

Suggested Outward Facing Technology for Regional School

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January 30, 2010

Executive Summary

Excellence in education is the focal point of the new regional school. Administrators and teachers are select upon his or her credentials. Another consideration is the ability to convey learning objectives to students. The students in turn convey the message to the community. Technology is developed and deployed to support learning objectives.

Outward facing technology (OFT) is the information system used by the school to convey learning objectives outside the physical building. The new regional school requires OFT to:

- Support Catholic identity and community activism.
- Provide communications to staff, students, parents, and general community.
- Expandability as requirements grow.
- Bring school into alignment with other school systems.

The goal of OFT is to identify school requirements, and not create an additional cost center. Many schools consider a website as the only method for OFT; however, those schools fail to realize a website is only a small part of OFT. I propose we take the technology to the level of many colleges and universities, but at a fraction of the costs associated with standard consulting organizations.

We will be able to re-cover the costs for this information system the first year. Community resources will provide the technology development and maintenance component. LAMP (Linux, Apache, MySQL, PHP) technologies will provide the software cost reductions we require, while maintaining W3 Consortium requirements. The entire OFT package is documented for current and future administrators and teachers. Costs are recuperated through area business sponsorships.

Outward Facing Technology

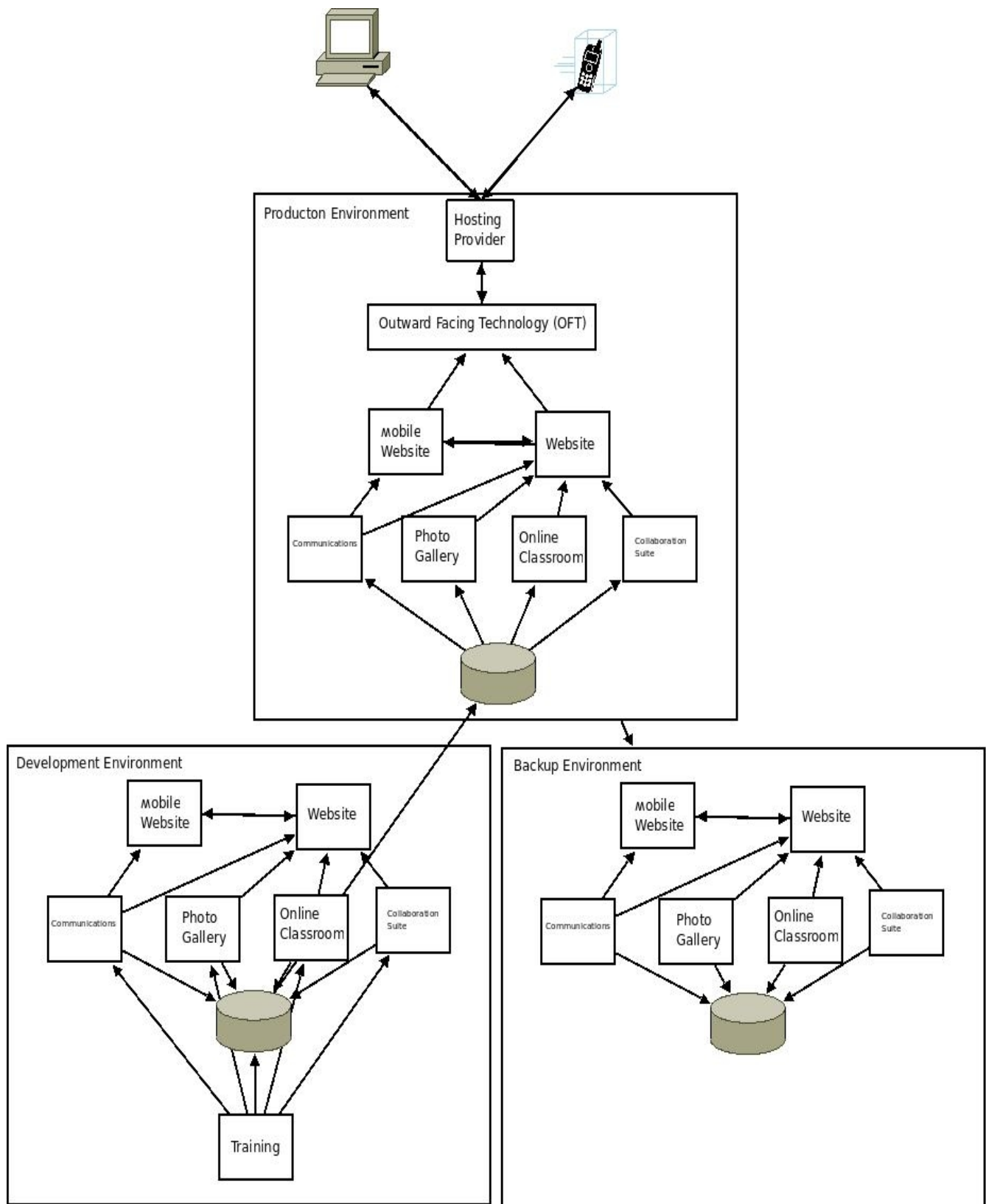


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Suggested Outward Facing Technology for Regional School

Analysis

Organization's require information systems. Organization information systems vary in complexity from a human resources information system (HRIS) to a library's card catalog. Regardless of complexity, all information systems require an analysis by the organization. Concerns include cost (implementation, support, and training), system development life cycle (SDLC) and user acceptance.

Cost Concerns

Cost concerns encompass all aspects of the information system: hardware, software, and human. Failure to address cost concerns result in a failed information technology (IT) project. Analyzing cost concerns will also establish time-lines for the project. Procurement of resources require time. The human resources concern will require a higher degree of time if the project relies upon talent mining and implementation.

Hardware Cost Concerns. Hardware cost concerns relate to the physical platform hosting the information system. The two platforms are physical and virtual. Physical platforms require the acquisition and implementation of a server on the school premises. Virtual or cloud computing is the acquisition of shared physical resources. Sharing physical resources has benefits.

Shared resources are acquired through a website hosting plan. The hosting plan is responsible for the physical server hardware costs. When a hardware component fails, the hosting company incurs the cost-of-repair. Hosting companies will also perform hardware upgrades to both the BIOS and firmware in a timely manner. Functional specialization results in little down-time for the client.

A drawback to cloud computing are the increasing costs associated with the hosting company's increasing costs of business. The primary concern with cost increases are government regulation,

hardware costs, bandwidth costs, and labor costs. Cost increases are disseminated to the clients.

Here is an article examining the cost concerns between physical servers and hosting plans:

1. Price of Server: Maintaining a reliable website on your premises requires purchasing a reliable server with a service plan. Remember down-time is money. Approximate cost: \$2,500.
2. Price of Bandwidth: DSL is not the method for supporting a reliable website. People do not realize it is not the downstream that matters, but the upstream in regard to website hosting. The upstream is the bandwidth the website viewers use to download your web page into his or her web browser. Approximate cost: \$50 per month.
3. Electrical and Environmental Considerations: House or apartment electricity is not meant to run a server. Servers require more power than your circuits can provide. In addition you will need to purchase a UPS and a room air conditioner to maintain the humidity and temperature in the room. Approximate cost: \$30 - \$50 per month electric.
4. Security Concerns: You are responsible for your own security of the information on the server. You will be required to purchase liability insurance.
5. SSL Certificate: You will need to purchase a secure socket layer (SSL) certificate and install the certificate if you want to open a web store because you need to ensure the security of customer and payment information.
6. Your Time: Yes, you will need to spend several hours each week performing maintenance and upgrades. So instead of concentrating on your e-business you will be burning the midnight oil maintaining your server. Ask yourself this question, "When was the last time you cleaned up the hard drive on your PC or replaced a component?" (Website Hosting, M. Kniaziewicz, (2009))

Software Cost Concerns. Major concerns for any new or existing regional schools are associated costs with the implementation and development of OFT. OFT should not cost the organization one cent. Your customers exist within proximity to the school's location. Unless your website is generating revenue through direct sales, you should not pay a consulting company or purchase fancy web-based software.

Consider open source software. Open source software is constantly upgraded by the software's community. Meaning clients will receive updates as potential problems are realized and a patch is implemented. Security patches are provide by the consulting company for web-based software. If the consulting company goes out of business you will be left with unsupported software. Save the fancier software for when the school grows and requires the software.

Maintenance of software is another cost concern. Life altering experiences occur. The person who created the website may experience a job transfer, children graduating, or just become tired of maintaining the website. Open source software provides on-line, community support in addition to published training material. Open source software is also supported by multiple administrators, so when one person leaves the group another person fills the vacancy. The administrator group is responsible for planning, testing, and implementing OFT maintenance.

Proper planning will avoid increasing maintenance costs. One way is through proper maintenance centered around the software development life cycle (SDLC). Microsoft views the SDLC as six years for operating systems. If the organization requires a maintenance extension, the cost would be considerably higher, then just performing routine maintenance, upgrades, and patches when provided by the software vendor.

Software maintenance requires consideration for the upgrade of internal components. Java requires updates to the Java runtime environment (JRE), and Visual Basic requires upgrades to the .NET framework. Software upgrades ensure compatibility with the new version of the framework or the website will no longer function. Scheduled maintenance ensures the website functionality keeps pace with web browser upgrades.

Website functionality is a main priority with software costs. I have gone to websites not World Wide Web Consortium (W3C) compliant. The result is a lack of functionality or support for web browser other than Internet Explorer. Firefox web browser now has a 46% market share compared with Internet Explorer's 36%. Ensure the OFT is W3C compliant to avoid excluding viewers.

Parishioners only have the best intentions when helping the school. He or she will use the technology that is the easiest for him or her to maintain, but W3C compliance is mandatory. The

regional school needs to consider long-term goals in lieu of short-term niceties. Open source content management system (CMS) provide a the solution. Open source is free to use and upgrades are provided by the software community. All open source CMS are W3C compliant and will work with every standard web browser, like Internet Explorer, Firefox, Chrome, and Opera. CMS also provide for easy-of-maintenance and software support.

Human Resource Cost Concerns. People comprise the school. People should not become a cost center for OFT. A very important aspect of human resources is to perform talent mining and proper analysis of the talents available to the school. If the school does not have the talent, then outsourcing is appropriate. OFT should encompass the talents within the school's community.

Example: The school has two parents who know Visual Basic .NET and 30 parents and students who know HTML. For the school's benefit, HTML should be used as the primary scripting language for web-based applications. Many students are capable of creating web pages using HTML; however, teaching Visual Basic .NET is outside the scope of the school.

The school will benefit by having more people actively involved with the OFT. Content management and maintenance can be a nightmare when considering work schedules, family functions and overall availability. OFT is designed to enable various department heads to add content and to do so from various locations; not just on the school's web server or submitting the content to an editor. We have entrusted these adults with our children, surely we should be able to trust them to place content on the website.

A cost of human resources overlooked is documentation. Documentation provides the continuity from administrator to administrator. OFT needs to be documented or not deployed because what is obvious to the software creator is not so obvious to his or her replacement. Not creating documentation will cost the school in the long run as new OFT is purchased to replace the technology no one understands.

Software Concerns

Functional requirements. Functional requirements are simply the right software for the task.

Traditional website design is best for just designing a basic information website. Examples of traditional websites may be an e-business card. Dynamic websites require frequent content updates and additions to the website. Content management systems (CMS) are an example of a dynamic website.

CMS provide speed for posting content to a website. CMS also allow multiple people to post information to the website, thus eliminating the latency of a single administrator to update the website. CMS also has multiple plugins to accommodate the concerns of the organization, like calendars and media players. The term “web master” is applied to a CMS for the purposes of updating the software and applying patches.

Security. Security is a major concern on the Internet. Software needs to be secure for the safety of the organization's image and end users. I prefer to work from a security aspect first, then functionality. Many website hackers are not malicious, but can cost the organization many hours of frustration trying to patch the security hole(s). Passwords should be changed every 30 days and FTP passwords changed after each usage. Security constraints need to be tight but not to the extent the organization is not updating materials.

Contiguous support. Contiguous support means continuity in ownership. Many websites end up with stagnant content because the website originator has a change in life style. Support for the software must also continue throughout the system development life cycle (SDLC). Apache web server is a good example of software with continued support through the SDLC. Problems arise when the creator of a website uses special software, like Dreamweaver, to create a website and the next administrator does not have access to Dreamweaver.

Cost of ownership. Cost of ownership are all the costs associated with adopting software into the organization. Purchasing new hardware to run the software on is a cost of ownership. If the software requires a specif operating system to obtain functional specifications, the licensing and maintenance of the operating system is a cost of ownership. Cost of ownership consideration must also take into account the return on investment (ROI).

Software is deployed to optimize the organization's ROI. Static websites provide information used by potential customers for evaluation purposes. Contact still needs to occur to generate a sale. Dynamic websites can be used to generate interest and retain customers. Unless the organization is creating a web store, cost of ownership needs to be kept to a minimal cost.

Another cost of ownership requiring consideration are licenses. The regional school will need to create three environments: production, development, and backup. Per seat licenses will require the purchase of three licenses. Open source will enable the regional school to deploy many software environments at no additional cost. Zero initial cost would be optimal.

Recommendation

The new regional school should have state-of-the-art OFT; however, contained within a budget. State of the art OFT will provide the regional catholic school with product differentiation. Many catholic schools have technology, but budgetary constraints prohibit deployment of newer technology. Open source technology will provide the new regional school with technological product differentiation.

Open source software is being used by many organizations. President Obama recently announced the Federal government would implement more open source technology. I recently implemented Nagios at for my employer; saving the organization \$1.5 million over implementation of a

proprietary software competitor. The regional school will also save money in regard to website backup and development costs.

Open source generally uses Linux, Apache2, MySQL, and PHP (LAMP) technologies. LAMP technologies are also open source. The regional school can backup software to an in-house Linux server and create as many instances of the open source software required for training new administrators. Contiguous support is vital for the long-term success of the new regional catholic school. Training administrators in a development environment means little to no down time for the production system.

I would recommend Linux as the website hosting plan. Linux offers the widest range of open source software. Linux hosting also provides a range of programming languages including Perl, PHP, and Java support. Many of the shortcuts Windows hosting provides is not W3C compliant, which means that web browsers other than Internet Explorer are not supported. Linux hosting plans include tiered pricing.

The \$3.99 per month hosting plan provides us access to all the open source software we require for the new school. The economy hosting plan will only enable the school to host one domain name. The number of applications deployed within the economy plan is unlimited. Increases in functional requirements means implementing the next hosting tier. Software implemented under one hosting plan remains even after upgrading hosting plans. Initial implementation of software packages should be carefully considered to include several considerations.

Functionality

The first priority of software deployed is meeting present and future required functionality. OFT needs to be easily deployed to the community. School administrators need the ability to place information on the website quickly without a long, software learning curve or waiting for a System

Administrator to find time to put the information forthright to the community. The regional school will want the functionality to place school lunches on a calendar. A content management system (CMS) meets functionality goals.

Maintainability

The regional school does not have a budget for a full-time information technology person. OFT needs to be maintainable by any person stepping into the roll of administrator. Open source software communities provide administrators with and up-to-date knowledge base. Text books provide more specific details. All open source software packages provide purchased support.

Extensibility

OFT needs to grow as the regional school grows. Open source software provide numerous modules and plugins for extensibility. Modules should be easily installed and configured within each application. The development community for the software is constantly developing more extensibility, like calendars and templates.

Deployment

Rapid application deployment (RAD) is important to the regional school. Software needs to be deployed to support the regional school's mission. Waiting weeks or months for new software to be developed, tested, and deployed interferes with the school's priorities. Most open source software can be deployed within 20 minutes. Functionality and extensibility can be enhanced within a few days.

Open source software

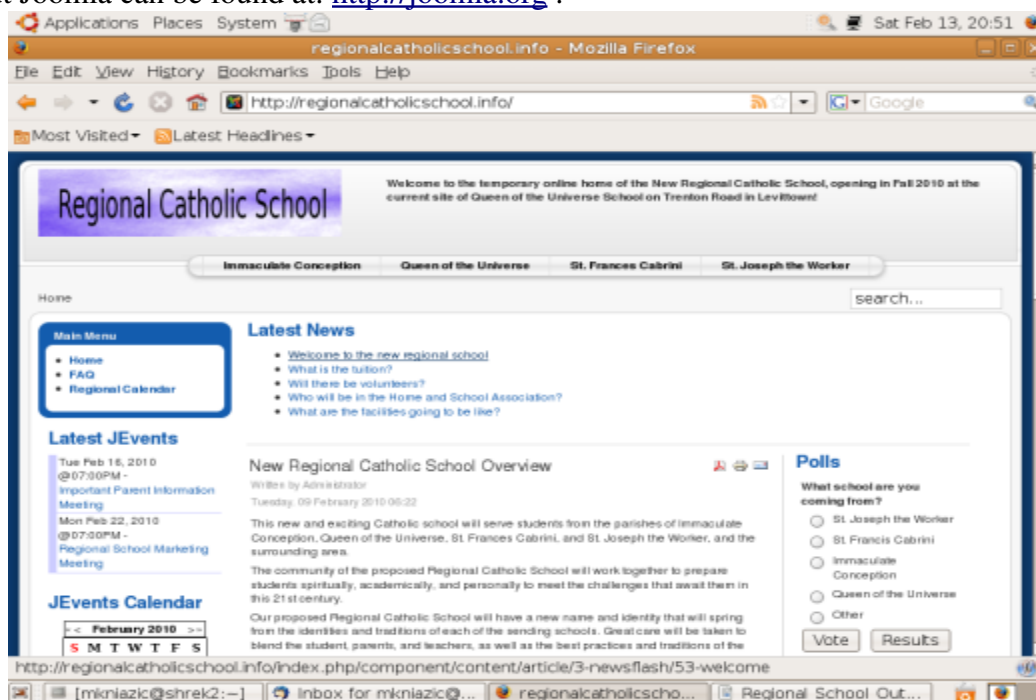
Meeting all requirements are: Joomla, Moodle, Google Docs, and Gallery. All four packages are provided, free of cost within all Linux hosting plans. The packages are deployed to the website in a four part installation process provided by the hosting provider. The packages also provide easy-to-

understand back-ends so administrators can implement functionality on-the-fly. Multiple versions of the software can be deployed to provide development and backup environments.

[Joomla](#) provides the functionality for the regional school. Joomla is supported through a vast open source community. Adding content to the website is accomplished by logging into the site, selecting to create a new article, and copy – paste the content from a word document. Administrators can now concentrate on performing regional school functions instead of trying to create a web page.

Joomla is friendly to software administrators. Administration is performed through various panels by the Super Administrator account. Changing “skins” requires working with the files within the theme directory. Since Joomla is open source, there are no licensing fees and the software can be deployed in a development environment. Testing can be performed without effecting the production website.

More about Joomla can be found at: <http://joomla.org> .



[Moodle](#) is a CMS directed towards schools, particularly online schools. Moodle is currently used by over 8,000 schools and organizations. Teachers and administrators can add classes, homework,

and lesson plans easily to Moodle. Moodle should be developed in the new regional catholic school for



the benefit of teachers and students that are unable to attend class, like snow days or sickness.

Moodle also provides the school with product differentiation along with Catholic Identity.

Pennsbury School District has adopted an online blackboard for students. Teachers place additional course materials on his or her course area enable further discovery by the student. Also included is a calendar, so the students know when homework is due and testing will take place.

Moodle also provides ease-of-software administration. The Super Administrator account enables moving modules and redesigning the outward appearance of the environment. Administrators can add functionality to the front page as well as the student area. Teachers can also implement a chat session within the classroom environment for collaboration. More information can be found at

<http://www.moodle.org>

[Google Docs](#) provide the new regional catholic school with online collaboration. Students have the ability to work with each other to complete homework assignment and projects. Teachers will no

longer need to hear the expression, “I forgot my homework” from any student. Homework and projects can be performed online and submitted to the teacher from the same location. Students can also work on homework and projects from any computer that has Internet access.

Google Docs provide functionality for the student. Students can create text documents, presentations, and spreadsheets with Google Docs. Students have the ability to share his or her document with one or more other students or to the classroom. The key here is that the students can collaborate with each other and also have a safe place to store school work. Administrators will also have the ability to send forms created in Google Docs to the families and or students for questionnaires and surveys.

[Gallery](#). Gallery provides a professional-looking photo display area. Event photos can be placed inside gallery for views. The software includes a hit-counter. Pictures can be grouped and published and unpublished before and after specific events. The user interface can also be configured to mirror other websites within the OFT group and present a seamless transition.

[Future Outlook](#)

OFT needs to grow with the regional school. Initially the OFT will be a cost center. However, by deploying open source software the financial footprint can be kept small. In the near future OFT will become a revenue generator for the regional school. Advertising, affiliations and a small web store will be the foundation behind the revenue generation.

Search engine optimization (SEO) is important for advertising and affiliations. Creating META tags for content is very important for SEO. Link-backs also provide SEO stimulation. Constant creation of new articles for the website is another SEO stimulation. As the new regional catholic school's OFT increases in rank, advertising and affiliation will become more appealing to local businesses.

The web store will contain “gear” such as gym clothing and other items. Having the ability to purchase or receive as donations certain merchandise will increase the web store's revenue, like an online flea market or Chinese Auction. The web store will also provide parents and students the ability to obtain school materials without searching the Internet. However, we do not want to provide direct competition to our local businesses.

Within a short period of time, the regional school can move towards more robust hosting and software. There are companies that provide great software packages that encompass all the requirements of the regional school. However, costs can be an issue. It is great that these costs can be written off as an expense, but the school will need to spend the money.

Conclusion

Outward facing technology (OFT) is an ongoing process. Regional school requirements need to be analyzed. Return on investment (ROI) is an objective method for analyzing cost and software concerns. Initially software should maintain a minimal cost footprint. The costs for deploying open source software is the cost of hosting.

Website hosting costs vary in price. Price variations deal with bandwidth, security, and support. The beginning level of hosting plans with Jamida is \$3.99 per month, or \$47.88 per year. The top hosting plan involves a virtual server. The pricing for virtual servers begin at \$30.89 per month, or \$370.68 per year. The hosting plans include access and easily installed software packages, while the virtual servers require administrative assistance to upload, install and configure the software.

Open source software should be used for the initial deployment of OFT. Open source software, like Joomla and Moodle, are easy to deploy and configure. The regional school should have enough web-based application specialist as to provide a zero cost deployment. Open source also provides paid

support, on-line documentation, and text books for providing administrator assistance and extensible functionality for end-users.

Open source software end-users consists of two groups: Administrations and viewers.

Administrators have the ability to change content and the content presentation and function primarily on the application's back-end. Viewers are visitors to the website who need to understand how the navigation controls function to obtain information and function primarily on the front-end. The concerns of each group create a subset.

Administrators require easy content layout and content presentation. Content management systems (CMS) provide both functions. Administrators can move menus around by changing properties within the template. Articles are added (published) with a text editor that provides META tags and spell checking. Articles can also be written using HTML and CSS. The articles and properties are placed in a database, which means when changes are made to the website, viewers receive the changes each time the site is visited.

Viewers require ease of navigation and up-to-date information. Once a website is established, viewers will not consistently land on the front page. A local search engine is required so the user can find articles pertaining to the information found on the page. An example is when you go to <http://regionalcatholicschool.info> and enter "tuition" in the search box, the viewer receives 4 links to articles with the key word "tuition". Ease of navigation also means descriptive menu options. Viewers should not have access to specific articles, but should be shown a variety of articles within a category.

Functionality does have a price. Generally the type of functionality addressed in this paper would cost over \$5,000. However, with an administration team of five members who understand or have the willingness to learn open source software, the functionality can be provided to the regional school

for **less than \$85 the first year at \$6.99 per month hosting costs with a Linux hosting plan.** If the school is already paying for professional photographers and publicists, \$85 the first year is not a cost center. Initial OFT should be minimal in cost due to the ROI concerns.

This document is free to use and implement for any regional school. However, the price stated above is only made available by Mike Kniaziewicz to Holy Family Regional Catholic School in Levittown, PA 19056. For other regional schools my hourly rate is \$50 per-hour with a project completion time of ~80 hours, including documentation. Content, including banners are the responsibility of the regional school.

My email address is: mikhail@ebusinessjuncture.com . Examples can be found at: <http://joomla.org>, <http://moodle.org>, <http://gallery.menalto.com>, and <http://docs.google.com>.