TELECOMMUNICATIONS TRAINING NEEDS IN HOSPITALS

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ABSTRACT

This article discusses the results of a survey on the importance and quality of thirty telecommunications issues and applications in healthcare organizations as reported by Information Systems (IS) managers. While it was encouraging to discover that the IS managers of healthcare organizations rated 29 of the thirty issues as above average in importance, they also rated the quality of their training in all thirty issues as below average. Training need was computed as the difference between the importance of an area and the quality of training in that area. The IS managers were seeking additional training in managerial issues such as data integrity and strategic planning for information technology. There was further analysis of the sources of telecommunications training. While self-instruction was the most commonly used source of training, it was the lowest in quality. Sources external to the organization, such as vendors and workshops, were rated higher in quality than the organizational sources of training.

Keywords: Telecommunication, Training, Healthcare, Information Technology

INTRODUCTION AND LITERATURE REVIEW

The United States does not have an organized healthcare system. Instead the US has a healthcare industry. Whereas many western nations have instituted universal healthcare under the direction of the central government, the United States exists within a framework of fragmented, independent providers consisting of hospitals, patients, physicians, alternative healthcare networks, governmental departments, and insurers. The industry suffers from a lack of centralization where each component competes against one another with no overall vision of what works best for the country as a whole. The competition among the various players has stymied any chance for real improvements. Information technology can be an important component in the effort to improve the healthcare system as it is a way to bridge all of the various healthcare providers together.

Profits margins at hospitals in 2002 averaged 4.4%, compared to 4.2% in 2001 according to the American Hospital Associations annual statistical report of US hospitals [4]. Solucient, based in Evanston Illinois, has about 800 hospitals that use its hospital benchmarking products. Solucient reported that the average profit margins of its member hospitals was 4.27% in 2001 up from 2.81% in 2000 [1]. Hospitals seem to be doing well even during these uncertain economic times. Part of the profits at hospitals can be explained by the fact that the prices for hospital care rose 4.7% in 2001 after a gain of 4.2% in 2000. The rate of general inflation was only 1.6% in 2001 and 3.4% in 2000. Healthcare inflation was at its highest level in seven years in 2001 [2].

The time is right for hospitals to increase budgets in Information Technology (IT) as their profits are at high levels. Information Technology (IT) can be used to improve productivity of healthcare providers in an effort to curb runaway costs increases and rising prices.

METHODOLOGY

Subjects

Mailing addresses for 6606 members of the American Hospital Association were obtained through PPS Medical Marketing Group, Inc. (http://www.ppsmed.com). These labels were matched with information derived from the PPS-VI data files published by the Health Care Financing Administration (HCFA). The healthcare organizations were screened in two ways:

1. Specialty and long-term care facilities were excluded from the study. Only hospitals classified as short-term general service hospitals were included.
2. Teaching hospitals were excluded. The questionnaire did seek financial information about the hospitals. Since teaching hospitals often have third-party payers supporting the costs of medical education, the researchers elected to exclude these hospitals.

As a result of the screening, 2400 surveys were mailed to the IS manager of healthcare organizations.

Questionnaire

Many of the concepts included in the questionnaire used in this survey were adapted from a questionnaire developed by Torkzadeh and Xia [5]. The questionnaire was pilot tested in 25 organizations in Illinois. In addition, it was used in two previous studies of small organizations. Based on the responses from these surveys and research into the healthcare organizations, the questionnaire was modified.

The survey consisted of three parts. The first part requested information about the respondents and their healthcare organizations. In the second part of the questionnaire, IS managers were asked to rate the importance of thirty telecommunications issues. A five-point Likert scale, ranging from "1" indicating no importance to "5" indicating extreme importance, was utilized. Similarly, the respondents were asked to indicate the quality of their telecommunications training on the same thirty issues on a six-point Likert scale, ranging from of "0" indicating no training, "1" indicating poor training to "5" indicating excellent training. In the final part of the survey, the respondents were asked to identify the different sources of their telecommunications training. In addition, they were asked to rate the quality of the training provided by each of the sources. Again, a five-point Likert scale ranging from “1” indicating poor training quality to “5” indicating excellent training was utilized.

Hypotheses

Previous research has shown that based on a factor analysis, the thirty telecommunications issues can be divided into four categories [6]. These four factors are: 1) standard applications (such as e-mail and voice mail), 2) emerging applications (such as conducting business on the internet), 3) managerial issues (such as data security and strategic planning for information technology) and 4) technical issues (such as software availability and vendor selection).

During the formulation of the objectives and statistical hypotheses, the researchers designed the questionnaire so that training need could be computed for each of the thirty issues. Training need was defined as the difference between the importance of an issue and the quality of the existing training. Training need is the focus of the first hypothesis:

1. IS managers at healthcare organizations will rate the need for training in the emerging information technology applications and managerial issues higher than the standard applications or technical issues.

Since the researchers felt that the emerging applications area would be of high importance to healthcare organizations and would also be a difficult area in which to obtain adequate training, the researchers predicted that the emerging applications area would have a high need for additional training. Similarly, the managerial issues area was predicted to be of great importance to the long-run viability to the healthcare organization. It was also expected that training in this area would be more difficult than training in technical issues or standard applications. Thus, it was hypothesized that issues in the emerging applications and managerial issues categories would have the highest need for additional training.

Previous research has shown that the quality of training on telecommunications issues in small businesses is generally poor [6]. Thus, the researchers desired to explore the sources of telecommunications training used by healthcare organizations. Thus, the second hypothesis is:

2A. Telecommunications training from vendors and workshops/seminars, conducted by third party providers, will be rated higher than the other training sources.
2B. Telecommunications training from an educational institution will be rated more highly than training from organizational sources.

Finally, with the discussions that are sometimes controversial, comparing and contrasting education and training, the researchers expected to find a difference in the opinions about the importance of telecommunications between the IS managers who had received their training from an educational institution and the other IS managers. The concept of education emphasizes the ability to expand one's knowledge into the future. It has a wider and longer term focus than training. It was hoped that educational institutions would emphasize the capability and importance of telecommunications. Thus, the final hypothesis was formulated:

3. IS managers with telecommunications training from educational institutions will rate the overall importance of telecommunications higher than IS managers without such education. It is further hypothesized that the IS managers with training from educational institutions will significantly rate the importance of emerging applications and managerial issues higher than the other IS managers.

ANALYSIS OF THE RESULTS

Response Rate

The researchers were pleased with the quality of the mailing addresses received from PPS Medical Marketing Group. Only two questionnaires were returned as undeliverable. The

researchers received 154 usable responses for a 6.4% rate of return. One reason for the low rate of return was the fact that the survey was mailed to "Information Systems Manager" as opposed to an individual by name.

Hypotheses Testing

Training need. The respondents were asked to rate the importance of thirty issues or applications related to telecommunications. Twenty-nine of the thirty items were rated at least slightly above average in importance. On a five-point Likert scale, where 3 indicated average importance and 5 indicated great importance, the average importance rating on all thirty items was 3.75. The ratings ranged from 2.51 for telemarketing to 4.67 for data security. Likewise, the respondents were asked to rate the quality of their training on the thirty issues/applications related to information technology. On a five-point Likert scale, where 0 indicated no training, 3 indicated average training quality and 5 indicated excellent training quality, the average quality of training rating on all thirty items was 2.09. Not one issue or application was rated average or higher. The quality of training on every issue was rated as poor or below average. The ratings ranged from 2.96 for facsimile devices to 1.23 for video teleconferencing. The mean of the importance rating and the quality of training rating for each of the four factors as well as the mean importance rating and quality of training rating on the thirty issues are shown in Table 1.

The need for training was computed as the difference between the importance of the issue and the quality of the existing training. Training need is the focus of the first hypothesis:

1. IS managers at healthcare organizations will rate the need for training in the emerging information technology applications and managerial issues higher than the standard applications or technical issues.

The average need for training for the IS managers of healthcare organizations was 1.69. Analysis of the mean responses of the training need of the four categories yielded a strong statement. These managers desire additional training on the managerial issues. The need for training in the managerial issues ($\mu = 1.88$) was rated significantly higher than the other factors and the need for training in the standard applications ($\mu = 1.31$) was rated significantly lower than the other factors, as noted by an ANOVA and a Tukey *post-hoc* test ($F = 8.73$, $p < .0001$). Thus, hypothesis one is partially supported. The mean training need by category and the mean training need by individual issue or application is included in Table 1.

Sources of training. The researchers anticipated that the external forms of training would be more highly rated than the internal forms of training. Of the external forms of training, the authors anticipated that the training programs offered by educational institutions would be rated lower than the training programs offered by vendors and other third-party providers of training. This was primarily due to the skill specific goal of training versus the broader life-long approach associated with education. Thus, the second hypothesis is:

2A. Telecommunications training from vendors and workshops/seminars, conducted by third party providers, will be rated higher than the other training sources.
2B. Telecommunications training from an educational institution will be rated more highly than training from organizational sources.

Table 1. Means of the Importance Rating, Quality of Training Rating and Training Need

Information Technology Issue	Importance Mean	Quality of Training Mean	Training Need Mean
Standard Applications Factor Mean	**3.87**	**2.56**	**1.31**
Voice mail	4.04	2.82	1.23
Electronic mail	4.32	2.89	1.43
Voice teleconferencing	3.47	1.95	1.57
Facsimile devices	3.92	2.96	0.95
Telephony	3.61	2.27	1.33
Emerging Applications Factor Mean	**3.18**	**1.65**	**1.60**
Video teleconferencing	3.22	1.23	2.03
Telemarketing	2.51	1.39	1.15
Telecommuting	3.32	1.61	1.73
Surfing the Internet	3.52	2.60	0.93
Conducting business on the Internet	3.24	1.58	1.69
Web page development	3.28	1.57	1.73
Technical Issues Factor Mean	**3.74**	**2.02**	**1.72**
Telecommunications terminology	3.37	1.92	1.45
Telecommunications software availability	3.73	2.03	1.72
Equipment capability	3.93	2.22	1.70
Environmental restrictions	3.37	1.79	1.58
Vendor Selection	3.67	2.25	1.42
Voice/Data integration	3.70	1.66	2.06
Electronic Data Interchange (EDI)	3.96	2.13	1.85
Local Area Networks (LAN)	4.22	2.42	1.81
File Transfer Protocol (FTP)	3.68	1.91	1.78
Managerial Issues Factor Mean	**4.05**	**2.17**	**1.88**
Network management and control	4.09	2.18	1.93
Data security	4.67	2.58	2.09
Data integrity	4.44	2.22	2.22
Strategic planning of information technology	4.09	1.95	2.15
Managing innovation and technology	3.98	2.16	1.80
IT for competitive advantage.	3.73	1.76	1.98
End user information technology needs	3.70	2.24	1.47
Data transmission management	3.84	2.01	1.81
Use of PC for telecommunications	3.93	2.26	1.66
Information management of telecommunications	3.98	2.32	1.66

The most common source of telecommunications training cited by IS managers of healthcare organizations was self-instruction. Surprisingly, vendor programs and workshops/seminars offered by third party providers were more commonly used that organizational sources. Educational institutions were the least used of the sources of training. However, 8% of the IS managers indicated that they had no training in telecommunications. The sources of training and

the frequency with which they were cited is presented in table 2. Note that the percentages total greater than 100% as many IS managers cited numerous sources for the training.

As expected, the IS managers did rate seminars/workshops and vendor supplied training higher than the other forms of training. This was statistically substantiated by an ANOVA with a Tukey post hoc test ($F=12.36$, $p<.0001$). Thus, the hypothesis 2A was accepted. However, the quality of training provided by educational institutions was not rated significantly higher in quality than organizational programs. Thus, hypothesis 2B was rejected. Finally, self-instruction was rated the lowest and below average in quality [3]. The means of the quality of training by the different providers of the training as indicated by the IS managers are also shown in Table 2.

Table 2. Frequency of Use and Quality of Training Providers

Sources of Training	Frequency	Percentage of Respondents	Quality Mean
None	12	8%	--
Self-instruction	115	73%	2.68
Organizational Sources	66	43%	3.08
Vendors	83	54%	3.28
Educational Institutions	37	24%	3.17
Workshops and/or Seminars	80	52%	3.45

Education versus training. If education emphasizes a broader life-long approach to learning while training emphasizes short-term and immediate skill development, it was hypothesized that IS managers with training from an educational institution would be more aware of the potential of telecommunications and would rate the importance of telecommunications more highly than the IS managers without training from an educational institution. Thus, the final hypothesis was formulated:

3. IS managers with telecommunications training from educational institutions will rate the overall importance of telecommunications higher than IS managers without such education. It is further hypothesized that the IS managers with training from educational institutions will significantly rate the importance of emerging applications and managerial Issues higher than the other IS managers.

In order to test this hypothesis, the authors divided the respondents into two groups: those with telecommunications training from an institution of higher education and those without such training. The twelve respondents who indicated no training in telecommunications were not included in this statistical analysis. The dependent variable was the average of the importance rating on the thirty issues. As expected, there was a difference in the responses of the two groups. The mean response of IS managers with training from an educational institution on the importance of telecommunications was 4.01. The mean response of the IS managers with training from other providers rated the importance was 3.73. This was a statistically significant difference ($t=2.56$, $p=.0118$). In addition this statistical difference was noted in all areas of telecommunications training [3]. The t-statistic and the group means for the four telecommunications categories are presented in Table 3.

Table 3. Importance of Telecommunications by Factors As Perceived by IS Managers

Factor	t-statistic	p-value	Importance Means	
			Educational Institutions	Other Training
Basic Applications	3.68	.0003	4.23	3.79
Advanced Applications	2.81	.0058	3.49	3.11
Technical Issues	2.13	.0349	3.96	3.68
Managerial Issues	2.20	.0292	4.27	3.99

SUMMARY AND CONCLUSIONS

The most commonly used source of training was self-instruction. Unfortunately, the quality of this source of training was rated as below average. It is difficult to obtain help and to be alerted to software idiosyncrasies by self-instruction. Thus, it was not surprising that vendor supplied training and workshops and seminars offered by third-party providers of training were rated the highest. These sources of training were only rated as slightly above average. Training from educational institutions was the least used of the sources of training. It was used by 24% of the IS managers of healthcare organizations. This form of training was rated the lowest of the external training providers. This can be partially justified by the difference in objectives between education and training. Educational institutions do appear to be stressing the ability to expand one's knowledge into the future. It has a wider and longer term focus than skill-specific training. Managers with training from educational institutions more highly rated the importance of telecommunications than the other managers

The healthcare managers have spoken. They desire additional training in information technology on the managerial issues. It is these issues that can give the organization a competitive advantage. They have a long-term focus. It is time that the organizations devote enough resources to the telecommunications function to allow for the shift in training from a short term to a long-term focus.

REFERENCES

1. Anonymous. (2002). Profits Are Up for Most U.S. Hospitals, But Outlook Remains Dismal for Some, *Healthcare Financial Management*, *56*(8), 100.
2. Jaklevic, M. C. (2002). Runaway Costs, *Modern Healthcare*, *32*(3), 12-13.
3. Ketler, K., Willems, J.R. & Srinivasan, M. (2002). Telecommunications Instruction in Healthcare Organizatons: Education or Training? *Proceedings of the Special Interest Group on Computer Personnel Research of the Association for Computing Machinery*, 34-40.
4. Reilly, P. (2004). AHA Report Says Hospital Profits Are Up for First Time Since 1996, *Modern Healthcare*, *34*(1), 6-7.
5. Torkzadeh, G., & Xia, W. (1992). Managing Telecommunications by Steering Committees, *MIS Quarterly*, *16*(2), 187-199.
6. Willems, J.R. & Ketler, K. (1999). Telecommunications Issues: The Information Systems Managers' Viewpoint, *Industrial Management & Data Systems*, *99*(2), 81-88.