The Role of Technical Support in Updating Web Design Courses - A Case Example

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Abstract

Web design courses often go through repeated updates and revisions in order to accommodate changes in technology and market demands. The updates may require the implementation of numerous steps that support the final outcome of the course. Each step plays a different role in supporting the changes in the courses of this dynamic field of study. This process, of course updates is clear to many and, similar steps may be followed in other courses. However, what is not quite clear in this process is the role that technical support staff plays in making these repeated updates. This paper intends to shed light on this role of the technical staff by illustrating the experience of one faculty member and the support that he received from the technical staff at his college. A faculty member at Eberly College of Business and Information Technology (ECOBIT) – Indiana University of Pennsylvania (IUP) teaches courses in web design. He has updated these courses a number of times so as to accommodate changes in technology. At the same time he received support from the technical staff at his college for these updates. At times, this kind of support was crucial in the implementation of the changes for the web design courses and to cover additional topics in the same courses. The experience of this faculty along with the support that he received from the technical staff at the college is illustrated in this paper.

Keywords: Technical Support, Technical Staff, Web Development and Technical Implementations

1. INTRODUCTION

Web development courses often go through repeated updates in order to accommodate market demand and technology changes. At times, the changes in web development courses are so quick that they require the faculty that teaches the courses to update them without delving too much in depth into the technical specifics of the new technologies and the problems associated with using them. In these times, the support of technical staff is crucial to the successful implementation of such changes.

This paper illustrates the experience of one faculty at Eberly College of Business and Information Technology (ECOBIT) - Indiana University of Pennsylvania (IUP) and his work with the technical staff to implement changes in web design courses. At times, the expertise of the technical staff and their support was crucial to implementing the changes. This support helped the faculty cover materials to a larger extent than before and also helped with introducing different new technologies.

The remainder of this paper is divided into four sections: The first section explains about technical support in general and in academic institutions in particular. The second section elaborates on web design courses, their continuous updates and the factors that make them difficult to teach. The next section explains about the technical

staff at ECOBIT, their personnel, the functions they normally perform and the support they provide to the various departments at the college. The fourth section discusses the support that a faculty of web design courses at ECOBIT received in updating web design courses along with the issues that were raised during the implementation of the updates. A summary and suggestions for future research is introduced at the end of the paper.

2. ABOUT TECHNICAL SUPPORT

The term "technical support" is often used synonymously with technical expertise of individuals or groups. However, the exact meaning of the term along with the specific kind of technical expertise is not totally agreed on. This section attempts to explain the meaning of technical support. It introduces the terms that are synonymously used to describe "Technical Support" and discuses the staffing of technical support personnel and the services they provide. The section begins by covering technical support in organizations in general and then narrows it down to academic institutions in particular.

Technical Support – Terms Used

Numerous terms have been introduced to describe the tasks included within technical support functions. Included in these terms desktop support technician (Stewart, 2006), Information Technology Support (Arteaga and Lucas, 2005) Technical Support Groups (Pierce, 2003), Help Desk Consultants (Benatan & McGarrity, 2001) or simply technologist (Arteaga and Lucas, 2005). However, all of the terms refer to the following attributes in some reference or another:

- Technical expertise acquired by individuals, groups or organizations.
- The technical expertise is provided in forms of services to individuals, departments or organizations.

Staffing in Technical Support

The term "technical support" has been widely used to describe individuals within different contexts. For example, an individual who answers a question from a neighbor regarding a computer problem may be providing a technical support service. A student who solves a computer glitch for his/her classmates may also be providing technical support service. Simple issues like these may be solved on a temporary basis that hold limited scope. However, technical support in organizations in which the stake of reliance on technology is high takes a different spin. In these organizations, technology support services take different forms and place more importance than simply fixing other's glitches. A loss of data during the work of an individual in these organizations or a malfunctioning of their hardware or software may cause the organization much in terms of resources. Thus, some companies resort to having a group of personnel that has the expertise to provide technical support services to solve these problems. This group is often grouped into one department that is frequently named "Technology Support Department" or "Technical Support Department".

The requirement for staff that work in technical support departments varies, but different studies indicate that this staff is required to be available to respond to calls from employees for some kind of technical support or another. Windley (2002) used the word "High Availability" to describe the work of the technical staff and noted the following three characteristics about the services they provide:

- Reliability—Reliable services perform their functions consistently. Overall system performance is one component of reliability.
- Availability—Service availability can be defined in terms of the percentage of time that the service is ready for use.
- Serviceability—This attribute applies to services that are easy to maintain, troubleshoot, and upgrade.

The responsibilities of technical support staff does not include only fixing or responding to calls for support. Instead, the same staff often deals with multitude of personality, technologies and personality issues. Thus, different personality characteristics may have to be evident in this staff to make them work well with others. Stewart (2005) noted that these individuals who provide technical support wear three different hats during their work and their answers to calls for support: The hat of a listener, the hat of an expert and the hat of a co-worker.

Walker (2001) on the other hand noted that staffing in technical support departments demands business knowledge, communication skills, and interpersonal skills, along with technical knowledge. Thus, technical staff members require a myriad of skills that range from technical to personal to organizational that make then ready to perform technical services.

Technical Support – Services

Providing technical support services vary widely depending on the situation, the organization and the type of expertise they provide. Rubens (2005) noted that technical support service can be as little as fixing the neighbor's computer or answering questions regarding the kind of computer to buy. However, in organizations where technology use is abundant and the range of software and hardware is increasing and changing rapidly, the uses of technical support expertise is different and include a wider range of services.

Windley (2002) differentiated between the technical support services that is provided in networking environment with other services and offered a five-tier approach to delivering such services:

Tier 1 customer support/helpdesk; this includes answering phone calls, email or other inquiries.

Tier 2, network support, manage workstation and provide security requirements

Tier 3, System network administrator

Tier 4, product operation engineering

Tier 5, Engineering

Shaw et al. (2002) explained about the technical support services that are provided by technical staff and the type of challenges they face in the work environment:

> Support personnel are normally expected to provide assistance to end-users across a variety of different packages and configurations, to deliver this support within a variety of work domains, and to provide this support in a cost and time-effective manner. Additionally, these services are delivered to a heterogeneous end-user population that represents multiple levels of technical, business, and organizational proficiency (p. 42).

The categories of services as well as the range of support that are provided are reminiscent of the challenges that technical support staff face in their work environment. At colleges and universities, some of the same issues are repeated but other challenges are faced by the technical staff. Thus further detail about the technical support staff may be needed to give the full picture.

Technical Support in Academia

A study completed by Arteaga and Lucas (2006) to assess the shortage of staff in technical support departments. The title of this article best represents this dilemma of abundance of services provided by technology support staff at academic institutions. The title of this study is "So many labs, so little time" and the study noted the following regarding the services they provide:

> Information Technology (IT) support groups are aware that in order to meet the needs of faculty and students who use the university's computer labs, it is imperative to provide up-to-date equipment and software. As the number of supported computer labs and multimedia rooms grow, the quality of the support may suffer due to the lack of staff needed to properly maintain the equipment. Needed patches, updates and virus definitions can be neglected due to lack of time and resources. Printer, scanner and projector maintenance can also suffer (p. 192).

Another study conducted to categorize the ethnographic background of technical support workers at a particular university (Cunningham, Knowles and Reeves, 2001) listed the following sample of services that are provided by the technical support staff at the same institution:

- Deal with immediate, low-level problems such as fixing a stopped printer queue;

- Interact with novice users to answer questions about standard software packages;
- Set up new facilities (ranging from complete installation of a 50+ computer lab, down to setting up a single new laptop for an academic);
- Proactively investigate potential software and/or hardware problems, and locate solutions to these problems that haven't occurred—yet;
- Keep an eye on long term developments in areas of hardware/software expertise, so that informed advice to decision-makers in the School can be provided
- Update information sources used by the technical staff and their 'customers' in the School; etc.

The support of technical staff is not limited to certain computers. They have to maintain the functions listed above in the computer labs, classrooms as well as offices of faculty, administrators and staff. Additionally, network functions may need to be maintained. This includes network security and other related functions.

In the same study that was conducted by Arteaga and Lucas (2006) wrote about the positive impact of technical support on their teaching. The study noted that technical support staff helped them cut down the time to trouble shoot problems and also learn about new hardware and software issues that they were not aware of. The authors of the same study noted further that the most important attributes of school technologists are:

- A thorough knowledge of the technology
- A talent for imparting knowledge to others
- Empathy for teachers who are trying to learn complicated software
- A strong desire to help others
- Patience
- Respect for the faculty.

3. ABOUT WEB DEVELOPMENT COURSES

The tasks associated with developing web pages are often considered to be difficult and web developers repeatedly encounter problems during the development and update of web pages (Rode, 2004, Ali & Mensch, 2008, Bardzell, 2006). There are numerous factors that add to the difficulties associated with developing such web pages. Different studies have been conducted to analyze these difficult factors. Rode (2004) for example outlined four factors that make it difficult for web designer to create web applications:

1) Abundance of technologies and standards
2) Inadequate technologies and integration between technologies
3) Inconsistent implementation of standards
4) Differences in end user platforms

The difficulties noted above are often transferred to the teaching of web design courses as well. These courses have certain characteristics that distinguish them from other technology courses. Verbyla and Roberts (1998) in their study of technology courses contrasted the topic of coverage areas between web design courses and other courses taught in Computer Science (CS) and in Information Systems (IS) areas. This study used the term "single paradigm" to describe courses in IS and CS and also used the term "multi-faceted" to describe web design courses.

In another study completed to address the challenges that face the selection of content in web design courses, it found that these challenges can be divided into three groups of factors (Ali and Mensch, 2008):

1) The multitude of technologies that are potentially involved in teaching web design courses.
2) The various standards that need to be studied when teaching interfaces of web pages with other technologies.
3) The different contrasting paradigms that may need to be studied when teaching web design courses.

The remainder of this section elaborates on the difficulties that are associated with teaching web design courses and more specifically difficulties related to factors when technical support is needed most.

The Multitude of Technologies

There are too many technologies involved in designing and creating web pages. Bardzell (2006) for example provided a brief list of these acronym-rich technologies and which are used for designing one form of web pages or another. This list included: HTML, CSS, Macromedia, Coldfusion, ASP, SQL, XHTML, DHTML, XML, ADO, CDO, JavaScript, Flash, PHP, Java, .NET, XSLT, WML, and WSDL.

The number of technologies involved in designing web pages is also expected to increase as more applications are added to the web development environment. The increased number of technologies presents a challenge to teach in the classroom. The teacher has to learn about the new technology and their proper application. However, the interface of technologies with each other poses additional problems to the teacher as well as the technical staff that is involved in installing the technologies and maintaining them. Particular software may be installed and to be working fine by itself, but when other software tools are installed they may affect some of the other previously installed software thus creating a ripple effect of previously installed software.

This kind of ripple effect gets more complicated in academia. Faculty members often share teaching in the same computer labs/classrooms. In another word, a faculty from a department (like computer science) may teach in the same classroom that is taught by faculty from another department (like Accounting). Thus, multiple software tools from different areas of study need to be installed on the same computers in the same labs. The installations of additional software may cause problems to the previously installed software and may cause incorrect functioning for different software, old or new.

Web Development Paradigms

In a web development environment, there are different paradigms that pervade the working and functions of the field. These paradigms are often overlapping and contrasting to the work of each other. Verbyla and Roberts (1998) explained the paradigms of web design and the challenges they add to selecting course content as:

> The great diversity of paradigms which underpin the Web's functionality presents a challenge to the designer and teacher of any topic covering web technology. …. Students need sufficient depth of knowledge in several key areas in order to be able to become proficient in the relevant techniques. Not-withstanding, breadth of coverage is still required given the plethora of technologies associated with the web (p. 27).

A study conducted to assess the difficulty of teaching web design courses [1] noted about two paradigms in particular that cause conflicting technical requirements: First the client side versus server side paradigm and second the open source versus commercial software paradigm.

The client side paradigm is where the user deals with the web browser and there is little interface with other software or applications. In the server side, the web page interfaces with sources of data and interfaces with other software platforms. This kind of interface increases the possibility of incompatibility between software versions and different platforms of the software.

The second paradigm of open source versus commercial software, teachers have to decide whether to use commercial software or to use open source (free) software. Commercial software companies (like Microsoft) charge fees for purchasing and using their software. These companies in most cases provide some form of support for their software that comes in the form of online help, user manuals and others. Open source software on the other hand is free and their use is rapidly increasing. However, the drawback to using open source software is that there is no readily available help line or manual that answer questions from users. Instead, users stumble through numerous chat sessions, blogs and other postings in order to troubleshoot a problem or to find an answer regarding a particular question or a problem about the software. Thus technical support may be needed in some of these special cases.

The Need for Technical Support

In web development courses, there is a need for support from technical staff especially regarding the points indicated above.

The technical staff at organizations has the technical expertise to deal with the multiple problems of software interface. They have broader picture about the interface of software with other applications. They also have the technical "know how" to search the problem, identify solutions and then implement such solutions regarding various interfaces with software (Windley, 2002, Stewart, 2005). Thus, in web design courses where updates are frequent and interface among software is numerous, the need for the services of technical staff for these kinds of courses is helpful in many cases and essential in others.

4. TECHNICAL SUPPORT AT ECOBIT

This section explains about the technical support that is provided at Eberly College of Business and Information Technology (ECOBIT) at Indiana University of Pennsylvania (IUP). The section first describes the organization of this technical support department and then provides details about the services they provide and their staffing.

Organization

The technical support staff at ECOBIT reports directly to the dean of the college of business. It is headed by the assistant dean for technology. The name of this department is "Research and Development". There are six academic departments within the college Accounting, Finance, Marketing, Management, Management Information Systems and Technology Support and Training.

In addition to the academic departments, ECOBIT has a department for workforce development and training. This department provides training to the different organizations in the area.

Services

The technical support staff at ECOBIT provides technical services to the following groups of people:

1- Faculty
2- Staff
3- Administrators
4- Students

The range of services includes anything that deals with technologies. This may include any of the following services:

- Installing hardware
- Installing software
- Maintaining, (fixing and repairing) hardware.
- Troubleshooting software problems
- Monitoring software updates to install patches and fixes
- Provide technical support to students
- Managing different computer labs
- Research and provide hardware/software prices

Staffing

The staffing of the tech support at ECOBIT consists of director, assistant director and a number of different individuals who work as technical consultants. In most cases, the technical staff includes a majority of students' workers. These students attend ECOBIT to complete their study but work at the same time at the technical support department. This policy has proven to provide a lot of benefits to the students. In most cases, the students acquire good experience working with the various technical issues they encounter. At the same time, the director of this department faces the challenge of staffing and training new consultants every year, as the old consultants graduate and move to the workforce.

5. TECHNICAL SUPPORT AND WED DEVELOPMENT COURSES

This section explains about a faculty who is teaching web design courses at Eberly College of Business and Information Technology (ECOBIT) and the technical support he received regarding updating his web design courses.

There are two web design courses that are taught by this faculty: BTST401 Dynamic Web Design and BTST402 Interactive Web Development. This faculty received normal support that are provided by the technology support department which included installations of new software, upgrading them and making sure that they work correctly in connection with other interfaces. However, the technology support staff has helped this faculty in two particular problems that involved research and more technical expertise: first it was regarding interfacing with the server side programs, and second

regarding the installations of open source software and backing up data from databases. Thus these two issues are explained in more detail in this section. The remainder of this section explains the experience of this faculty within each of the two paradigms of web development that were discussed earlier in this section.

Server Side Interface

The instructor of this course wanted to teach about connecting web pages to databases to interactively retrieve and update data from databases. The faculty learned that we need to install server software that enables this connection. Microsoft's Internet Information Server (IIS) needed to be installed to make this possible and to be able to retrieve data from databases saved on the server.

IIS is known for having some interface problems and is also known for being affected by other installations. In other words, if new software is installed, it may affect the working of previously installed IIS.

Prior experience of this faculty with the database interface was repeated with problems, thus the coverage of web page interface with databases was limited. When this faculty started dealing with the technical staff, they worked with him to solve these problems of the database interface. The technical staff was able to solve the problems and the interface worked fine at the beginning. However, once new software was installed, this IIS interface stopped working and generated a lot of problems for the faculty teaching the course and for the students that were enrolled in it.

The technical staff worked to research the problem. They went repeatedly through Microsoft's knowledge base web site and through different blogs and postings. At the beginning the initial result indicated that this IIS interface is a recurring problem and that no solutions were found. However, the technical support staff was finally able to find the solution and install the fixes on a few computers for experiment.

The computer fixes that the technical staff was able to find needed to be installed on all the computers in the classroom as well as the public labs. But the classrooms were scheduled to capacity during all working hours and the lab was open 24 hours and often filled to capacity. Thus, installing the fixes on all the machines required major disruption. The tech support staff reached on an interim solution where the fixes are installed on several computers in the public lab and then wait until the weekend to install them in the classrooms. The interim solution was followed, the fixes were installed and the faculty continued teaching the database interface through IIS. The instructor was able to cover additional materials regarding server side that he was not able to do in prior times. Moreover, the problems were well understood by the technical staff, thus when similar issues surfaced at later semesters, the technical staff was able to fix them quickly to ensure that they do not disrupt the class.

There were three critical issues; the first was a Read/Write access to IIS designated areas: The problem turned out to be a process that Microsoft mandates for the successful operation of IIS. The server side software has to be installed on a writable partition where the server can create temporary files at will. Lab machines and public area machines are usually restricted, if there were no restrictions, students would unknowingly populate the entire partition with files.

The technical staff figured out a process by which they were able to create separate rewritable partitions that would be accessible and writable during the class session but would disappear on reboot. Production files that were generated during the session would be saved to an entirely different partition that was mapped in IIS. When a student restarted the machine, the temporary files would disappear but the production files would still be present on the secondary partition.

The second issue was related to proper user permissions (ACL's) for every user to write to these areas: Within the Operating System (XP) and IIS, in order to create files the logged in user has to have write permissions across the partition. In order to grant writable access, the user has to be a part of the power users group and have manual access granted to all IIS folders at the parent level. You also add the user "Authenticated User" of the local machine to the administrators group to grant general and overall access to all writeable partitions

Finally a correction was made regarding the default locations in IIS. Within the Operating System registry keys have to be modified to point to the writable partitions, such that,

production files created by the user can be automatically saved to the thaw areas of the disk. These areas are not wiped clean on a reboot and student files are maintained throughout the semester. Students can then back up these files to their network storage areas that can be accessed remotely by the students over the network.

Dealing with Open Source Software

The faculty teaching this course wanted to teach PHP and MySQL as part of the coverage for the server side paradigm and the coding/programming phase of his teaching web design courses using open source software. Knowing the complexity of the of the installations and scarcity of help available regarding open source software, the faculty started working on this combination of different software to see what needed to be installed so as to transmit the knowledge to the technical staff to install them in the lab.

PHP is a server programming language and MySQL is database software that is often used on web pages. Both technologies can be separately installed and work independently. However, the difficulty starts when making both interfaces work with each other. During the initial phases of installations and testing, the faculty along with the technical staff went back and forth to solve the problems. At a few times, a number of problems surfaced and the technical staff was able to resolve them. The steps to install along with the problems they encountered were well documented by the technical staff. As a result, in the semesters that followed working with this software included more installations and faced other problems. However, the technical staff referred to their documentation and were able to solve the problems efficiently.

Most of these issues revolved around reconfiguring .ini files (initialization files) used by a particular Open Source application, in our case it was mostly php. Once the writable locations were redirected in the .ini files and the computer registry, the applications ran properly.

The other area of setup/reconfiguration was the area of specifying the ip address of each machine such that all database calls are redirected to a central configuration (called localhost in Microsoft terminology). There is no central database that all machines connect too, since it is not a client/server model, instead clients call themselves and the server module which is also installed on the local client. Once this redirection is accurately resolved, both the client and server work properly in synch.

6. SUMMARY AND FUTURE RESEARCH

This paper explained about the technical support that is provided to web development courses. It started by explaining about technical support in general terms and tackled issues such as definition, staffing and technical services. It then discussed the web development courses and the need in these courses for technical support. It concentrated after that on the technical support provided at Eberly College of Business and Information Technology (ECOBIT) – Indiana University of Pennsylvania (IUP) in terms of organization, staffing, technical requirements and the services they provide. The paper then elaborated about one faculty at this college and how he used support from the technical staff at ECOBIT. The support that the faculty received was crucial in the completion of the course and helped with broader coverage of the subject.

The authors of this paper are planning to expand on this paper by including some numbers and figures regarding technical services and the various functions they provide. They intend to gather data to show comparison figures and charts about the type of services provided by the technical staff at ECOBIT. Thus more detailed coverage of the type of services provided by the technical staff at ECOBIT is planned for future research paper.

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