
Infrastructure and Administrative Support for Online Programs

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Abstract

The purpose of this study was to evaluate the availability and effectiveness of administrative support elements for online teaching faculty, and introduce a faculty validated Matrix for use as a guide in development of administrative support for online programs. When administrators make decisions about the infrastructure support needs of a current or planned online teaching program, these decisions are often based on external expert advice rather than on the advice of experienced ground level faculty. Online teaching faculty are the best source of advice and information on what works and what does not. With this premise in mind faculty at a premier medical university were surveyed to find out what elements are important to the development of an effective online teaching program. Faculty feedback was used to validate an Online Teaching Infrastructure Matrix designed to help campus administration evaluate the current administrative support they provide to online teaching programs.

Introduction

The transition of education from the traditional face-to-face classroom environment to an online or hybrid environment is continuing to increase each year. University systems around the nation realize the future survival and expansion of their educational programs will depend largely on their ability to provide online education (Allen & Seaman, 2006).

Administrative support is the vital foundation to a sound online education program. Administrative support includes assistance in the form of funding, guidance, oversight, and assistance in removing the obstacles that hinder a healthy and well-supported online education program (Ryan, KayHodson-Carlton, & Ali, 2005). A healthy support structure begins with university administration promoting a synergistic environment conducive to innovation and results in the enthusiastic buy-in from faculty (Escoffery, Leppke, Robinson, Mattler, Miner, & Smith, 2005).

Other elements that affect online education programs include existing infrastructures designed for the traditional campus-only student. These include student recruiting, admissions, academic counseling, registration, financial aid, and other student services (Restauri, 2004; Tallen-Runnels, Thomas, Lan, Cooper, Ahern, Shaw, et al., 2006).

Traditional administrative support roles such as those of instructional designer, technology support specialist, and administrative advisor frequently fall to already overburdened online teaching faculty. These support positions also need to be redesigned, adjusted, and provided with timely training so that they can adequately fulfill the requirement for the services they provide in an online environment (Restauri, 2004).

Faculty who teach online need to know that they have a strong infrastructure to support their needs technologically, economically, and emotionally, but sadly many institutions fall far short of meeting the

needs of online teaching faculty. Faculty who perceive that they have the backing of a fully-developed, well designed support structure for online teaching are rarely apprehensive about accepting the challenge, but in cases where faculty apprehension abounds, it is usually due to a serious lack of administrative support in one or more critical areas (McLean, 2005).

A good online program does not develop by accident. It can only develop through careful and purposeful processes that include courseware design, technology selection, updating obsolete policies, promotion and acceptance of a paradigm shift, consideration of faculty workload, faculty and staff skills development, and removal of institutional barriers to the development of synergistic teamwork and interdisciplinary cooperation (McLean, 2005; Thompson, 2003).

The purpose of this study was to evaluate the availability and effectiveness of these administrative support elements for online teaching faculty, and introduce a faculty validated Matrix for use as a guide in development of administrative support for online programs. Through this investigation and the subsequent validation of a developmental Matrix for administrative support, a systematic process was developed by which colleges or universities can reorganize the campus infrastructure to better handle the challenges of online program development. The resulting model and Matrix evolved from the cumulative experiences reported in the literature, and from real time experiences of faculty from the trenches of online course development.

The online teaching needs of faculty often go unmet by the institutional infrastructure because administrators frequently fail to understand how technology is rapidly changing the way instruction must be delivered to meet student demand. Other factors such as instructional design, student admissions, registration, faculty and staff development, and faculty workload are impacted tremendously by the adoption of an online program, yet much of the time these entities are ill-prepared to handle the changes that the online students will bring (McQuiggan, 2007).

Institutional support for online and distance education is subpar in many institutions when it comes to faculty development, faculty incentives, and student assistance. Online education programs are often developed in haste to meet growing demand, but the infrastructure, policies, and support entities are often not in place to support the demand (Tallen-Runnels et al., 2006).

A fair amount of literature depicts case studies and portrays faculty's needs for improved administrative support, but little is provided in terms of a systematic approach to provide a guide for the improvement of administrative support as a planned process for online program development. Studies that look at the institutional support needs of all faculty at an institution or across several institutions are few (Ali, Hudson-Carlton, Ryan, Flowers, Rose, & Wayda, 2005).

Experts in various fields such as technical managers, infrastructure planners and directors are often the only sources of advice when it comes to what faculty need to effectively conduct an online training program. This study in contrast, went directly to the frontline faculty member to ask for his or her opinion on what is important to the success of an online teaching program. Institutional infrastructure support often falters because of a lack of direct communication with the faculty who may know best how to solve the important issues.

The study endeavored to identify: a) faculty perceptions of what elements are important to the development of a successful online teaching program; b) which of those elements were in use at their specific institution; c) factors serving to enhance faculty participation in an online teaching program, and which factors impede their involvement; and d) faculty perceptions of the clarity and expected effectiveness of the Matrix.

The study resulted in the development and validation of a Matrix (Table 1) that can be used to effectively evaluate institutional infrastructure support for online programs. This Matrix provides information administrators can use to make important decisions about how to develop and support their existing or planned online teaching programs.

Background

Administrative Support Needs

Efficient and effective use of technology in an online environment requires administrative support at all levels of the institution. Frith and Kee (2003) found that many faculty blamed the loss of students on the instability of the infrastructure and the inability of campus support personnel to work through issues that often frustrated online students and prevented them from having a successful online experience. Though IT personnel are not faculty and may not have daily or direct contact with the students, in an online teaching environment their actions or inactions can significantly impact the success or failure of academic programs.

Rayn, Hodson-Carlton and Ali (2005) presented an exceptional model that captures many of the facets that should be considered when teaching online. They also developed and tested a Matrix that outlines factors to be considered and the sequence that takes place when nursing faculty develop an online program. The focus in the development of an online program should be to preserve as much of the same qualities that made the face-to-face program an effective product while making improvements for online presentation. Factors that should be considered include: How can student/student and student/professor relationships be preserved and developed in an online and often isolated environment? How must the teaching strategies change to accommodate technology and the online environment? How is the course content affected when moved from a campus to an online environment? What infrastructure support functions must be modified to accommodate online teaching environment and the online or distant students? Each of these factors provides its own set of needs that should be carefully addressed when developing an online program (Ryan, et al, 2004).

The development of an online program should begin with a careful evaluation of the process involved in such an undertaking and an evaluation of each of the factors affected by such a move. The infrastructure that must be in place before an online program can even begin to be developed includes the support from administration, technology support systems, a Course Management System (CMS) or process, faculty and staff development systems, and policies that will drive the development process. These policies must specifically outline how questions of content ownership will be handled, how faculty will be compensated for their online teaching effort, and how the appropriate course workload will be determined for the online programs. Once these initial steps have been taken, then the process of online program development can begin (Ryan, et al, 2004).

Models of e-Learning

If the infrastructure support is not appropriately designed, equipped and trained, faculty are often burdened with additional roles of instructional designer, technology support specialist, and sometimes even administrative advisor or admissions processor. Restauri (2004) discusses two prevailing models often used by default on campuses for the development of online programs. The first model, the individual model, seems more prevalent than it should be. It consists of the process whereby individual faculty are left to fend for themselves in gathering of support, learning new technology, and designing an online program from scratch with little or no support from the infrastructure in place. Programs developed under this model often fail due to faculty burnout, poor course design, or a technology infrastructure that is so riddled with problems that students quit the program due to the frustration of frequent disconnects and the inability to get the technology to work as intended.

The second model, the team approach, has proven far more successful and resilient. With this model, campus administration actually develops a teamwork approach where experts from each critical area of the infrastructure are intimately involved in the online course developmental process from beginning to end. In some cases new technology support personnel must be hired to support the online technology needed for the program. Other support personnel such as content developers, instructional designers, and administrative support are either realigned to support the online endeavor or new personnel are hired to provide the support. The second process may seem more expensive at the onset, but in the long run it can save critical faculty from resigning in frustration and encourage more student enrollment. Universities that use the team approach also experience much better buy in from faculty campus wide (Restauri, 2004).

Escoffery et al. (2005) identified what a team structure should look like and the traditional roles of each team member in the process of online course delivery. Faculty are generally expected to develop the

course content, interact with students, and provide guidance in an online course environment. The roles of other players include the instructional designers who are expected to provide assistance in developing course materials, provide assistance with integration of technology with the curriculum and provide expertise on the implementation of online courseware. They may also serve as a liaison to the program, provide faculty and staff with guidance and expertise on distance learning, assist faculty in identifying course needs, and help troubleshoot technical or software problems when they arise. Multimedia staff are frequently tasked with the roles of designing and developing web pages, upkeep, maintenance, and support of training software and technologies, assisting faculty in the development of new online technologies, researching, evaluating, testing, recommending, implementing, and supporting new courseware and other online applications, and maintaining security and backup of all educational data. Unfortunately the reality is that these roles are ideal scenarios, and not the norm. The norm is that most faculty fulfill many if not all of the roles mentioned above in addition to their teaching load as part of an online teaching program (McQuiggan, 2007; Restauri, 2004).

Paolucci and Gambescia (2007) reaffirmed earlier research conducted by Laird (2004) where he found that online infrastructure support often can be identified or categorized into one of four general models of e-Learning integration. At some universities the *Independence or Distance Education* unit is established as its own sub-department within the larger campus but operates independently from the rest of the campus and has no real connection to the traditional academic mission of the campus. The independent or distant education style may have worked in the past, but in the modern university system it is becoming much more efficient and effective to have an integrated system (Lee, Chun, Im, & Heo, 2003).

In the *Lone Wolf Model* as Laird (2004) calls it, each faculty member is given exclusive control over how he or she will create and deliver in the online program. The *Silo Model* is similar to it in that each department in the institution operates independently from any other departments on the campus. These examples can work in a very small organization, but can quickly result in chaos and redundant support systems in a larger organization. Portions of these models still have merit however, since the faculty member is usually the subject matter expert, a limited amount of autonomy should be given within each department to have a certain amount of control over the look, feel, and presence of the online learning experience for students (Paolucci & Gambescia, 2007).

The fourth and final method Laird (2004) discusses is the *Integration Model*, and is the most progressive and forward thinking model in the group. The process brings together all the campus resources and unifies the traditional instruction with the online instruction, creating a synergistic effect that allows technology, infrastructure, and resources to be shared by all faculty and staff. The online learning and the traditional learning infrastructure are combined and share resources equally. This method maximizes efficient use of administrative and technological resources, minimizes redundant systems and costs, and allows faculty to provide better quality instruction in a more productive atmosphere (Paolucci & Gambescia, 2007).

Administration's Perspective

The research focused on the needs of faculty and the value of faculty feedback in administrative decision-making. The administrative perspective may be somewhat different depending on the institution and the varying needs at each level of administration. One unifying objective, however, is accreditation. While one may be able to find differing points of view about how online education should be implemented and supported among administrators at different levels, accreditation sets standards that must be adhered to by all levels of administration.

Accreditation guidelines are the driving force behind the decisions made by administrators concerning the course of action to take when developing an online or distance education program. Every program at the institution must meet accreditation standards in order to be considered an option at all. If administration chooses to implement an online program, the university must consider the appropriate accrediting body guidelines.

Magiuka, et al., (2005) discuss ten critical design and administrative concerns that were a vital part of the decision making process for the careful planning and development of what is now Indiana University's Kelley Direct (KD) online program. In the early stages of the planning process, KD administrators and

planners searched the literature to find what other universities had done in similar situations. They found six elements or questions that could be posed for careful consideration by administrators when planning and developing an online teaching program. These elements included a focus on the vision of the university and the plans for the future; 2) how the curriculum would change for the online environment; 3) what was needed to train the faculty and staff and provide for continued support services; 4) how student services need to be modified for online support; 5) what kind of student training and support would be needed; and 6) what policies would be needed to address the question of copyright and intellectual property (Levy, 2003).

In addition to the six elements there were ten administrative concerns or issues to be considered. The first was that a decision had to be made on which student group would be served by the online program. Would this program be a substitution for current part-time or residential programs, or would it target new students who could not attend current campus offerings? University administrators decided that the KD program would be a separate entity from the traditional programs offered by the Kelley School of Business at Indiana University. The program would run parallel to the on campus programs and would share the same faculty (Magiuka, et al., 2005).

The second issue facing administrators was how the graduates would be treated and whether there would be an online identifier on the diploma. Administrators decided that since the same faculty who taught the program in residence would also be teaching the online program, there would be no need to identify the online program as being any different than the residential program. Both sets of students would receive equivalent instruction. The third administrative factor to consider dealt with whether to have a residential component to the online program, and if so for how long and how often. Because there was a fear that students may feel isolated from the main campus, a week-long residence component was established as essential to the online program (Magiuka et al., 2005).

The fourth administrative issue is how faculty should be used to provide instruction in the online program. Would they only teach in-load, or would they be allowed to teach overload? Factors to be considered in this issue were: could this be accomplished by using existing faculty, hiring temporary faculty, or developing a plan to use both full-time and adjunct faculty. A faculty committee was formed to help make this decision and it was decided that existing faculty would be allowed to teach overload, but be given additional compensation (Magiuka et al., 2005).

The fifth administrative factor was whether to focus the design effort and funding on developing teaching templates for adjunct faculty to use, or to provide training for existing faculty on the finer aspects of online pedagogy? The development of templates for online courses assists in streamlining course content and course layout so that temporary or adjunct faculty can be used to teach the course, but quality of instruction often suffers with this option. Full-time faculty are more expensive, but provide a higher quality of education. For the KD programs administrators decided to use full-time faculty in order to maintain a more professional culture (Magiuka et al., 2005).

A sixth factor considered by administrators was whether any type of template would be used to streamline or standardize online instruction. Students often prefer a standardized template so that the location of options and features are the same across all courses. Administrators decided to implement a standardized template for the online component so that all courses would have the same look and feel (Magiuka et al., 2005).

The seventh administrative issue was how much interactivity to design into online courses, and how much of the interactivity to leave to the judgment of the individual faculty. This is an issue that deserves careful consideration, because the greater interactivity designed into the course the more work is created for faculty to monitor and participate. Students often expect or demand immediate response from faculty in an online environment, and if that response is delayed students often express extreme dissatisfaction with faculty responsiveness. Ultimately, in the KD program, the decision was left up to faculty to decide how much interactivity to build into a course (Magiuka et al., 2005).

The eighth administrative factor is whether to use commercial off-the-shelf online technology, open source technology or whether the campus should develop its own proprietary teaching tools. There are

numerous advantages and disadvantages to consider with any online teaching technology, so this process may take some time. In the end, the KD program decision makers decided to adopt the ANGEL Course Management System (CMS) with the understanding that in-house programmers would make modifications as necessary to meet online teaching goals.

The ninth issue was how to select a CMS that would best fit the goals and design of the curriculum to be placed online. Some universities may start out with one CMS and later decide to change over to another one that best fits the needs of the growing online program (Magiuka et al., 2005).

The final factor for administrators to consider is the identification of the role corporate partners and alliances with other universities will play in the design and implementation of an online teaching program. This decision will inevitably be different for each university system because it is closely tied to the types of programs that will be offered. Corporate partners may request specific accredited training for their staff and corporate leadership.

The economics of administrative decision-making may be driven more by a desire to expand enrollment. Where expansion once meant costly land purchases and building projects, online education programs may seem like a much less expensive alternative. Other important administrative considerations are collaborative agreements, not only with other institutions, but also with corporations that may become a valuable source of funding. Online education has brought on a new paradigm of cooperation between governmental and private agencies seeking to pool resources and share expertise. Collaborative efforts can spawn a new age of flexibility in curricula implementation (Allen, et al., 2007).

Methodology

A case study was used to determine what specific administrative support services are already being provided at a premier medical university and whether faculty feel that these services are adequate or need improvement. Surveys may be used to provide valuable information concerning the current and future needs of online teaching faculty, and can be used repeatedly to show trends, update procedures, or revise policies as needed.

Research Methods Employed

A descriptive survey was developed that identifies specific elements outlined in the Matrix (Table 1) to be evaluated for their perceived importance by online teaching faculty. This survey also included questions asking faculty to validate the content of the Matrix as part of the case study to determine what administrative support elements faculty value and consider important to the success of an online teaching program.

The investigation and survey produced a validated Matrix and tool for evaluating support needs of online teaching faculty at various institutions, and showed a detailed analysis of the perceived support needs of the faculty at a premier southern medical university. This detailed analysis delineates valuable information for administrators and decision makers at many institutions to assist them in making future decisions on where and how to allocate resources.

The survey used close-ended questions with five-point Likert-scale responses. The questions were developed to collect data on the perceptions of online teaching faculty along with demographic information. A few open-ended questions were included to allow faculty the opportunity to make additional comments.

The sample size was the total population of full-time online teaching faculty at a premiere medical university, which is approximately 100 faculty. At a premiere medical university the support needs for both full-time and part-time faculty are substantially the same. Part-time faculty have a larger clinical responsibility, so they may only teach one or two classes as compared to the full-time faculty. The survey was sent electronically to 206 full-time faculty at a premiere medical university who potentially teach online classes in various schools on the main campus in Augusta, Georgia and at satellite campuses throughout the state of Georgia. The actual number of faculty who teach online is 100, but surveys were

sent to all faculty in departments that have online teaching programs in order to reach all possible eligible participants. The focus of the survey was on those who taught online, hybrid, or some combination of face-to-face and online. Faculty who did not have an online teaching element to their instruction were eliminated from the survey.

The responses were collected and evaluated using the statistical analysis software SPSS® to ascertain whether there is a significant difference with the two questions and compare the importance of a support function with whether that function is adequately provided by the institution. Part *a* of the question was compared with part *b* using a paired sample t-test to ascertain whether there was a statistically significant difference between the two questions. A statistically significant difference means that either the support function was important to faculty, but was not adequately supported, or that the support function was not that important to faculty, but was well supported. The descriptive statistics help identify which is the case for each set of questions.

Survey

The survey was developed using a variety of surveys found in literature as models (Allen, et al., 2007; Escoffery et al., 2005; McLean, 2006; Paolucci & Gambescia, 2007; Restauri, 2004; Ryan et al., 2005). The survey was designed to take approximately 20 to 30 minutes to complete and consisted of 85 Likert-scale response questions with a few optional fill-in questions allowing faculty to add comments. The Matrix was then presented and faculty were asked three questions that inquire about their view on the overall accuracy of the Matrix. Two of these questions asked faculty to comment on any items they would add to or delete from the Matrix as shown. Four multipart questions follow that ask specific questions about infrastructure support for online students. In order to gather accurate data concerning incentives and disincentives, the final two questions ask faculty to rate a list of incentives or disincentives from most desirable to least desirable. The opportunity is provided to allow faculty to add an incentive or disincentive that may not be listed (Fowler, 2002; Leedy & Ormrod, 2005).

The survey was evaluated and edited by a panel of experts consisting of a statistician, an instructional designer, a program support specialist, a multimedia support specialist, an academic services professional, an information technology network support professional, and two faculty online program directors. The survey was then piloted to a group of five online teaching faculty who provided feedback as to the flow of the survey and the time it took to complete it. Completion times ranged from 15 to 30 minutes. Other feedback was evaluated for incorporation into the survey, and modifications were made based on faculty suggestions.

The Matrix shown in Table 1 was modeled after Ryan, et al., (2005). The major difference is the focus on the infrastructure support needs in the development of online teaching programs vs. Ryan, et al.'s focus on curriculum development. The descriptions and explanations provided in Table 2 review the relevant literature relating to each aspect of the Matrix.

Personal experience, and multiple needs and strategies indicated in the literature were used to design the Matrix (Meyer & Barefield, 2009). It is divided into three *Supportive Infrastructure Stages* to clarify at what stage each particular element should be considered important in the planning process. These include the initial or *Foundation* stage, the *Development* stage, and the *Maintenance* or continuance stage.

The *Foundation stage* defines the infrastructure and procedural groundwork that should be in place before beginning an online teaching program. The *Development stage* outlines important elements that should be implemented during the development of an online program, and the *Maintenance stage* identifies processes and housekeeping elements that should be implemented to encourage a progressive online teaching program.

Table 1

<i>Online Teaching Infrastructure Matrix</i>		
Supportive Infrastructure Implementation Stage		
Foundation	Development	Maintenance
1. Administration in tune with faculty needs 2. IT department with customer oriented support role 3. Effective and well supported campus network 4. Effective Server Support 5. Online Student Registration, Billing and Payment System 6. Online Bookstore Services 7. Online Library Services	1. Online Program Policies 2. Staff Development Program 3. Faculty Incentives 4. Teamwork Approach 5. Faculty Development Program 6. Faculty Mentoring Program 7. Course Management System 8. Lecture capture or course online delivery system 9. Online test security	1. Continuously evaluate new online technology 2. Update technology only when value added 3. Periodically assess and update quality of course content 4. Set limits on online faculty personal time intrusion 5. Survey faculty semiannually 6. Survey students at end of every Semester 7. Make changes to programs based on faculty and student input

Table 2

Online Teaching Infrastructure Matrix Description

Foundation Stage: Defines the infrastructure and procedural groundwork that should be in place before beginning an online teaching program		
Factor	Description	Source(s)
1. Administration in tune with faculty needs	Far too often administration may take action based on outside recommendations or market influences without first taking time to determine faculty needs and concerns. In an undertaking of this magnitude, it is important that administration develop a teamwork atmosphere with faculty in order to secure buy-in and the full understanding and cooperation of the faculty	McLean, 2006
2. Information Technology (IT) department with a customer oriented support role	In order to create an effective and harmonious work environment for faculty who teach online, technology support personnel must learn to be extremely supportive and responsive to immediate needs of the faculty. Little is more frustrating to faculty who teach online than the breakdown of equipment or slow responsiveness of technical support. These issues need to be addressed at the highest levels to ensure the IT department is ready to support the additional demand that will result from the implementation of an online program	Frith & Kee, 2003 Jennings & Bayless, 2003
3. Effective and well supported campus network	It should be obvious that online teaching program success is going to rely heavily on the network infrastructure and campus servers to provide the needed connectivity to	Frith & Kee, 2003

4. Effective Server Support	online students. These functions should be up and running 100% of the time in order to adequately support an online teaching program	
5. Online Student Registration, Billing and Payment System	Support and services for students who will enroll online must be in place before an online teaching program can be developed. These services are essential parts of the basic foundation needed to support an online teaching program. If these services are not established well in advance of implementation, online students will have difficulty with registration, counseling advice, purchase of required books, and performing research	Tallen-Runnels et al., 2006
6. Online Bookstore Services		
7. Online Library Services		
Development Stage: Designed to identify the processes and elements that are essential during the development of an effective online teaching program		
Factor	Description	Source(s)
1. Online Program Policies	It is important to establish policies before or very early in the development process so that a guide to follow exists. These policies should address issues such as methods to be used in the development process; how the program will be administered; what groups or individuals will handle various aspects; how training will be conducted; what, if any, faculty incentives will be implemented; what hardware and software will be used and how technology will be configured; how the curriculum will be developed and placed in the online format; and finally, how the program will be funded	Compora, 2003
2. Staff Development Program	Staff and faculty development is essential to the strength and effectiveness of any online program. The expense of proper training pales in comparison to losses of time and energy that result from staff and faculty who lack proper training. Several studies show that it is even better if faculty development classes can be offered online, so faculty can get a better feel for what their students will experience. A healthy online training program must be preceded by a healthy development program for both faculty and staff	McQuiggan, 2007
3. Faculty Incentives	Incentives are often expected or are offered to faculty as an enticement to work in an online program. The reason incentives are often expected or required is that online teaching is more of a strain than normal classroom teaching. Without proper control of time spent online, longer work hours and a higher workload may easily result with an online teaching program. Since students are likely to be studying in the online environment at anytime 24/7, there is often a tendency for students to also want access to the professor 24/7	Dahl, 2003; McKenzie, et al., 2004
4. Teamwork Approach	A well honed <i>Teamwork Approach</i> to the online teaching process can often be enough incentive in itself. If faculty and staff feel they are part of an effective well-organized	Dahl, 2003; McKenzie, et al., 2004

	team, they will often find satisfaction in that fact alone	
5. Faculty Development Program	See #2 above	
6. Faculty Mentoring Program	Faculty mentoring has been lauded as one of the more effective methods of helping faculty retain and apply training session information. Training that takes place without mentoring is quickly forgotten and refresher training is required, but training that is followed by a well organized mentoring program has proven very effective in helping faculty remember what was discussed in the classroom. Mentoring can also be a form of encouragement to faculty who might otherwise not implement certain technology at their disposal	Helton & Helton, 2005; Mandernach, Donnelly, Dailey, & Schulte, 2005
7. Course Management System	Selection of the proper <i>Course Management System</i> (CMS) is critical to the development of an online teaching program. Some of the more common include WebCT®, Blackboard®, eCollege®, Desire2Learn® ANGEL®, and Moodle™. Each CMS has unique features that may or may not be useful or user-friendly for a given institution. This is why it is critical to evaluate several systems before launching an online teaching program to ensure your institution is getting a product that will adequately meet the needs of the faculty and the students	Ruiz et al., 2006
8. Lecture capture or course online delivery system	This line of online teaching products includes Tegrity™, Impatica®, Camtasia®, Elluminate®, or Wimba®. The author calls these Course Delivery Systems because each of these products has a unique way of managing multimedia for online delivery of course lectures or lessons either synchronously or asynchronously. Most of these products are software-based and can work with or augment the capabilities of a CMS to provide better student comprehension of online course content. The careful selection of these products is also very important to the overall quality of an online teaching program	Kosak et al., 2004; Ryan, et al., 2005
9. Online test security	Faculty are often, and rightfully, concerned about online test security. How can tests be proctored or students be monitored while taking a test online and at a distance? The answer in many cases is, you can't, but online tests can be designed so that minimal time is given to complete the test in order to restrict a student's ability to find answers they do not already know. Software is available that will restrict a student's ability to exit the testing software until test completion, but at times this can be cumbersome and difficult to use. This issue is an important consideration in the development of an online teaching program and policies should be developed early to prevent future problems	Tallen-Runnels et al., 2006
Maintenance Stage: Designed to keep a well-developed online teaching program going strong, and to map out changes, updates and improvements that may be needed along the way		
Factor	Description	Source(s)

1. Continuously evaluate new online technology	This process ensures the online teaching program is managed and supported by the best and most up-to-date technology available	Ryan et al., 2005
2. Update technology only when value added	This is closely related to #1 in that decisions to upgrade technology should only be made when it can be proven that there will be value added with the updated technology. Many times technology is updated just because it is the latest and greatest, with no evaluation of the need for the upgrade	Ryan et al., 2005
3. Periodically assess and update quality of course content	This process is much more critical in an online environment than with campus courses because technology and online student demands change much more rapidly. Maintaining accreditation is often another factor that requires constant monitoring and updating of online course materials. Many institutions evaluate their online curricula and update it each semester	Cook & Dupras, 2007; Tallen-Runnels et al., 2006
4. Set limits on online faculty personal time intrusion	This factor is often overlooked by administrators who are not familiar with the stresses and demands of an online teaching program. Without constraints, faculty could very easily become overwhelmed from the 24/7 demands on their time. Policies should be carefully designed to take this factor into account, and build in faculty release time and downtime to recuperate and regenerate. Poor management in this area can result in the loss of valuable faculty members at a very high cost to the institution	McLean, 2006
5. Survey faculty semiannually	These factors work closely with item #3 because they are an integral part of the update and upkeep process. It is common practice to provide an exit survey to students at the end of each semester, but faculty surveys are much less common. Faculty also need to have a continuous process where they can voice their opinion on what policies are working well and what may need to be changed. Faculty surveys are a good way for administrators to be proactive and keep abreast of trends and changes that may be needed	Ryan et al., 2005
6. Survey students at end of every Semester		
7. Make changes to programs based on faculty and student input	This is a follow up to items #5 and #6. Surveys are great, but they have little affect if not used to make positive changes to the curriculum, the technology, and the support structure for an online teaching program. Feedback from faculty and students should be carefully evaluated and changes should be made when possible and feasible	Ryan et al., 2005

Results

The purpose of this study was to evaluate the availability and effectiveness of administrative support elements for online teaching faculty. Four main factors were the focus of this study and they include: 1) faculty perceptions of what elements are important to the development of a successful online teaching program; 2) perceptions on which of those elements had been successfully implemented at their specific institution; 3) factors serving to enhance faculty participation in an online teaching program, and which factors impede their involvement; and 4) faculty perceptions of the clarity and expected effectiveness of the Matrix.

The elements outlined in the Matrix were used as the basis for evaluating the infrastructure support of a premier southern medical university. The goal was to provide a means to better understand what specific administrative support services are already being provided and whether faculty feel that these services are adequate or need improvement. The investigation concentrated on identifying gaps in administrative

support and training for online educators. Of the 206 survey invitations sent only 51 surveys were completed. This results in a 51% response rate which is based on the 100 full-time online teaching faculty.

Conclusions

Infrastructure support for online teaching faculty needs to be a well organized effort with a never ending process of improvement. At whatever state the current infrastructure is, there is always room for improvement, but the implementation of an online teaching program requires certain considerations not normally an issue in a campus only type of teaching environment. The Matrix created and tested here outlines the processes and functions needed at each stage of the implementation process in order to establish an online teaching program with the infrastructure needed to adequately support it. The contents of the Matrix are summarized below for a better understanding of how this process can be effectively implemented.

In the Foundation stage of the Matrix there are at least seven elements that need attention before an online teaching program is developed. These elements are outlined below.

- Administration in tune with faculty needs
- IT department with customer oriented support role
- Effective and well-supported campus network
- Effective Server Support
- Online Student Registration, Billing and Payment System
- Online Bookstore Services
- Online Library Services

In an undertaking of this magnitude it is important that administration develop a teamwork atmosphere between administration and faculty in order to secure buy-in and the full understanding and cooperation of the faculty (McLean, 2006). In order to create an effective and harmonious work environment for faculty who teach online, technology support personnel must learn to be extremely supportive and responsive to the immediate needs of the faculty. (Frith & Kee, 2003; Jennings & Bayless, 2003).

An online teaching program is going to rely heavily on the network infrastructure and campus servers to provide the needed connectivity to online students. These functions should enjoy a 100% uptime, or very nearly 100% uptime in order to adequately support an online teaching program (Frith & Kee, 2003). Online student Registration, Billing and Payment System, Online Bookstore, and Online Library Services are essential parts of the basic foundation needed to support an online teaching program. These online services should be well established in advance of implementation of an online teaching program. (Tallen-Runnels et al., 2006).

In the Development stage of the Matrix there are at least nine elements that need to be included as part of the development process for an online teaching program. These elements are outlined below.

- Online Program Policies
- Staff Development Program
- Faculty Incentives
- Teamwork Approach
- Faculty Development Program
- Faculty Mentoring Program
- Course Management System
- Lecture capture or online course delivery system
- Online test security

It is very important to establish clear online program policies before or very early in the development process so that everyone has a guide to follow. These policies should address issues such as methods to be used in the development process; how the program will be administered; what groups or individuals will handle various aspects; how training will be conducted; what, if any, faculty incentives will be implemented; what hardware and software will be used and how technology will be configured; how the

curriculum will be developed and placed in the online format; and finally, how the program will be funded (Compora, 2003).

Staff and faculty development is essential to the health, wellbeing, and effectiveness of any online program. Several studies show that it is even better if faculty development classes can be offered online, so faculty can get a better feel for what their students will experience. A healthy online training program must be preceded by a healthy development program for both faculty and staff (McQuiggan, 2007).

Faculty Incentives are often expected or offered to faculty as an enticement to work in an online program because online teaching is often much more of a strain than normal classroom teaching. Incentives are helpful, but a well honed Teamwork Approach to the online teaching process can often be enough incentive in itself. Teamwork is vital to the effective implementation of an online training program (Dahl, 2003; McKenzie, Ozkan, & Layton, 2006; Restauri, 2004).

Faculty Mentoring has been lauded as one of the more effective methods of helping faculty remember and put into practice what was learned in training sessions. Training that takes place without mentoring is quickly forgotten and refresher training is required, but training that is followed by a well organized mentoring program has proven very effective in helping faculty remember what was discussed in the classroom. (Helton & Helton, 2005; Mandernach, Donnelly, Dailey, & Schulte, 2005).

Selection of the proper Course Management System (CMS) is critical to the development of an online teaching program. Some of the more common include WebCT, Blackboard, eCollege, Desire2Learn, ANGEL, and Moodle. Each CMS has unique features that may or may not be useful or user friendly for a given institution. This is why it is critical to evaluate several CMS before launching a online teaching program to ensure your institution is getting a product that will adequately meet the needs of the faculty and the students (Ruiz et al., 2006).

A lecture capture or course online delivery system may include Tegrity, Impatica, Camtasia, Elluminate, or Wimba. These products can augment the capabilities of a CMS to provide better student comprehension of online course content. (Kosak et al., 2004; Ryan, Hodson-Carlton, & Ali, 2005). Online test security should also be a consideration in the development stage. How can tests be proctored or students be monitored while taking a test online and at a distance? The answer in many cases is, you can't, but online tests can be designed so that minimal time is given to complete the test in order to restrict a student's ability to find answers they do not already know. There is software available that will restrict a student's ability to exit the testing software until this test is completed, but at times this can be cumbersome and difficult to use. This issue is an important consideration in the development of an online teaching program and policies should be developed early to head off future problems (Tallen-Runnels et al., 2006).

The Maintenance stage of the Matrix is designed to keep a well developed online teaching program going strong, and map out changes, updates and improvements that may be needed along the way. The elements of this stage are outlined below.

- Continuously evaluate new online technology
- Update technology only when value added
- Periodically assess and update quality of course content
- Set limits on online faculty personal time intrusion
- Survey faculty semiannually
- Survey students at end of every Semester

The process of continuously evaluating new online technology is important to ensuring the online teaching program is managed and supported by the best and most up-to-date technology available. Updating technology only when there is value added ensures that decisions to upgrade technology are only made when it can be proven that there will be value added with the updated technology. (Ryan et al., 2005).

Periodically assessing and updating the quality of course content is a process that is much more critical in an online environment than with campus courses because technology and online student demands change much more rapidly. Many institutions evaluate their online curriculum and update it following each

semester (Cook & Dupras, 2007; Tallen-Runnels et al., 2006).

Limiting intrusions into faculty personal time is critical to ensuring faculty do not become overwhelmed and burnout from the 24/7 demands on their time. Policies should be carefully designed to take this factor into account, and build in faculty release time. The result of poor management in this area can be the loss of valuable faculty members at a very high cost to the institution (McLean, 2006).

Surveying faculty and students at predetermined intervals is essential in maintaining a flow of information between administration, faculty and students. Faculty and student surveys are a good way for administrators to stay ahead of the game and keep abreast of trends and changes that may be needed (Ryan et al., 2005). Along with frequent surveys it is important that administration stay aware of the information provided by the surveys and make changes to programs based on faculty and student input. Surveys are great, but they have little affect if they are not used to make positive changes to the curriculum, the technology, and the support structure for an online teaching program. The feedback from faculty and students should be carefully evaluated and changes should be made when possible and feasible (Ryan et al., 2005).

The research highlighted the processes necessary for effective implementation of an online teaching program. The Matrix provides an outline for administration to follow in the implementation process. The data collected from the survey of faculty at a premier southern medical university provides invaluable insight into the specific needs of online teaching faculty at this institution, but this survey can also be used at any institution so administrators can gain a better understanding of their faculty needs with regard to online teaching (Meyer & Barefield, 2009).

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