microsoft

Office and vice versa). FOSS has been widely adopted among European school systems, but

its use in the United States today remains minimal (*4, 6, 8, 9)*. This is likely due to parental

concerns that FOSS will not provide their children with the skills needed in the 'real world' (*9*). Today, however, computer use is largely standardized. Though software or operating systems might look slightly different, the deeper concepts that underlie utilizing software products are incredibly similar.

Technology is always changing and public school systems should produce students who are computer literate – not literate at just one specific version of one specific program. According to Bryan Pfaffenberger, a technology and education guru, computer fluency is "a robust understanding of what is needed to use information technology effectively across a range of applications" (*8*). For example, instead of simply memorizing the screens associated with creating a graph from a Microsoft Excel spreadsheet, students should learn the concepts they're applying to carry out that task. Does the student understand what a cell is and how they're inputting information into them in the spreadsheet? What's the difference between a cell and a spreadsheet anyway? These higher-level concepts are much more important than memorizing the screens and 'what to click' in a specific version of a specific software product. Pfaffenberger argues "the pace of technological innovation in today's software industry is so rapid that the 'which-button-to-press' training students receive will be laughably obsolete by the time they graduate" (*8*). Thus, public schools can serve the goals of computer literacy education equally as effectively, if not better, by migrating from proprietary to FOSS (*9*).

1.3 Lack of sample roadmaps and supplementary information to assist in transition.

Though parental concerns have played a significant role in preventing the widespread transition from proprietary to FOSS, the lack of sample 'roadmaps' (discussed

below), supplementary training materials and positive publications about schools that have made the transition have also undoubtedly played a role in preventing widespread transition among public schools. A simple search on the World Wide Web clearly shows the lack of freely available information relating to the transitional process. The creation and free distribution of these materials would certainly assist public school districts in making informed decisions about whether the transition from proprietary to FOSS is right for their district, taking into account their unique needs and expectations from a technology program.

The next sections will explore several crucial materials needed to provide clear information relating to transitioning from proprietary to FOSS among public school systems. First, I will explain the need for clear roadmaps laying out the stages of transition most public schools would experience after choosing to transition. Second, I will explore how the creation of freely available video skill sets explaining how to utilize FOSS will benefit schools during important transitional phases. Lastly, I will explore the possible broader implications related to the creation of the proposed materials.

2. Proposal for Creation of Transitional Roadmaps and Supplementary Educational Materials

2.1 Creation of Sample Transitional Roadmaps.

A sample roadmap clearly explaining the transition from proprietary to FOSS would help school districts understand the transition process from its first day to the maintenance of the system several years after the initial transition has been made. This would aid public school districts in ensuring that the transition process occurs as smoothly as possible. The roadmap will also attempt to limit disruption of 'business as usual' throughout the entire process. It is common for school board members to be versed in fields other than technology, so making informed decisions about FOSS computing models is often impossible. Therefore a clear roadmap explaining timeframes, estimated associated costs and common problems likely to be encountered throughout the transitional process would help clarify the process to school boards interested in changing their information technology model to FOSS.

The proposed roadmap would start with a relaxed initial transition of computer labs and other less crucial computing services to FOSS. By easing administrators, educators and students into the new software, the transition is likely to be more successful than if all computing systems were suddenly transitioned to a FOSS model. This relaxed transition would allow both the proprietary and FOSS model to operate somewhat simultaneously for the first academic year, and ensure that 'business as usual' is not significantly disrupted. However, during this time, all proprietary software begins to be phased out. This would mean that no upgrades would be done to proprietary software and any such requests among staff would be transitioned to FOSS, not any other form of proprietary software (to alleviate some of the costs associated with running both models at the same).

The first year will be incredibly important to new and existing IT professionals allowing them to become familiar with free and open source computing models. The initial

migration of non-crucial 'backend' hardware will also allow these IT professionals to gain

firsthand knowledge with problems that might be encountered while having little effect on

the day-to-day operation of the district's computer resources. The availability of video skill

sets (discussed later in this proposal) and experienced training personnel will be crucial

during this period. During this first year, the transition of non-crucial computing services

would be coupled with voluntary transition of educator's machines. This would allow

school districts to beta test software critical to the educator's job (e.g. gradebook and

attendance software) among educators willing to try something new. Not only would this

give IT professionals experience with the software that will be used by all educators later in

the transition, but it will also allow other teachers (those who do not volunteer) to see their

peers working with the software they will eventually be migrated to.

The first year of this roadmap will clearly show schools how to make the first steps

towards migrating to a FOSS computing model without completely 'taking the plunge' so to

speak. If, after the first year of the transition, the school district determines that FOSS is not

right for their unique needs, a transition back to their existing proprietary models can be

accomplished with little hindrance. However, if the relaxed transition goes smoothly, the

district can easily continue with the full-fledged adoption of FOSS.

The roadmap for the second year of the transition will attempt to completely phase

out all proprietary software being used by the district (ideally during summer when there

is time to make the widespread changes needed to accomplish said goal). At this point

students, some staff, and all IT professionals have had two full semesters to familiarize

themselves with the new software. Throughout the coming year, the roadmap will express

the need for full-time support staff and training videos to ensure the transition occurs

smoothly. The availability of these support materials will be crucial to the success of the transition during this year. Also, the roadmap will attempt to familiarize all applicable users of the wealth of knowledge available via the FOSS community of developers and support professionals. The roadmap will detail all aspects of the transition occurring during that academic year and will also try to address common problems that might be encountered during this highly important stage in the process. Ideally, by the end of this academic year, the school district will have completed the bulk of the transitional work.

After the second year of transition, the roadmap will provide sample maintenance and software/hardware upgrade schemes to keep the computing model operating efficiently for the district and all applicable parties. The roadmap will provide these samples for three to five years after the initial transitional period to ensure that the district's IT staff can successfully continue this trend into the future. Not only will this portion of the roadmap provide these sample schemas, but it will also reiterate the importance of sticking with FOSS into the future. If a school district stops paying proprietary software companies it is likely that these companies will do everything in their power to gain the district back as customers. The roadmap will educate school boards about these attempts by proprietary companies and explain the long-term benefits of staying with a FOSS computing model.

2.2 Creation of Freely Available Supplementary Educational Materials.

During the initial transitional periods the availability of high quality training materials will be crucial to the success of the transition (*7*). Under the model proposed by the sample roadmap (discussed above) students, staff and teachers will have access to on-

site training and support as well as on-demand tutorial clips and video training sessions during the first two years of the transition.

IT professionals at each respective public school, per the roadmap, will provide on-site training and support throughout the transition. These employees will gain understanding of the new software and hardware through several different channels. First, the roadmap will explain the benefits of having formal Unix administration certification and will strongly recommend that all IT professionals working for the district take a course in Unix administration. There are countless online and in-person resources to achieve this certification. Having this skill set will be necessary to adequately maintain the new software and hardware products (and useful for the IT professionals throughout their career). In addition to the formal training gained through Unix Administrator certification, IT professionals will gain first-hand experience using FOSS and hardware during the first year of implementation (the relaxed transitional period) and from video tutorials tailored to IT staff. These videos will explore important maintenance and support standards that will be useful before, during, and after the initial transition period. These videos will also expose IT professionals to the exceptional community of FOSS developers and the additional support resources they are able to provide. By the end of the Unix certification process, the video training classes, and the first year of transition IT professionals should be ready to provide exceptional training and support to students and staff.

In addition to videos for IT professionals, this proposal funds the creation of training videos tailored to students and staff. These training videos would be offered in two flavors: short video tutorials and longer video training sessions. The short clips will explain how to use software that all students and staff most likely use on a day-to-day basis like email,

office suites, and Internet browsers. They also will teach users standard tasks, such as how to install a program or print to a shared printer. These short clips will ideally be used as reference materials if a user runs into a specific problem. The longer video training sessions will go in-depth into topics that interest both students and staff. Special training sessions for educators will familiarize educators with crucial software packages (like gradebooks) and also provide suggestions for how to better integrate technology into their classes. Examples of these video training sessions include how to use a particular free and open source scientific program in a chemistry lab or how to use a 3D animation program in a technology classroom setting. The video tutorials will also cover programs that might be interesting to students, like a game development language or a free and open source photo manipulator. In conjunction with free video hosting websites, like YouTube, these educational materials would be available on-demand, 24 hours a day 7 days a week. The availability of high quality materials, such as those that would be created by this proposal, will be crucial in making the transition from proprietary to FOSS as smooth as possible.

3. Plan of Action

3.1 Funded Researchers

One of the biggest benefits of working in the realm of FOSS is the community of developers working with FOSS projects. Because of the availability of knowledgeable individuals worldwide who will likely be willing to work on a project of this type for free, this proposal only requires funding one full-time employee, Ben Limmer. Mr. Limmer has worked for multiple high-profile FOSS projects and has connections to other important FOSS advocates and advocacy groups. He also has extensive knowledge in the realm of training and

documentation, especially the creation of video documentation. In conjunction with the FOSS community, Mr. Limmer will be able to produce the proposed materials in the timeframe discussed below.

3.2 Proposed Timetable

First two months:

Gather information about a wide variety of proprietary computing models in schools throughout the United States, for use in creating effective sample roadmaps. Also probe FOSS community with regards to the project.

Months two – six:

Take gathered information and create several sample roadmaps. Involvement with the FOSS community will be very important during this time (for comments and criticism). As roadmaps become available they will be offered for review among the schools studied in the first two months. At least half of the roadmaps will ideally be completed by the end of this period.

6 months – 12 months:

Release completed sample roadmaps. Gather and respond to comments on the samples, making changes as needed. During this time, follow several schools that utilize the roadmaps and create video skill sets tailored to these schools needs (as they will likely work well with other transitioning districts). Release videos to YouTube (or other free hosting website) as they are finished. Gather and respond to comments on the videos.

12 months to 18 months:

Continue working on any materials that are not completed by this point and gather and respond to comments from FOSS community and school districts using the materials. Update roadmaps and videos as needed. This time will also be used to promote the new materials among FOSS community members and school districts.

3.3 Broader Impacts of Materials Created by the Proposal.

This proposal has widespread consequences aside from the creation of materials to assist public schools in the transition to FOSS. In addition to the concerns discussed previously, another major roadblock in the widespread adoption of FOSS in public schools is the lack of positive public relations materials that expose the successes of schools that have made the switch. Rather than simply focusing on the direct fiscal savings for schools, more published information on implementation studies are necessary (*5*). Such studies will allow public school districts to analyze the pros and cons of moving from proprietary to FOSS. These studies will also provide educators and administrators with information "from the trenches" to assist their final decision on making the switch (*5*). As schools utilize the materials created by this proposal, it is likely that transitions to FOSS will occur more smoothly and therefore more schools will stay with the FOSS computing model. The first districts to choose to adopt a FOSS computing model will provide perfect study cases to further examine the long-term impacts of switching to FOSS. Moreover, assuming the proposed materials allow public school districts to easily and successfully transition to FOSS computing models, a plethora of positive public relations materials will likely spur interest in FOSS among other governmental institutions and consumers alike (*1*).

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