The CIO in Higher Education:
Leadership, Competencies,
Effectiveness

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Overview

As many higher education information technology leaders assume cabinet-level roles as chief information officers (CIOs), institutions with truly effective IT leaders have a strategic advantage. A 1999 Gartner study projected that by 2003, as many as 75 percent of all academic institutions would have a CIO position, with nearly half of those operating as full or equal cabinet members at their respective institutions.\(^1\) As the role is elevated within institutions, the nature and scope of CIO responsibilities will change. Emphasis on the more technical or traditional “IT director” position will decrease in favor of CIOs with detailed understanding of higher education and an institutional perspective on strategy and operations. Successful IT leaders will need leadership skills\(^2\) that enable them to effectively align and manage IT resources to meet the strategic needs of their institutions. Such alignment will improve both IT success and organizational performance within academic institutions.\(^3\) Success of IT in higher education will depend on effective strategic and operational leadership.

Despite the increased prevalence of the CIO position, no single model has emerged that explains what can realistically be expected of the CIO in various organizational contexts. While many authors have captured the general essence of the CIO role, what makes a particular CIO effective is contingent on many highly dynamic factors of the internal and external environments of the organization he or she serves. To address this problem from the research literature, the researchers identified knowledge-based and activity-based factors related to CIO effectiveness in various contexts. By applying these factors with other leadership-specific variables, such as leadership style, a picture of what makes a CIO effective in higher education begins to emerge.

Research Methodology

This research bulletin analyzes the findings from 229 valid responses to a national survey of the highest-ranking information technology or information management staff members at 867 higher education institutions. The findings are based on data gathered between July and September of 2002. By focusing on the roles of leadership style and of knowledge-based and activity-based competencies in developing effective IT leadership, the study provides insight into the characteristics of effective IT leadership in the higher education environment. The goal of the survey was to gain insight into competencies required of IT management in higher education. By examining differences among IT leaders at different types of academic institutions, the survey provided both confirmation and insight into the nature of top IT leadership in higher education and the factors that contribute to its effectiveness.

The institutions surveyed were selected using a stratified random sample pulled from four Carnegie class groupings: doctoral and research; master’s (comprehensive); baccalaureate; and associate’s (including community colleges). Surveys were coded using a predetermined scheme for all questions, and data were entered directly into the statistics software package SPSS (version 11.0). The survey data were initially analyzed using both frequency analysis and descriptive statistics. In addition, on select questions,
cross-tabulations, correlation analysis, simple regression analysis, reliability analysis, and/or factor analysis were applied.

The survey itself consisted of six major sections:

- **Section one** collected demographic information about the respondents, such as title, education, and work experience.
- **Section two** collected data about institutional or IT department characteristics, including Carnegie class, department and institution size, and areas of responsibility.
- **Section three** provided a leadership-style inventory. Each CIO responded to a series of 20 questions on a five-point scale based on how closely they associated with each statement (1 = not like me, 2 = not usually like me, 3 = somewhat like me, 4 = usually like me, 5 = very much like me). These questions yielded four composite values for each respondent, each representing one of four leadership types: trustee, adapter, collaborator, and entrepreneur. Based on their responses to the 20 items, respondents received a calculated score for each of the four types, providing a measure of preference for that leadership style.
- **Section four** assessed the perceived relationship between the top IT leader and the topmost administrator at the institution. This section also evaluated satisfaction with the IT planning efforts and involvement in non-IT decision making. These variables have been identified in prior research as good indicators of effectiveness.
- **Section five** measured three knowledge-based factors related to CIO competence that respondents felt were critical to succeed in their jobs: business factors, technical factors, and behavioral/organizational factors.
- **Section six** measured three activity-based factors related to CIO competence: conveying the relevance of IT, managing critical relationships, and implementing IT-based solutions. Respondents evaluated the relationship between performing each activity-related task and overall success in their jobs. These factors were adapted from existing literature to fit within a higher education context.

### Highlights of IT Leadership Effectiveness and Leadership Style

For decades, researchers and practitioners alike have attempted to better understand what is involved in effective leadership. Various theories and explanations of leadership have emerged, and several attempts have been made to integrate these theories into a single, comprehensive framework. Current theory suggests that leadership effectiveness is a function of leader characteristics and behavior, group member characteristics, and other situational variables. Put another way, effective leadership is neither concrete nor static. In fact, examples of effective leadership are not universally applicable.
The concept of effective leadership suggests that there are critical success factors that define competence. What does this mean for the CIO function? In short, successful CIOs will have a mix of knowledge and skills that are behavioral, business, and technical in nature.\(^5\) Earl and Vivian summarized the state of the literature on this topic well. They wrote that the modern CIO “needs technological expertise and experience, business know-how and judgment, and behavioral skills of a high order, especially in leadership, communication, teamwork, and facilitating change.”\(^6\) Their comment reflects the growing emphasis of CIOs on behavioral and organizational domains. These domains focus on the need for top IT leaders to focus on knowledge areas and activities both inside and outside the traditional IT functional area. These include managing relationships, conveying IT relevance, leading and facilitating organizational change, influencing organizational strategy, and developing organizational policies that are technologically relevant.\(^7\) The challenge is defining the appropriate balance of knowledge and skills across the variety of activities and knowledge domains in order for a CIO to be effective.\(^8\)

As noted in the methodology section above, for this study we defined CIO competence using six dimensions drawn from the literature: three are knowledge-based (business, technical, and behavioral/organizational), and three are activity-based (conveying the relevance of IT, managing critical relationships, and implementing IT-based solutions). Table 1 provides a rank ordering of the knowledge-based factors that respondents identified as critical.

**Table 1. Respondents’ Rank Order of Critical Knowledge-Based Factors**

<table>
<thead>
<tr>
<th>Business Factors</th>
<th>Human Factors</th>
<th>Technical Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution objectives and goals</td>
<td>Successful people who embody the values and character of the institution and its culture</td>
<td>Security applications (system and network)</td>
</tr>
<tr>
<td>Institution resources</td>
<td>Set of expectations that members of a group have for one another</td>
<td>World Wide Web or Internet</td>
</tr>
<tr>
<td>IS staff</td>
<td>Informal reporting structures</td>
<td>E-mail</td>
</tr>
<tr>
<td>Institution mission</td>
<td></td>
<td>LANs</td>
</tr>
<tr>
<td>Students</td>
<td></td>
<td>Database technology</td>
</tr>
<tr>
<td>Top-level administration</td>
<td></td>
<td>Course management software</td>
</tr>
<tr>
<td>Faculty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institution policies</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2 describes, in rank order, the critical activity-based factors respondents indicated they must perform to be effective. Items receiving a mean of less than 4.0 on a 5-point scale by the respondent population as a whole are not included.

### Table 2. Respondents' Rank Order of Critical Activity-Based Factors

<table>
<thead>
<tr>
<th>Manage Relationships with Relevant Others</th>
<th>Convey Relevance and Value of IT</th>
<th>Plan and Implement IT-Based Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speak the language of constituent groups from across campus (other departments, faculty, and students)</td>
<td>Disseminate information about the need and rationale for IT-based change</td>
<td>Create a participative IT planning process</td>
</tr>
<tr>
<td>Actively participate in top-level institutional decision making</td>
<td>Promote IT as an agent of institutional transformation</td>
<td>Procure and organize the technological expertise necessary for systems analysis, design, and implementation</td>
</tr>
<tr>
<td>Stay abreast of developments in the program areas of other managers</td>
<td>Disseminate information about the results of recently completed IT-based projects</td>
<td>Involve those to be affected by an IT-based change in its design and implementation</td>
</tr>
<tr>
<td>Explain to users that their feedback regarding the detailed systems design is critical to expanding the benefits of their systems</td>
<td>Disseminate information about the benefits/costs of IT-based change</td>
<td>Disseminate results of IT projects</td>
</tr>
<tr>
<td>Provide information on a selective basis to get people to support desired IT-based changes</td>
<td>Stress the economic value of IT to top-level institutional administrators</td>
<td>Coordinate IT projects</td>
</tr>
<tr>
<td>Educate constituent groups from across campus regarding the issues of IT architectures</td>
<td></td>
<td>Participate in IT projects</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Procure and allocate the equipment needed for systems development</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Encourage an iterative systems-development approach by IT staff to ensure flexibility to evolving system requirements</td>
</tr>
</tbody>
</table>

### Relationships Among Competency Factors

Further analysis of these data resulted in some interesting patterns.

- Strong relationships are evident between the competencies and activities identified as critical. Table 3 illustrates the intersection of critical knowledge-based and activity-based factors.

- Although all the significant correlations are positive between factors and activities, the strength of the relationships (and the number of significant relationships) is not universal.

- Respondents who rated awareness of the key business factors as critical were more likely to rate activities under managing relationships and conveying relevance as critical as well.
While there were some strong positive correlations between key business factors and certain individual measures of planning and implementation, overall there were far fewer significant intersections between these two categories than between others.

Table 3. Intersection of Critical Knowledge-Based Competencies and Activities

<table>
<thead>
<tr>
<th>CIO Competencies</th>
<th>CIO Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Manage Relationships</td>
</tr>
<tr>
<td>Business</td>
<td>More strongly related</td>
</tr>
<tr>
<td>Human</td>
<td>More strongly related</td>
</tr>
<tr>
<td>Technical</td>
<td>More weakly to barely related</td>
</tr>
</tbody>
</table>

The same relationship exists between the human factors and the activities, with a strong relationship between those human factors rated as critical and the activities of managing relationships and conveying relevance. However, results illustrate that there was a weak relationship between the critical human factors and the rating of planning and implementation activities as critical, suggesting the possibility of some interesting questions regarding this connection. Finally, the technical factors were not as strongly related to any of the activity categories, with the weakest relationship being between the criticality of technical factors and the importance of managing relationship activities.

Overall, the patterns in Table 3 suggest that the critical human and business competencies are more tightly linked to activities oriented toward managing relationships and conveying the relevance and value of IT, while the critical technical competencies are most relevant to planning and implementing IT solutions.

The Power of Leadership Style

The preceding discussion is useful to consider as we begin to develop our thinking about the nuances involved in establishing effective IT leadership. One of those nuances, which was considered in the context of this study, is the role of leadership style. We know that leaders exercise their power in different ways based on their personality or organizational context. These differences—leaning towards autocratic or laissez-faire leadership, for example—are typically referred to as leadership style. There is also evidence that different leadership styles are better suited for certain organizational environments or organizational initiatives and can have a significant effect on organizational profitability. For this study, respondent leadership styles were measured...
along four dimensions or tendencies: trustee, adapter, collaborator, and entrepreneur. A brief description of each of these dimensions, or styles, is captured in Table 4.

Table 4. Description of Leadership Dimensions

<table>
<thead>
<tr>
<th>Leadership Dimension</th>
<th>Description of Preferences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trustee</td>
<td>Preference to use regulations and rules to guide open-ended decisions; preference for clearly defined goals and procedures in working on tasks; tendency to approach interpersonal relationships with logical reason rather than subjectivity</td>
</tr>
<tr>
<td>Adapter</td>
<td>Awareness of many political interests in decisions; preference to use bargaining and compromise to decide how work is to be accomplished; tendency to be means-oriented in developing interpersonal relationships; tendency to base decisions on contingent considerations</td>
</tr>
<tr>
<td>Collaborator</td>
<td>Comfort with complex decisions; preference or tendency to work toward consensus; tendency to be concerned with &quot;people&quot; in forming interpersonal relationships; tendency to base decisions on intuitive assessment of what will produce decision benefiting all</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>Tendency to be a &quot;big picture&quot; thinker who prefers strategic decisions; tendency to take calculated risk and focus energies on high-value terminal goals; tendency to use innovation and intuition in creating task and interpersonal relationships</td>
</tr>
</tbody>
</table>

Respondent Leadership Styles

As noted in the methodology section, based on their responses to the leadership style portion of the survey, respondents received scores between 5 and 25 on each of the four dimensions, indicating their preference or tendency for particular leadership styles. The type for which a respondent received the highest score is considered the "dominant" or preferred style of leadership. Figure 1 shows the breakdown of dominant leadership style by percentage of respondents. Dual-types indicate respondents who scored equally in two or more categories.
Respondents with higher trustee preferences were more likely to be among those with director-related titles, while those with the collaborator, adapter, or entrepreneur preferences were more likely to have a CIO- or vice president–related title. Adapters and entrepreneurs were more likely to have their highest degree earned at the master’s or doctoral level, be an executive officer of their institution, and participate in resource decisions that are non-IT oriented. Adapters were also somewhat more likely to have spent more time working in higher education than other types.

**Relationship Between Leadership Style and Knowledge-Based Competency Factors**

When leadership style is compared to the knowledge-based areas that influence CIO effectiveness (from Table 1), the following interesting observations emerge:

- Individuals with high collaborator and/or higher entrepreneur scores were most likely to give higher rankings to the topmost business-oriented knowledge-based factors, particularly those factors with an institutional focus.

- High scores for collaborator, adapter, or entrepreneur styles were more strongly related to higher critical ratings in all of the human factors, with the exception of formal reporting structures.

- Adapters had the strongest and most significant relationships, with high scores for all human factors except formal reporting structures.
High collaborator and entrepreneur scores related to higher scores for database technology and decision-support systems. High collaborator scores also related to more critical ratings for security applications, while high entrepreneur scores related to higher scores in both World Wide Web applications and distance learning.

Adapters showed the greatest relationship to a large array of critical technical factors. Higher adapter scores related to a higher rating of importance for all technical factors except for LANs and distance learning.

These patterns suggest that leadership style preferences may play an important role in how leaders decide which knowledge-based factors are critical for them to be aware of, and thus how they may choose to focus their time and energy for professional development.

**Relationship Between Leadership Style and Activity-Based Competency Factors**

Like the knowledge-based competency factors, leadership styles were more strongly and significantly related to CIO activities than most other variables. As with the knowledge-based areas, these patterns suggest that preferred leadership style has significant influence over what activities top IT leaders deem important, and thus how they likely spend or allocate their time. Among the interesting patterns are the following:

- Individuals with high adapter and collaborator scores were most likely to rate managing relationship activities as most critical, but only slightly more so than those respondents with high trustee or entrepreneurship scores.

- Individuals with high adapter and entrepreneur scores were most likely to provide higher importance ratings to the key activities tied to conveying the relevance and value of IT.

- High collaborator and trustee scores were related to higher ratings for several of these activities, with high collaborator scores being most strongly tied to promoting IT as an agent of institutional transformation and high trustee scores tied more closely to stressing the economic value of IT and disseminating information about the costs and benefits of IT-based change.

- Individuals with high adapter, collaborator, and entrepreneur scores were more likely to rate the following planning and implementation activities as critical:
  - Disseminating results of IT projects,
  - Encouraging iterative systems development,
  - Encouraging end-user involvement in design and implementation, and
  - Procuring and organizing the technological expertise required for system development.
In contrast, high trustee scores typically resulted in a different set of planning and implementation activities receiving higher importance ratings, including:

- Participating in IT projects,
- Coordinating IT projects,
- Encouraging end-user development, and
- Procuring and allocating equipment for systems development.

**What It Means to Higher Education**

As with private-sector organizations, institutions of higher education are becoming increasingly dependent on information technology. As a result, we find more CIOs in higher education at the cabinet level. Today’s students are increasingly technologically savvy and may have been using computers—and soon even the Internet—since preschool. Other networking technologies, and the need to constantly re-educate the workforce, create additional demands for ubiquity in delivery. These and other pressures have led many institutions to pursue new ventures in distance education, high-tech classrooms, and wired campuses. With rapidly changing technologies and growing costs of technology for colleges and universities, this approach may not be sustainable over the long term. Thus, the top information managers in higher education require many of the same competencies as CIOs in other sectors if their institutions are to both survive and flourish in the information age.

**The Importance of Leadership Style for IT Leaders**

In contrast to Gartner projections, the results of this study suggest that higher education has not adopted the CIO concept as quickly as expected. Other predictions, however, including one that up to half of U.S. colleges and universities might have CIOs by 2000, appear to have been realized. A key finding of this study is that leadership style appears to play an important role in CIO effectiveness, as prior literature suggests for leadership in general. The study provides good evidence that there are significant relationships between leadership style and other variables linked to CIO effectiveness. These findings, among others, may help institutions with the problem of “recruit[ing] people who can adequately respond to the demands of the function.”

This leads to two specific sets of observations important to institutions in the process of seeking a CIO or the professional development of the existing top IT leader.

- This study found that leadership style preferences influence how CIOs rate the importance of various competency factors and activities. Because these factors and activities have been previously linked to CIO effectiveness, we believe that leadership style may have an important impact on CIO effectiveness and on how CIOs choose to pursue IT alignment within their organizations. This finding deserves more attention as we attempt to develop or seek individuals who will be more effective leaders of the IT function.
The adapter leadership style was significantly correlated with a number of important variables linked to CIO effectiveness, such as satisfaction with involvement in IS planning efforts, participation in non-IT decisions, and holding an executive officer position. Institutions seeking to better manage the IT function may seek leaders with high adapter preferences or attempt to develop stronger adapter behaviors in current leaders. Institutions may also find certain leadership style preferences are more suited to carrying out select IT initiatives.

**Institutional Planning, IT Planning, and CIO Satisfaction**

On a related note, the study also shows that across the board, top IT managers in higher education are involved in top-level IS planning. Fewer than 75 percent, however, are involved with institutional strategy, and even fewer participate in non-IT decisions or are involved with running their institutions. A similar percentage frequently communicated with top administration in general or about IS plans specifically. Most respondents also gave a lower evaluation to their ability to link IS plans with institutional plans. Other indicators from the survey further suggest that, as a whole, the top-level IT manager in higher education has a poor satisfaction level with IS strategic planning processes. This set of findings is important because prior research clearly links these perceptual factors to the effectiveness of the IT planning process, the CIO, and the IT function in general. From these findings, two specific observations stand out:

- Individuals with high adapter leadership style preferences are most likely to express satisfaction and success with the IS strategic planning process, providing further evidence that individuals with this style preference may be more effective in the top IT leadership role.

- Institutions should make additional effort to involve their top IT leaders in developing institutional strategy, running the institution, and participating in non-IT decisions. Doing so may develop better adapter leadership behaviors and should almost certainly result in IT decisions that are more closely aligned to the institution’s needs. As a result, both the top IT leadership and the IT function in general should become more effective for institutions pursuing this strategy.

No one knows, at this time, whether leadership styles and behaviors can be trained. There is significant debate as to whether such human characteristics are innate or learned. It appears clear, however, that leadership style does influence the effectiveness of an IT leader. Thus, this factor should be considered in recruitment and promotion decisions.

**Key Questions to Ask**

- How and to what degree are top IT leaders involved in the institution beyond IT? Specifically, are they involved with developing institutional strategy or running the institution as a whole? Are they participating in non-IT decisions?
• Does your IT leader have frequent opportunities to communicate with other top leadership in the organization? Is the IT leader a member of the executive cabinet for the institution?

• What leadership style or behaviors does your current IT leadership exhibit or prefer? How can the leaders expand their "adapter" behaviors and skills?

• In evaluating an IT leader, what experiences will you look for to assess a candidate’s adapter leadership style or behaviors? Collaborator behaviors? Entrepreneur behaviors? Trustee behaviors?

• How will a change in leadership style help your institution or IT organization better resolve strategic problems and improve the success of future initiatives?

Where to Learn More


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Endnotes


7. Ibid.

8. Shi and Bennett, op. cit.


13. Rotemberg and Saloner, op. cit.


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