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Developing a Web-Based Developmental Feedback Program

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DEVELOPING A WEB-BASED

DEVELOPMENTAL FEEDBACK PROGRAM

THESIS

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Abstract

Developmental feedback programs provide an opportunity to improve leadership practices by giving leaders feedback about their performance from a number of sources. This thesis expanded on Capt Doug Patton's pilot study (2002) that developed and validated an upward feedback instrument (UFI) for Aeronautical Systems Center (ASC) and Air Force Security Assistance Center (AFSAC) supervisors. Specifically, the purpose of this thesis was to develop a web-based developmental feedback collection, reporting, and analysis tool-set. The collection and reporting instrument was based on Patton's instrument (2002) and updated under an on-going study by Capt Abby White (2003). The analysis tools were loosely based on the exercises contained in the Leadership Challenge Workbook (Kouzes and Posner, 2001) as well as recommendations from other leadership scholars (e.g., Yukl, 2002).

A structured approach to the information systems life cycle was used to design the web-based developmental feedback system. The result of the life cycle was a system that performed three distinctive functions: 1) on-line collection instruments for self and observer assessments, 2) automatic feedback data entry and reports for each leader and across leaders for the researcher, and 3) on-line workbook to aid leader self-analysis and development of action plans. The perceived utility of the feedback provided by the program and usability of the system were assessed. Results from the assessments were used to recommend improvements to the program.

DEVELOPING A WEB-BASED DEVELOPMENTAL FEEDBACK PROGRAM

I. Introduction

Background

Developmental feedback programs provide an opportunity to improve leadership practices by giving leaders feedback about their performance from a number of sources. This thesis expanded on Patton's pilot study (2002) that developed and validated an upward feedback instrument (UFI) for Aeronautical Systems Center (ASC) and Air Force Security Assistance Center (AFSAC) supervisors. Specifically, the purpose of this thesis was to develop a web-based developmental feedback collection, reporting, and analysis tool-set. The collection and reporting instrument was based on Patton's instrument (2002) and updated under an on-going study (White, 2003). The analysis tools were loosely based on the exercises contained in the Leadership Challenge Workbook (Kouzes and Posner, 2001) as well as recommendations from other leadership scholars (e.g., Yukl, 2002).

The upward feedback instrument developed by Patton (2002) was designed to measure six different leadership constructs. Five constructs were modeled after the practices presented in *The Leadership Challenge* by Kouzes and Posner (1995). The five practices were challenge the process, inspire a shared vision, model the way, enable others to act, and encourage the heart. Kouzes and Posner (1995) defined two commitments for each practice that described, in further detail, actions people should take to develop their leadership behaviors. Posner and Kouzes (1988) developed the Leadership Practices Inventory (LPI) to measure each of the five leadership practices.

Patton's sixth construct, have fun, was developed at the request of ASC and AFSAC, and reflected the extent to which supervisors engaged in behaviors that were designed to relieve stress and tension in the workplace. In addition to the sixth leadership practice, have fun, Patton's UFI differed from the LPI in that it measured leader behavior at the lower commitment level.

The leadership commitments inventory (LCI) was the instrument designed for this study's web-based developmental feedback program. White (2003) modeled and developed the LCI using the research conducted by Kouzes and Posner (1995, 2002) and Patton (2002). It maintained the original five practices from Kouzes and Posner's LPI, and the sixth practice from Patton's UFI, now called "Enjoy the workplace."

The LCI updated over half of Patton's items in order to more distinctively measure the twelve commitment constructs and to reflect changes made by Kouzes and Posner (2002). All items were updated to facilitate 360-degree observation.

Research Objectives and Scope

Feedback programs only provide value to the extent people use them. To change or improve their leadership behaviors, leaders must move through four stages of feedback. These stages are: (a) feedback is perceived, (b) feedback is accepted as accurate, (c) feedback is found useful, and (d) actual behavior is changed (Brett & Atwater, 2001). An effective developmental feedback program should provide the tools necessary for the leader to move through the four stages. An effective tool should also be fairly efficient. The original instrument was a paper and pencil questionnaire. Data needed to be entered manually and the researchers generated reports through a labor-intensive process integrating data across multiple spreadsheets. Reports were provided in

paper format. The commercially available workbooks were tailored with additional instructions for the have fun construct, as well as idiosyncratic differences between the commercial and developed instruments. No facilities were provided to allow supervisors to track their performance over time.

The overall objective of this study was to develop a web-based system for the developmental feedback programs of ASC, AFSAC, and Air Force Materiel Command (AFMC) that could move leaders through the feedback process while automating data collection, reports, and statistical analysis. There are many advantages to web-based systems. Some include high rate of response, short time frame for the collection of responses, and time and cost savings (Clarkson, 1999; Coomber, 1997; Kimball, 1998; Mertler, 2002; Sheehan & Hoy, 1999; Sills & Song, 2002; Slevin, 1997; Tierney, 2000; Virtual Survey Limited, 1996; Watt, 1997). Furthermore, they are an excellent resource for obtaining and processing large amounts of data (Mertler, 2002). This study aimed to develop a web-based system with three distinctive functions: 1) on-line collection instruments for self and observer assessment, 2) automatic statistical analysis and generation of reports for each leader and across leaders for the researcher, and 3) on-line workbook to aid leader self-analysis and development of action plans. These functions were specifically designed to move a leader through the feedback process to improve their leadership behaviors.

Research and Investigative Questions

To accomplish these objectives, it was necessary to answer specific research and investigative questions. The overall research question was "How can a web-based developmental feedback program provide the necessary tools for leaders to move through

the four stages of feedback and improve their leadership behaviors?" The investigative questions were as follows.

1. What system capabilities are dictated by developmental feedback requirements that will allow the leader to easily move through the feedback process to behavior change?
2. How do the requirements affect system architecture?
3. How does the system architecture affect the actual system design?
4. How do you translate the architectural and physical designs into a working information system?
5. How do you assess the perceived utility of the feedback and usability of the information system?

Importance of this Research

This study retrieved and consolidated the theoretical requirements for an effective developmental feedback program, providing a baseline program for organizations. This program was designed to provide leaders with an accurate portrayal of their performance, allowing them to make meaningful behavioral changes that will improve their leadership and the organization. This study is also beneficial to researchers in that it created a platform for them to launch developmental feedback studies. They now have a tool that will provide automatic data input and statistical analysis, saving time and money.

II. Literature Review

This literature review contains four sections. The first section focuses on what makes an effective developmental feedback program and how such a program can provide accurate and useful feedback. The second section highlights the theory behind and development of the Leadership Practices Inventory (LPI), Upward Feedback Instrument (UFI), Leadership Commitments Inventory (LCI), and Stakeholder Assessment feedback instruments. It also addresses the reasons why the LCI was developed and used in place of the LPI and UFI. In the third section, the advantages of web-based surveys are discussed. Finally, the fourth section focuses on information systems development.

Developmental Feedback

Developmental feedback (also referred to as 360-degree feedback, multi-rater feedback, or multi-source feedback) can be provided by a number of sources. Sources can include a leader's boss, peers, subordinates, team members, or customers. Developmental feedback programs focus on providing positive change for the leader and the organization (Bracken, 1994). An effective program will highlight leadership development areas for the leader, encourage the leader to set goals based on desired improvement in those areas, and ultimately lead to behavior change (London & Smither, 1995). To implement a successful program, top management should introduce the program to let leaders know that developmental feedback is important to the organization. Leaders must also be given the discretion to seek feedback, develop action plans, and change behavior based on the feedback (Alimo-Metcalfe, 1998).

Ilgen, Fisher, and Taylor (1979) posited that an individual's processing of feedback can be broken into four stages: (a) perception of feedback, (b) acceptance of feedback, (c) desire to respond to feedback, and (d) the intended response. Perception of feedback is concerned with how accurately the recipient perceives the feedback from any given source. These perceptions are affected by the interval between the behavior and the feedback received (timing), whether or not the feedback was positive or negative (sign), and how often feedback is provided (frequency). Feedback acceptance refers to the recipient's belief that the feedback is an accurate portrayal of his or her behavior or performance. Here feedback is most likely accepted as accurate if the source was reliable and credible and if the feedback was positive. The desire to respond to the feedback is linked to the power of the feedback source. Power refers to the extent to which the recipient believes the source influences the contingency between the recipient's behavior and his or her receipt of valued outcomes. In other words, the more the source controls valued outcomes, the more likely the recipient will respond to the feedback.

The intended response is motivated by the feedback received, which plays an essential role in the goal setting process. But feedback alone will not produce behavior change (Locke & Latham, 1990, 2002). Therefore, feedback must allow the recipient to set specific, difficult goals. As a result, that person will be more likely to produce the intended response. However, the feedback process does have a constraint. If the recipient does not have the discretion (i.e., support of supervisor or organization) to change behavior, the feedback provided cannot be acted upon.

Brett and Atwater (2001) applied the feedback model and assessed the four stages in understanding how developmental feedback results in behavior change. The stages

were adapted to their study and were: (a) feedback is perceived, (b) feedback is accepted as accurate, (c) feedback is found useful, (d) actual behavior is changed. Effective developmental feedback programs will provide the tools necessary for the leader to move through the four stages.

After sifting through the literature on developmental feedback it became apparent that effective developmental feedback programs provided three functions: (a) feedback collecting, (b) results reporting, and (c) action planning. These functions, if properly designed and implemented, work together to help the leader move through the aforementioned stages of feedback.

Organizations should tailor these functions to meet their needs. The following paragraphs highlight each function. The features of each function are ideal to implement, however organizations may not be able to institute all of the features due to resource constraints and practicality.

Feedback Collecting

To collect feedback, an organization needs a developmental feedback instrument and raters. There are numerous available instruments but organizations should work hard to choose or develop an instrument that meets their needs. First and foremost, the instrument should be reliable and valid (Bracken, 1994; Fletcher, Baldry, & Cunningham-Snell, 1998; Morical, 1999; Vinson, 1996) and should have been developed based on statistical methods (Vinson, 1996). To ensure complete and purposeful feedback, the category structure of the instrument should be developed using factor analysis (Bracken, 1994; Hazucha, Hezlett, & Schneider, 1993). This breaks the items into specific areas of focus and provides the leader more specific direction for

individualized development planning. The areas of focus should highlight behaviors (not traits) that are important to the organization as well as the organization's values (Bracken, 1994; London & Smither, 1995; Morical, 1999). This lets the leader know which leadership behaviors are critical for success. All these features ensure the leader being assessed gets accurate information. The instrument can be administered as a paper-and-pencil survey or electronically. The advantages of an electronic (or web-based) survey will be discussed later.

While choosing an instrument, organizations should choose one that allows the leader to perform a self-assessment (Church, 1995; London & Smither, 1995). Self-assessment is important for a couple of reasons. It allows the leader to view the relevant leadership behaviors and gain an initial understanding of some of the areas they might need to improve. It also provides information for the leader to compare his or her ratings with the ratings of others, thereby gaining a better self-understanding (London & Smither, 1995). After the self-assessment, the leader should request feedback from other sources. Organizations determine who will provide the feedback and should choose an instrument that allows for multiple sources of feedback (i.e., boss, peers or coworkers, subordinates).

These raters are obviously an extremely important part of the developmental feedback process. Therefore, choosing the correct raters should be at the forefront of any leader's mind (Alimo-Metcalfe, 1998; Bracken, 1994). London and Smither (1995) identified certain rater characteristics that affect how much the leader will pay attention to the feedback. The feedback source must be reliable and credible and must have the power to affect leader response. If the source is reliable and credible, the leader will

more likely view the feedback as accurate. Ilgen et al. (1979) predicted that a feedback source that controls valued outcomes (i.e., has power) will most likely cause a recipient to respond to the feedback and provide the intended response. In the case of multi-source feedback, the leader's boss would seem to have the most power because the boss controls many valued outcomes such as pay, benefits, time off, and promotions. An improvement seen by the boss may have an effect on the valued outcomes. It would seem that other sources might have less power because of their inability to control valued outcomes. However, Brett and Atwater (2001) posited that direct reports' might also be perceived as the most relevant because the leadership behaviors highlighted are most applicable to that group.

There must also be enough raters to provide accurate feedback. Theoretically, more raters will assure more accurate feedback. Greguras and Robie (1998) posited that the number of raters should be increased for better interrater reliability. London and Smither (1995) found that a larger number of raters also ensured the leader paid more attention to the feedback (i.e., deemed it more accurate). According to London and Smither (1995), three to five raters reduced the possibility of biased, inaccurate information.

One pitfall sometimes found in developmental feedback programs is that leaders will pick their friends to assess their leadership behaviors. As a result, the leader does not necessarily receive the most accurate information. Organizations can reduce the possibility of this bias occurring by limiting the number of raters a person can have, by requiring leaders to have their list reviewed by someone, or by limiting the number of assessments a particular rater can perform (Bracken, 1994). They can also achieve less

bias through encouragement (get better information) and assurance (critical information will not be used administratively).

Organizations should ensure the feedback is confidential and anonymous (Alimo-Metcalfe, 1998; Bracken, 1994; London & Smither, 1995; Vinson, 1996). Even when programs are used for developmental purposes it is wise to guarantee confidentiality by using a party outside the organization to process the data and provide the results. In other words, the feedback data should only be used to provide feedback reports for the leader. Furthermore, the leader should be the only person to have access to the reports. Confidentiality and anonymity encourage honest participation by leaders and raters alike, resulting in more accurate feedback (Bracken, 1994). Most feel that to ensure anonymity at least three raters should be used in a particular feedback category (Bracken, 1994; London & Smither, 1995).

Results Reporting

Once the raters provide the feedback, it must be presented for the leader to receive and understand it. Feedback reports are a good way to integrate feedback results into the developmental feedback program (Church, 1995). These reports should be the starting point of the development process, allowing leaders to review their results and prepare a development plan (Alimo-Metcalfe, 1998). The results should be clear, specific, and purposeful in nature (Morical, 1999).

A complete and understandable report format is key to understanding the feedback and can affect the perceived accuracy of the results (London & Smither, 1995). A report using a graphical representation of the results allows leaders to make immediate

interpretations of the feedback and makes it easier for them to translate the results into action (Morical, 1999).

Comparison reports are helpful for leaders to relate others' feedback with their own self-assessment (Church, 1995). These comparisons allow leaders to determine discrepancies between their perceptions and the perceptions of others. The discrepancies provide natural targets for goal accomplishment in order to restore perceptions of self-competence.

Ratings of the instrument items or categories should be presented with some index of variability (e.g., standard deviation or range) to show the leader the degree to which the raters agreed or disagreed (Gregarus & Robie, 1998; London & Smither, 1995). Once again, in order to ensure anonymity of the raters, feedback results for a specific category should not be presented until three raters have provided feedback (Bracken, 1994). However, for certain categories of raters (e.g., the boss) the rule of three does not apply. The boss is accustomed to providing feedback and likely does not require anonymity to provide an honest assessment.

Action Planning

Feedback alone does not lead to skill development and performance improvement. As stated before, the feedback must allow the leader to set specific, difficult goals before behavior change can take place (Locke & Latham, 1990, 2002). Developmental feedback programs should have some sort of action planning mechanism to allow for goal setting. In this case, goal setting does not necessarily have to be voluntary but should occur as a result of the program design (London & Smither, 1995). Action planning or follow-up is necessary for a successful program.

Once leaders review the results in the feedback report, they are ready for skill development or improvement. To do this they must develop some type of action plan. Action planning can be enhanced through one of three ways: a one-on-one facilitated development session, a development workshop, or a development workbook (Bracken, 1994).

An effective way to help leaders develop action plans is through a one-on-one facilitated development session. In the one-on-one session a facilitator (who is an expert in feedback interpretation) is available to provide helpful planning and development support (Bracken, 1994; Morical, 1999; Vinson, 1996). The facilitator can help the leaders read and interpret reports, develop and write action plans, guide discussion of feedback results with raters, and review progress (Bracken, 1994).

London and Smither (1995) found that negative and discrepant feedback is usually seen as inaccurate, less useful, and related to negative reactions. Therefore, developmental feedback program administrators may need to tailor follow-up activities for those who receive negative feedback. Furthermore, leaders will not act on feedback they do not understand. A one-on-one facilitated session is an excellent way to combat these problems and to ensure leaders gain the most benefit from the feedback.

If the organization does not have the resources to support one-on-one facilitated sessions but still wants some personal interaction during action planning, it can use development workshops (Alimo-Metcalfe, 1998; Bracken, 1994). The workshops can help prepare the leader to receive feedback, assist in the interpretation of reports, and provide guidance for action planning. Workshops also provide personal interaction in a group setting, which can allow leaders to exchange ideas. Workshops provide the same

functions as a one-on-one facilitated development session except they do not provide a tailored, individual experience.

The final option an organization has for action planning is the development workbook or self study guide (Bracken, 1994; Church, 1995). The workbook can assist leaders in analyzing the reports, extracting strengths and weaknesses from the feedback, and developing action plans. These workbooks should include formats for conducting feedback meetings, suggestions on how to conduct feedback meetings, suggested time lines for events, and listings of internal and external training resources to targeted skill areas (Bracken, 1994). While the workbook is not as tailored to the individual as the facilitated session or workshop, it can be practical for larger organizations.

Whichever option the organization chooses to use to help leaders formulate their action plans, it must ensure that follow-up occurs, as follow-up is the key to skill development and change. In order to ensure they develop better skills, leaders should review plans and progress quarterly, obtain input into their action plans from co-workers during feedback meetings, and receive continuous coaching and feedback (Hazucha et al., 1993). The action planning process is key to goal setting, which leads to behavior change.

Developmental Feedback Summary

Effective developmental feedback programs will provide the tools necessary for the leader to move through the four stages of the feedback process. To ensure leaders are given the tools to improve their leadership behaviors (i.e., change behavior), effective developmental feedback programs provide three functions: (a) feedback collecting, (b) results reporting, and (c) action planning. As stated before, to ensure the leader gets

reliable and accurate information, the feedback instrument chosen for the developmental feedback program must be reliable and valid (Bracken, 1994; Fletcher, Baldry, & Cunningham-Snell, 1998; Morical, 1999; Vinson, 1996) and should have been developed based on statistical methods (Vinson, 1996). The items in the instrument should focus on behaviors (not traits) that are important to the organization and highlight the organization's values (Bracken, 1994; London & Smither, 1995; Morical, 1999). The web-based developmental feedback program in this study tested a feedback instrument that was based on two previously used feedback instruments.

Theory Behind and Development of the Feedback Instruments

The Leadership Practices Inventory (LPI) has been used extensively to assess leadership behaviors. Posner and Kouzes (1988), the developers of the LPI, went through the necessary steps to ensure their instrument was reliable and valid. Patton's upward feedback instrument (UFI) was based on the LPI and measures leadership at a more specific commitment level. Patton also went through the proper steps to develop the instrument but has only one study to support its reliability and validity. The leadership commitments inventory (LCI), introduced in this study, was based on the results from Patton's (2002) pilot UFI study. It was developed because the six constructs and 12 commitments from the UFI needed further refinement, Kouzes and Posner (2002) released an updated version of *The Leadership Challenge*, and there was a shift from a purely upward feedback instrument to a 360-degree approach. A fourth feedback instrument, the stakeholder assessment, was also introduced in this study. This instrument was designed for the web-based program, measured customer satisfaction, and

was used to assess criterion validity for the LCI. The following is a review of the instruments.

Leadership Practices Inventory

Development of the Leadership Practices Inventory. To develop the original Leadership Practices Inventory (LPI), Posner and Kouzes (1988) asked managers to describe their "personal best as a leader" to gain a qualitative perspective on what leaders do. The personal best incident was designed to highlight a time when the leader was responsible for an extraordinary organizational accomplishment. The personal best survey consisted of 37 open-ended questions. Some examples of questions were: "What made you believe you could accomplish the results you sought?" and "What did you learn most from the experience?" (p. 484). There were 650 surveys of middle to senior managers collected along with 38 in-depth interviews. The interview consisted of the same type of questions as the survey.

These surveys and interviews were content analyzed to find the most frequently mentioned leadership behaviors. After many content analyses, five leadership constructs or practices surfaced. The practices and their strategies (called commitments) are found in Table 1. Posner and Kouzes (1988) claim that over 80% of behavior and strategies reported in the sample of leaders' personal best experiences were represented by these constructs.

To develop the instrument items, they administered a group of items to 120 MBA students. Subsequently, to perform the required content analysis, they went through an item-by-item discussion and any difficult, ambiguous, or inconsistent items were eliminated, replaced, or revised. It is desirable for experts in the field to perform this

Table 1

Leadership Practices and Commitments

Leadership Practices	Strategies (Commitments)
Challenge the Process	1. Search out challenging opportunities to change, grow, innovate, and improve
	2. Experiment, take risks, and learn from the accompanying mistakes
Inspire a Shared Vision	3. Envision an uplifting and ennobling future
	4. Enlist others in a common vision by appealing to their values, interests, hopes, and dreams
Enable Others to Act	5. Foster collaboration by promoting cooperative goals and building trust
	6. Strengthen people by giving power away, providing choice, developing competence, assigning critical tasks, and offering visible support
Model the Way	7. Set the example by behaving in ways that are consistent with shared values
	8. Achieve small wins that promote consistent progress and build commitment
Encourage the Heart	9. Recognize individual contributions to the success of every project
	10. Celebrate team accomplishments regularly

Note. From "The Leadership Challenge," by Kouzes and Posner (1995).

type of analysis (Huck & Cormier, 1996) and in this case, nine professionals in psychology, organizational behavior, and human resource management familiar with psychometric issues, the instrument's conceptual framework, and management issues provided feedback on the items.

After revising the items, Posner and Kouzes (1988) administered the items to 2,100 managers and subordinates to determine internal reliability (consistency) and construct validity by analyzing the factor structure. The proposed instrument lent itself to exploratory factor analysis to test if five distinct leadership constructs would emerge. The technique identified the extent to which each item was related to each factor (or construct), and if the practices were, in fact, five separate constructs (Dooley, 2001). Based on these analyses, they rewrote the weak items and created the first version of the LPI, which consisted of 30 statements (six for each practice). There were two versions, the LPI-Self and LPI-Other. Leaders used the LPI-Self to perform a self-assessment of their own leadership behaviors. Observers (e.g., direct reports) used the LPI-Other to assess their leaders' behaviors (Posner & Kouzes, 1988).

To incorporate findings from the vast amount of data collected since the inception of the LPI, Posner and Kouzes (2000) published a second version. In this version, the response format was changed from a 5-point scale to a 10-point scale and some of the statements were revised. They also divided observer scores into categories (e.g., manager, direct report, peer or co-worker, and other). However, the basic structure of the LPI was not changed and the categories allowed leaders to receive more specific feedback. Similar to the first version, the second version still measured the frequency

with which a leader engaged in leadership behaviors consistent with the five leadership practices.

Since then, Kouzes and Posner (2002) have published a new version of their book, *The Leadership Challenge*. They posited that while the content of leadership had not changed, the context had. Hence, this version of the book maintains the five practices but updates the commitment definitions. They also reordered the presentation of the leadership practices to show leadership as "a personal journey of exploration and then as a rallying of others" (p. xxvi). The five practices and updated commitments are found in Table 2. There were some semantic differences in the commitment definitions and of particular interest were the commitments defining the "Model the way" practice. The original commitment definitions were (a) set the example by behaving in ways that are consistent with shared values and (b) achieve small wins that promote consistent progress and build commitment. The commitments now read (a) find your voice by clarifying your personal values and (b) set the example by aligning actions with shared values. "Find your voice" replaced the "Achieve small wins" commitment and was put in place to show that communication is key to becoming a credible leader. Once a leader finds his or her voice, he or she must then set the example to earn and sustain credibility. This was the only major change to the practices and commitments in the new book.

LPI reliability. Internal reliability or consistency focuses on the degree to which the same characteristics are being measured and test-retest reliability focuses on the consistency of an instrument over time (Huck & Cormier, 1996). The LPI has been extensively tested for both.

Table 2

Leadership Practices and Commitments (Updated)

Leadership Practices	Commitments
Model the Way	1. Find your voice by clarifying your personal values.
	2. Set the example by aligning actions with shared values.
Inspire a Shared Vision	3. Envision the future by imagining exciting and ennobling possibilities.
	4. Enlist others in a common vision by appealing to shared aspirations.
Challenge the Process	5. Search for opportunities by seeking innovative ways to change, grow,, and improve.
	6. Experiment and take risks by constantly generating small wins and learning from mistakes.
Enable Others to Act	7. Foster collaboration by promoting cooperative goals and building trust.
	8. Strengthen others by sharing power and discretion.
Encourage the Heart	9. Recognize contributions by showing appreciation for individual excellence.
	10. Celebrate the values and victories by creating a spirit of community.

Note. From "The Leadership Challenge," by Kouzes and Posner (2002).

The first version of the LPI was originally administered to 2,876 managers and executives and their subordinates. Internal reliability estimates (using Cronbach's alpha) for each of the five practices were above .70 for LPI-Self respondents (*N*=708) and above .79 for LPI-Other respondents (*N*=2,168)—exceeding the cutoff value of .70 (Huck & Cormier, 1996). Test-retest reliabilities for each practice were above .93 (*N*=57; Posner & Kouzes, 1988). Thus, all the reliabilities for the LPI met standards and it can be considered a reliable instrument from the data collected.

Further studies by Kouzes and Posner (1995) have added to the internal consistency evidence. Overall, almost 44,000 respondents have completed the LPI (Self and Other [now called Observer]). Internal reliability estimates (using Cronbach's alpha) for the five practices have been above .71 for the LPI-Self respondents (*N*=6,651) and above .82 for the LPI-Observer respondents (*N*=37,248). The second version of the LPI reported reliability results that were consistent with the first version. The version had an overall sample of 17,908 respondents. Internal reliability estimates (Cronbach's alpha) were above .75 in each response category across all of the practices (Posner & Kouzes, 2000). LPI scores have also remained stable over time period comparisons that were conducted on participants in The Leadership Challenge Workshop every two years since 1987, showing consistency across the practices.

Other studies have demonstrated the reliability of the LPI as well. Fields and Herold (1997) used the LPI to investigate "whether the broader dimensions of transformational and transactional leadership can be inferred from subordinates reports of leadership behaviors using instruments not specifically designed for this purpose." They reported reliability estimates (Cronbach's alpha) ranging between .82 and .92 (*N*=1,892).

In a study to investigate optimism and pessimism in business leaders, Wunderley, Reddy, and Dember (1998) administered the LPI to more than 2,000 managers and their subordinates. Coefficient alphas for this study were above .70 for the LPI-Self and above .81 for the LPI-Observer responses. Collectively, the results provided by Posner and Kouzes (1988, 1995, 2000) and other studies provided evidence that the LPI is a reliable instrument.

LPI validity. Since the original version of the LPI, Kouzes and Posner (1995) posited the LPI has been tested for construct validity using factor analyses across numerous samples. Aggregate scores of all respondents (N=43,899) showed a few factor cross loadings but for the most part they obtained five factors, consistent with the subscales of the LPI. Validity assessments for the second version of the LPI indicated that some statements loaded on more than one factor but the results provided support that leadership behaviors are measured by the five practices (Posner & Kouzes, 2000).

Other studies have found similar results. The study by Fields and Herold (1997) found that while each of the practices could be considered a different construct, the practices did correlate and may measure some of the same behaviors. Carless (2001) claimed that the LPI had weak discriminant validity because the practices (constructs) correlated with each other, indicating that there might not be five separate constructs. Furthermore, the Patton study (2002) also found cross loadings and high correlations among the five practices. These results indicated there could be concerns for those looking to improve their leadership skills. The leadership practices form a relatively general model. Therefore, this model may be too general and not provide the concise information a leader needs to improve his or her leadership skills. In other words, a

simpler model with fewer, more distinct constructs could provide more concise information and give better feedback for leadership improvement.

Posner and Kouzes (1988) also tested the criterion-related validity of the LPI, concurrently and predictively. In general, criterion-related validity involves correlating an existing measure that is accepted as an indicator of the target behavior (criterion) with the new measure. Posner and Kouzes (1988) tested this concurrently using a leadership effectiveness scale, which was administered to several samples that simultaneously completed the LPI. This instrument was designed to determine how much the respondents were satisfied with the leadership provided by the manager, among other things. To demonstrate LPI validity, Posner and Kouzes hypothesized a relationship between a leader's effectiveness and his or her leadership behaviors. They used a stepwise regression analysis with leadership effectiveness as the dependent variable and the five leadership practices as the independent variables. Using only responses from the LPI-Other (to avoid self report bias), the results revealed a highly significant regression equation (F=318.9, p<.0001) and explained 55% (adjusted R^2 = .76) of the variance around subordinates' assessments of their leaders' effectiveness. Thus, a high score on the LPI probably means that a leader's subordinates consider him or her an effective leader.

Posner and Kouzes (1988) tested predictive validity by determining how well the LPI scores differentiated between high and low performing leaders. To do this, they separated the lowest and highest third of the managers on the LPI-Other leader effectiveness scale to form low and high performer categories. They conducted a discriminant analysis using 85% of the sample of LPI-Other respondents as the

discriminant function. The remaining respondents were used as a hold out sample. In this case, the discriminant function correctly classified 92.62% of the known cases and 77.78% of the hold out respondents. The LPI was also able to correctly classify respondents significantly. Consequently, the LPI scores could be used (with some accuracy) to differentiate between high and low performing leaders.

Other studies (Fields & Herold, 1997; Wunderley et al., 1998) have used the LPI to provide evidence of the presence of other traits in leaders apart from those specific to the five practices. Fields and Herold (1997) investigated whether or not subordinates could distinguish between transactional and transformational leadership behaviors using the LPI. This study was interpreted two different ways and provided evidence of both convergent and predictive validity. Leaders that were rated high on the LPI would also be expected to score high on a transformational and transactional scale. The study showed that this relationship existed, and thus provided some evidence of convergent validity. Furthermore, the results indicated some level of predictive validity. A leader that engages in the behaviors measured by the LPI might be expected to fulfill transformational and transactional roles more effectively in the future. Therefore, transformational and transactional behaviors could be predicted by the LPI.

Wunderley et al. (1998) hypothesized that LPI-Observer ratings would correlate positively with a leader's level of optimism and negatively correlate with a leader's level of pessimism. While the relationships were generally weak, their study found all correlations for optimism were positive while all correlations for pessimism were negative. "Inspiring a shared vision" and "Encouraging the heart" correlated significantly with optimism. Therefore, they concluded from their study that leaders'

optimism might have some positive effect on their subordinates' perceptions of their leadership behaviors, which provided evidence of convergent validity.

Sources of potential contamination. Social desirability was a potential source of contamination and was addressed by Posner and Kouzes (1988). Social desirability explains a person's tendency to complete items in a socially desirable way. People occasionally complete items in a manner that gives a preferred image (Dooley, 2001). This problem could surface on the LPI due to the nature of the measured constructs. Rating yourself or somebody else a bad leader is not socially desirable. Leaders might complete their self-assessments in a manner that makes them look good, especially if they know their boss might see the results. Direct reports rating their leaders are even more susceptible to this phenomenon because they may not believe their responses are anonymous and might respond positively to avoid reprisal. Therefore, the LPI may result in skewed data due to positive feedback for a leader who, in reality, may not actually be perceived as a very good leader. As a result, the feedback does not adequately reflect the leader's behavior.

Posner and Kouzes (1988) tested the extent to which social desirability might explain the results using the Marlowe-Crowne Personal Reaction Inventory and determined that none of the correlations were statistically significant ($p>.05$). Thus, there was evidence that those completing the LPI did not influence their responses in a socially desirable manner.

There also might be the chance that LPI scores might not generalize to other groups, samples, or settings (Dooley, 2001). Posner and Kouzes (2002) have compared scores across individual differences, settings, genders, functional disciplines, ethnic

backgrounds, and cultures. Overall, they found few statistical differences or interaction effects between the groups, providing evidence that LPI results could be generalized across many groups.

Weaknesses of the Leadership Practices Inventory. Leadership continues to be a difficult concept to define, which leaves the LPI open to a multitude of criticism. For instance, some might not agree that the LPI measures the correct leadership behaviors. The experts who determined the items for the LPI could define leadership differently than someone else. Thus, the items may not reflect leadership in its totality, the practices might have some ambiguity, and the scales may measure some of the same behaviors. Evidence of this was discussed earlier in the validity section. However, the LPI's items were developed through a systematic content analysis; and even though this method is highly subjective the procedures used provide evidence that the appropriate behaviors were tapped.

Most of the reliability and validity evidence presented in this paper were from studies completed by Posner and Kouzes (1988, 1995, 2000) themselves. Thus, there may be the chance that someone might interpret the studies as biased. This problem could be addressed with independent studies by other researchers but the proprietary nature of the LPI may discourage further studies.

The final weakness highlighted is the fact that the LPI is inflexible and expensive. Organizations cannot tailor it to meet their exact needs and the cost may prevent some companies from using it. Therefore, this study also highlights two instruments (Upward Feedback Instrument and Leadership Commitments Inventory) that were developed as a result of these factors.

Upward Feedback Instrument

Development of the upward feedback instrument. To develop the Upward Feedback Instrument (UFI), Patton (2002) performed a content analysis of Kouzes and Posner's (1995) existing leadership commitments. Subsequently, a five-item scale was created for each of the 10 commitments. The sponsoring organizations felt that an added practice (i.e., Have fun) was also an important leadership behavior. Therefore, the "Have fun" practice and five item scales for its commitments were created from critical incident responses. This process was similar to Posner and Kouzes's (1988) creation of the LPI items using the personal best incident responses. The "Have fun" commitments were named (a) allow humor to reduce stress and boredom and (b) promote fun activities to relax and unwind. After creating the new commitments, the research team performed more content analysis for all 12 scales looking for bias or errors and revising the items as necessary. These 12 scales (60 items) were subsequently administered to the sample.

Upward feedback instrument reliability. At the present time, Patton (2002) is the only researcher to have used the UFI. During this pilot study, the UFI was administered to Air Force leaders (N=85) and their subordinates (N=641) that worked within the sponsoring organizations. The UFI measured the extent to which leadership behaviors were observed using a 7-point Likert scale where 1=Not observed and 7=Almost always observed. Internal reliability (Cronbach's alpha) estimates for the 12 scales ranged from .87 to .91, providing evidence of reliability (Huck & Cormier, 1996).

Test-retest reliability was measured using Pearson's correlation coefficients for the commitment scales. No test-retest time period was given. The original scale means did not correlate highly with the retest means and therefore did not show a high degree of

stability over time. The low retest response rate (*N*=28) may have caused sampling error, and at this point no conclusions can be drawn about the actual stability of the UFI over time.

Upward feedback instrument validity. To establish the construct validity of the instrument, confirmatory factor analyses were used to confirm the underlying latent structure for the commitment scales. The research team was interested in whether or not the UFI measured Kouzes and Posner's (1995) five leadership practices and the sixth practice "Have fun."

Using a sample of 391 employees of the sponsoring organizations, nested confirmatory factor analyses provided evidence that a six-factor (practice) model provided the best explanation of the underlying latent structure of the 12 commitment scales. However, similar to the LPI, a convergent validity analysis revealed many cross loadings across the practices, providing evidence that the scales may be measuring constructs that overlap considerably. Cross loadings were most evident with the "Challenge the process", "Inspire a shared vision", and "Model the way" commitments. Therefore, the convergent validity of the UFI is suspect and may need to be re-evaluated. Moreover, there was no criterion validity analysis discussed in the pilot study.

Sources of potential contamination. Because the UFI is based on the LPI, the same sources of contamination exist (i.e., social desirability and generalizability). No discussion of how the researcher compensated for social desirability was found in the literature. Furthermore, the UFI was not compared across different settings, genders, functional disciplines, ethnic backgrounds, and cultures, questioning the extent to which the UFI results can be generalized across many groups.

Weaknesses of the upward feedback instrument. The weaknesses of the UFI are similar to the LPI in that leadership is a difficult subject to define. The greatest weakness of the UFI, however, is the lack of empirical support for its use. It simply has not been field tested to the extent the LPI has. The results may improve and the instrument may show more validity as the sample size increases. The validity of an instrument is demonstrated over time, and provides basis for the current study. .

Leadership Commitments Inventory

The Leadership Commitments Inventory (LCI) was the instrument fielded with this study's web-based developmental feedback program. White (2003) modeled and developed the LCI using the research conducted by Kouzes and Posner (1995, 2002) and Patton (2002). It maintained the original five practices from Kouzes and Posner's LPI, and the sixth practice from Patton's UFI. Three significant factors led to the development of the new instrument.

First, based on the content validity and factor analysis from Patton's (2002) pilot UFI study, the six constructs and 12 commitments needed further refinement. Specifically, the 12 commitments were not viewed as distinctive constructs and the leadership concepts overlapped based on the pilot UFI items. Due to the high inter-correlations among the items on the UFI, each practice and commitment was newly defined, which led to over half of the pilot questions being modified or deleted (White, 2003).

Secondly, in September 2002, Kouzes and Posner released an updated version of *The Leadership Challenge*. The most significant change in their updated version was the revision of the "Model the way" practice. Previously, "Model the way" was captured by

the two commitments *set the example* and *achieve small wins*. They revised the practice so that *achieve small wins* was incorporated into challenge the process, and instead they replaced it with *find your voice*. In addition to modifying the model practice, they also re-ordered the practices in the book, to better reflect the leadership development process. The new order of the practices is: (a) Model the way, (b) Inspire a shared vision, (c) Challenge the process, (d) Enable others to act, and (e) Encourage the heart (Kouzes and Posner, 2002). Based on the research by Kouzes and Posner, *find your voice* was revised for the LCI to read *shares personal values* (White, 2003).

The third factor that led to the new LCI was a shift from a purely upward feedback instrument to a 360-degree approach. While the UFI focused on feedback from subordinates only, the LCI focused on feedback from subordinates, peers, and team members in an attempt to replicate a 360-degree approach. The resulting items written to measure each leadership behavior, focused on the team viewpoint rather than the subordinate viewpoint (White, 2003).

Development of the leadership commitments inventory. Based on the content validity and factor analysis from Patton's (2002) pilot UFI study, White (2003) determined the six constructs and 12 commitments needed further refinement. As a result, a definition for each practice and commitment identified in Patton's (2002) pilot instrument was developed. While defining each practice and commitment, the goal was to capture the essence of Kouzes and Posner's (2002) definitions while including concepts from other leadership experts. These definitions established the groundwork for the content analysis.

In an effort to develop items that measured their intended content domain, White's (2003) first objective was to develop new items that reflected the updated definitions. To do this, she used the pool of 60 items from Patton's (2002) UFI. Based on the formal definitions for the practices and commitments, 33 of the original 60 UFI items were revised or discarded. Thirty-nine new items were written and those items were sorted by a sample of military officers (*N*=17). The sorting exercise produced a pool of 48 items.

White (2003) conducted a second content analysis to analyze five new items that were developed as a result of the change to the "Model the way" commitment, *shares personal values*. This analysis also served to validate one other rewritten item from the first analysis. A similar sample of military officers (*N*=19) attempted to match these items to their respective commitments. The five new items representing *shares personal values* were all properly categorized. Two previously validated items were not properly categorized and were subsequently rewritten.

Following the two content analyses, a four-item scale was created for each of the 12 commitments. These 12 scales (48 items) were administered to a sample using the web-based developmental feedback program that was developed in this study.

Stakeholder Assessment

The stakeholder assessment was designed to measure customer satisfaction with a leader's organization and was to be administered with the web-based developmental feedback program, alongside the LCI. The results were to be used to provide criterion validity evidence for the LCI.

The stakeholder assessment was designed to assess customer satisfaction of a leader's staff or work group and provide criterion validity evidence for the LCI under the following assumption. An effective supervisor influences the products and services that a customer receives from his or her staff or work group. Therefore, under this assumption, a leader who receives high scores on the LCI should also receive high scores on the stakeholder assessment.

To measure a customer's satisfaction with the organization, the stakeholder assessment needed to assess a set of dimensions that could be generalized across a variety of work groups that provide an array of products, services, and information. It needed to assess the performance of the staff or work group rather than the supervisor because some customers may interact with the supervisor while others interact with specific points of contact (i.e., subordinates). So the assessment needed to evaluate the quality of both the staff or work group and the services and information the work group provides customers.

The dimensions to measure the performance of the staff or work group and the quality of the information and services provided were extracted from an analysis of customer satisfaction literature (Davis, 1999; Hayes, 1992; Levitt, 1972; Naumann & Jackson, 1999; Schneider & Bowen, 1999). The service dimensions were quality of information, products, and services; responsiveness; professionalism; and overall satisfaction.

The quality of information, products, and services dimension was defined as the extent to which the information received was clear, free from error, up-to-date, and complete. It further measured the quality of the information, products, and services received by the customer. Responsiveness was the extent to which the products and

services were delivered when needed and free from error. It further measured how well the work group adapted to the customer requirements. Professionalism measures the extent to which the staff members were knowledgeable, courteous, and caring when providing needed products, services, and information. Finally, overall satisfaction was defined as the extent to which the customer was pleased with the needed products, services, and information and would freely choose this work group's products if given a choice of providers.

The stakeholder assessment consists of 24 items. Six items measure quality of information, products, and services; seven items measure responsiveness; four items measure professionalism; and four items measure overall satisfaction. There are also two open-ended items that allow the customer to identify things the work group does well and needs to improve. The last item of the assessment is an open-ended item that allows the customer to provide feedback for the leader. Reliability or validity evidence for the assessment and its scales has not been compiled and reported.

From Paper-and-Pencil to Computer-and-Keyboard

Web-based surveys are an extremely promising method for conducting research (Mertler, 2002). First and foremost, they are an excellent resource for obtaining and processing large amounts of data and they can be distributed over the Internet via a web site or e-mail (Mertler, 2002; Sheehan & Hoy, 1999). Web-based surveys and the methods used to deploy them have advantages, limitations, and issues. Even so, they can be a viable method for developmental feedback programs and have been used in this capacity. This section highlights the advantages and limitations of a web-based survey

and their deployment methods. It also highlights the fact that organizations can use the web as a feasible platform for their developmental feedback programs.

Advantages of Web-based Surveys

Web-based surveys have many advantages over traditional surveys (i.e., postal or telephone). Advantages include cost and time savings, flexibility, geographical reach, ease of use, and assurance of anonymity and confidentiality (Clarkson, 1999; Coomber, 1997; Kimball, 1998; Mertler, 2002; Sheehan & Hoy, 1999; Sills & Song, 2002; Slevin, 1997; Tierney, 2000; Virtual Surveys Limited, 1996; Watt, 1997). Of the advantages, cost and time savings are the most prevalent.

Given the nature of web-based surveys, cost savings over traditional survey methods are inherent (Clarkson, 1999; Kimball, 1998; Mertler, 2002; Sills & Song, 2002; Sheehan & Hoy, 1999; Slevin, 1997; Tierney, 2000; Virtual Surveys Limited, 1996; Watt, 1997). Researchers do not have to purchase surveys, copies, postage, nor envelopes. Data entry, analysis, and reporting are all automatic, negating the need for personnel and time to perform these functions. There are also no requirements for interviewers. Watt (1997) posits that the cost advantage over traditional surveys is realized for surveys with more than 500 respondents. This may be due to the initial start up costs for web design and hosting (Sheehan & Hoy, 1999).

Time savings are also a key advantage to the web-based survey methodology. Time savings are realized through quick survey response collection (Clarkson, 1999; Kimball, 1998; Mertler, 2002; Sheehan & Hoy, 1999; Sills & Song, 2002; Tierney, 2000; Watt, 1997). The total time of survey delivery and response can be reduced by weeks over the postal method, allowing researchers to make quicker decisions (Sheehan & Hoy,

1999). Further time savings are realized through automatic data entry, analysis, and reporting. There are no requirements to manually perform these functions. Automatic data entry also reduces the human error factor of manual data entry, saving the time required to re-enter the data (Clarkson, 1999; Mertler, 2002; Sills & Song, 2002; Tierney, 2000; Watt, 1997).

Web-based surveys are flexible to modify (Clarkson, 1999; Kimball, 1998; Sheehan & Hoy, 1999; Sills & Song, 2002; Watt, 1997). Surveys can be modified after they have been fielded, which can prove to be a huge advantage over paper surveys. If a researcher needs to change a question or item it can be done quickly and without the respondents' knowledge. For paper surveys, this cannot be accomplished without sending out a revised set of surveys. Web-based surveys also have a lot of flexibility in reporting results. Reports can be tailored to individuals or groups (Watt, 1997). Participants are able to choose the most convenient response format. They can choose the survey over the web or print the survey out and mail it in (Coomber, 1997).

Web-based surveys can reach a large, more diverse cross section of participants than traditional surveys because of the geographical reach of the Internet (Coomber, 1997; Mertler, 2002; Sheehan & Hoy, 1999; Sills & Song, 2002). This results in a greater percentage of responses from a diverse group of respondents. The reach of web-based surveys can prove to be an advantage for researchers who are looking for respondents across geographical borders and for large organizations with dispersed personnel (Sheehan & Hoy, 1999).

Another advantage of web-based surveys is their ease of use (Clarkson, 1999; Kimball, 1998; Mertler, 2002; Sills & Song, 2002; Slevin, 1997; Virtual Surveys

Limited, 1996). Respondents are able to complete and submit the survey at the same time (Clarkson, 1999; Slevin, 1997). Graphics and multimedia features (e.g., option buttons, tutorials) also enhance web-based surveys. Explanations and instructions can be integrated into the survey and accessed by the respondent when needed (Clarkson, 1999). These features speed up completion time and make the survey more interesting for the respondent. Virtual Surveys Limited (1996) found that these features could result in higher quality responses, reducing item omission and response error and increasing completeness of answers in open-ended questions. For instance, in their study, a larger number of comments for the open-ended questions were coded from surveys completed on-line than those completed on paper.

For some surveys it is critical that the participants and their responses are anonymous and confidential (Clarkson, 1999; Coomber, 1997; Kimball, 1998; Mertler, 2002; Sheehan & Hoy, 1999; Sills & Song, 2002; Slevin, 1997). Anonymity and confidentiality can be difficult to guarantee and some respondents may be wary that their answers are not anonymous (Clarkson, 1999). Therefore, researchers must demonstrate anonymity to the respondent (Coomber, 1997). Researchers can implement and include a security system to protect the data and ease the mind of the respondent (Mertler, 2002). Most organizations provide anonymity and confidentiality by using an outside source to process and analyze the data, and report the results (Clarkson, 1999; Sills & Song, 2002; Slevin, 1997). Others propose using passwords to control who responds to the survey and who has access to the results (Kimball, 1998). When using e-mail surveys, encryption technology and assurances of confidentiality may be required (Sheehan & Hoy, 1999).

Web-based surveys can be used to collect data with greater efficiency and convenience while saving time and money. These features alone make the methodology appealing (Mertler, 2002). However, before adopting this methodology one should be aware of its many limitations.

Limitations of Web-based Surveys

Web-based surveys have three main limitations or disadvantages. The most commonly discussed limitation is sample bias. Technical concerns can also be a limitation. Finally, security concerns with the Internet leave respondents wary that their responses may not be anonymous.

Studies posit that sample bias is caused by the non-random nature and self-selectivity of Internet samples (Clarkson, 1999; Mertler, 2002; Sills & Song, 2002; Sheehan & Hoy, 1999; Tierney, 2000; Virtual Surveys Limited, 1996). Not all people in a proposed population have access to the Internet. Furthermore, there is no worldwide population list of Internet users and not all people in the population are given the chance to complete the survey. Therefore the general population is not a good population for a web-based survey (Watt, 1997). Further exacerbating the bias is self-selectivity of Internet users to complete the survey. Combining these factors indicate that web-based surveys may not be generalizable (Clarkson, 1999; Sheehan & Hoy, 1999; Virtual Surveys Limited, 1996).

Further threats causing bias are non-response, multiple responses, and inappropriate responses. Non-response error can be caused by technical problems, timing of follow-up, confidentiality and anonymity concerns, and misidentification of the survey as junk e-mail (Sills & Song, 2002; Sheehan & Hoy, 1999; Tierney, 2000; Virtual

Surveys Limited, 1996). More bias is introduced when a respondent completes more than one survey or completes a survey inappropriately (Sheehan & Hoy, 1999). Web-based surveys are especially susceptible to this behavior because many times the researcher has no control over who visits the web site. Incentives also cause multiple responses and unwanted entries (Tierney, 2000). One way to combat non-response and multiple responses is by using an e-mail survey. An e-mail survey can identify non-respondents or multiple responses by the same person. However, this is accomplished at the expense of anonymity and confidentiality (Sheehan & Hoy, 1999).

While reducing bias is always a major concern in survey research, response rates are key to the validity of the survey results (Yun & Trumbo, 2000). However, there is little evidence that web-based surveys result in higher response rates than postal surveys. Sheehan and Hoy (1999) reviewed nine studies that used postal and e-mail surveys. Four studies showed that postal survey achieved higher response rates than e-mail, three studies showed that e-mail achieved higher response rates than postal, and two studies showed no significant difference between the two. Other studies have found similar results (e.g., Yun & Trumbo, 2000). Nonetheless, there are certain factors, inherent to web surveys, that affect response rate (e.g., technical problems and security concerns).

Technical problems create another limitation for web-based surveys (Clarkson, 1999; Mertler, 2002; Sills & Song, 2002). Delivery of the survey instrument can be hindered if respondents' Internet browsers are not compatible with the survey technology or there is a problem with the Internet link to the survey. Researchers must ensure the survey is compatible with a wide variety of browsers and software (Clarkson, 1999). Furthermore, potential respondents may not have Internet or e-mail access or may not be

familiar with computer use (Clarkson, 1999; Mertler, 2002; Slevin, 1997). Additionally, if using an e-mail survey, the e-mail may fail to reach intended recipients (i.e., the wrong name was typed in or the respondent's e-mail address was changed).

There also may be security concerns associated with web-based surveys. Respondents may not believe their anonymity and confidentiality is assured, and may worry about potential identification (Mertler, 2002; Sills & Song, 2002). Consequently, researchers should hire an outside organization to collect and process the responses and results, which can cause an increase in cost and complexity (Sills & Song, 2002).

These limitations can be a cause for concern when deciding whether or not to implement a web-based survey. Researchers who do decide to use the web-based methodology must choose which deployment method to use, web site or e-mail.

Survey Distribution: Web Site or E-mail

There are two ways to distribute surveys via the Internet. Surveys can be sent directly to potential respondents via e-mail or posted on a web site (Clarkson, 1999; Kimball, 1998; Mertler, 2002; Sheehan & Hoy, 1999; Slevin, 1997; Tierney, 2000; Virtual Surveys Limited, 1996; Watt, 1997). Normally, when using a web site, an e-mail that contains a link to the survey or web site is sent to potential respondents (Mertler, 2002; Tierney, 2000; Watt, 1997). Respondents visit the web site and choose to complete the survey. Given these choices, organizations can choose which medium to use given the advantages and limitations of each.

E-mail. E-mail surveys can be beneficial because respondents do not need access to the Internet or a have a compatible browser; they just need an e-mail account (Slevin, 1997; Virtual Surveys Limited, 1996). For reasons such as this, e-mail surveys have a

tendency to increase response rates over web site surveys. E-mail allows for ease and flexibility of responding because the e-mail survey requires few steps to complete (Slevin, 1997). Both accessibility and simplicity give e-mail surveys better response rates than web site surveys (Slevin, 1997). Furthermore, e-mail allows the researcher to identify duplicate responses and non-responses. Researchers can therefore profile non-respondents. E-mail also has financial benefits over a web site because there are no design or web hosting costs (Sheehan & Hoy, 1999)

While e-mail surveys have some advantages over a web site, they also have their limitations. E-mail questionnaires are usually formatted with grids of questions and scale responses, which are not visually attractive (Watt, 1997). This format can also make them difficult to complete (Virtual Surveys Limited, 1996). E-mail surveys do not allow incremental checks for validity of the inputs until the survey has been completed and submitted. For instance, if the researcher finds missing responses, he or she must return the survey to the respondent for the required information (Slevin, 1997; Watt, 1997). E-mail addresses frequently change and respondents may not be reached (Virtual Surveys Limited, 1996). As stated before, e-mail allows the researcher to identify duplicate responses and non-responses, eliminating respondent anonymity. Finally, unsolicited surveys can be seen as aggressive and violating netiquette (Coomber, 1997; Sheehan & Hoy, 1999).

Web site. As stated above, e-mail is not the only web-based choice to distribute surveys. Surveys posted on web sites also have their advantages and limitations. Given that potential respondents have access to the Internet, surveys posted on web sites are a more lucrative medium than e-mail surveys (Clarkson, 1999). The most optimum

method is to contact the respondent by e-mail and ask him or her to visit a web site to complete the survey. This speeds response time and provides better questionnaire interface than e-mail (Virtual Surveys Limited, 1996). Web site surveys are easier to complete because they have option buttons. Graphics, images, animation, and links can be used to make the survey faster and more interesting, resulting in higher quality data. These surveys also have the ability to check for valid responses as the respondent completes the survey. If bad data are entered, the respondent receives an error message that instructs them to re-enter the data (Slevin, 1997). Database operations and queries can be programmed to adapt the survey results to virtually any reporting need the researcher may have (Watt, 1997).

Surveys posted on a web site are not without limitations. First of all, respondents must have access to the Internet to complete the survey (Mertler, 2002; Slevin, 1997; Virtual Surveys Limited, 1996). Furthermore, the respondent is required to move through many steps before they can complete the survey (Slevin, 1997). Technical problems with incompatible Internet browsers and user inexperience can also eliminate some respondents (Clarkson, 1999; Virtual Survey Limited, 1996). If the web site and survey contain too many graphics or features, the load time of the site is increased which has been know to produce lower response rates than e-mail surveys (Clarkson, 1999; Slevin, 1997).

Regardless of whether an organization chooses a web site or e-mail to deploy a survey, there will be advantages and limitations. Research suggests that web sites are best when studying large groups of on-line users and e-mail surveys are better for studying smaller, homogenous on-line user groups (Sheehan & Hoy, 1999). Based on its

advantages, a web-based (i.e., web site or e-mail) survey is a sound choice when respondents have access to the Internet (Clarkson, 1999). Therefore, Internet-based surveys should be used to target groups for academic, business, and employee research. They are also feasible for organizations that adopt new technology early (Virtual Surveys Limited, 1996). Some organizations have chosen a technology-based methodology to implement their developmental feedback programs.

Web-based Developmental Feedback Programs

The Internet is a viable platform for developmental feedback programs. Bracken and Summers (1998) summarized a methodology for implementing a web-based developmental feedback program, the advantages of web-based developmental feedback, and factors to consider before deploying a web-based system.

The methodology discussed by Bracken and Summers (1998) was relatively simple. The feedback survey was loaded on a web site. The service provider sent e-mails to participants (i.e., leaders) with instructions and timeframes for the assessment. The participants accessed the web site and keyed in their personal identification and password. The leaders then created a list of raters (i.e., peers, subordinates, etc.) and selected the names of the raters from a drop down list or simply entered the names and valid e-mail addresses. Raters were sent an e-mail message requesting them to go to the web site to complete an assessment. At the end of the allotted time window, the feedback was collected, collated, and assembled into reports. The feedback reports were read from the web site. The web site also contained a link to an interactive development planning system. This system guided the participant through the steps to identify key development

areas. It also helped the participant design and develop an action plan so they could turn the feedback into behavior change.

Bracken and Summers (1998) discussed four main advantages to web-based developmental feedback. For instance, web-based systems ensured rater reliability and confidentiality. They reduced the resources required to administer the program and allowed people to redirect their efforts to value-added activities such as action planning. Systems were capable of covering a large geographical area, making them good for large, dispersed organizations. Finally, the cost per participant was considerably less than traditional survey methods (i.e., paper).

Before deploying a web-based developmental feedback program, organizations should review some important factors. First of all, the organization should have some prior developmental feedback experience. This can reduce administrative burdens and make it easier for participants and raters to adapt to the new technology. Second, participants and raters must have access to the Internet. The organization should provide a special computer station for those who do not have access. Third, users must be able to move through the process easily. They should try to be patient if technical problems or setbacks occur. If the senior management of the organization has nurtured a technology supportive culture, the implementation of the program will be easier. Additionally, the organization should have some technical sophistication and adequate information technology resources. System administrators must implement features that ensure full security of the system and confidentiality for users and these features must be communicated to the user. Furthermore, there should be adequate support during the early phases of the program (Bracken and Summers, 1998).

Summary of Web-based Surveys

Web-based surveys are an extremely promising method for conducting research (Mertler, 2002). They have plenty of advantages for organizations that are "connected." These surveys also have limitations that organizations should consider. Despite limitations, web-based surveys have been used successfully in developmental feedback programs and are practical for organizations that have the proper resources. Given the characteristics (i.e., advantages and limitations) of web-based surveys, the most practical format is to deploy the survey on a web site and advertise to participants via e-mail.

Information Systems Development

Information systems development success or failure can depend on numerous factors such as project risk, scope, management, design, and adequacy of resources (Gordon & Gordon, 1999). There were numerous systems development failures in the mid-sixties due to poor or nonexistent development techniques. In an attempt to reduce the number of failures, information systems developers created development methodologies similar to engineering systems development processes (Aktas, 1987). As a result, numerous approaches to systems development now exist. The information systems development life cycle (ISDLC), which is prevalent throughout information systems literature, serves as a good guide to a development project. The traditional approach to the ISDLC however does not offer the tools necessary to successfully develop an information system (Aktas, 1987). The structured approach to the ISDLC provides the tools and methodology necessary to guide the system developer through the ISDLC en route to successful systems development (Aktas, 1987). This section provides various examples of the ISDLC, compares the traditional approach to systems

development with the structured approach, presents a model of the major phases of the development process, and highlights tools used in the structured approach to information system analysis and design (i.e., hierarchy charts and data flow diagrams).

Information Systems Development Life Cycle

A review of the literature will unfold many different versions of the information systems development life cycle (ISDLC). Each version contains numerous phases with different nomenclature but they all contain similar components. Peters (1987) presented many definitions of the ISDLC. He combined the commonalities within those definitions and described the ISDLC as a model, plan, or guide that is activity and process oriented and is of use to both those managing the work and those doing it. Three life cycle models posited during different time periods are described below.

Brookes, Grouse, Jeffery, and Lawrence (1982) presented an example of the ISDLC. Their model had various phases with associated tasks. Tasks for each phase must be completed before moving onto the next phase. Their model represented the life cycle with the following phases: statement of terms of reference and specification of requirements, the feasibility study, systems analysis, the logical design of the new system, the physical design of the new system, programming, implementation, and post-implementation.

In the first stage, statement of terms of reference and specification of requirements, the developer determines the user's requirements and expectations. The feasibility study determines the overall architecture of the new system. Systems analysis provides full detail of the existing system to include physical flow of data and information through the system. This phase also highlights constraints on improvement

of the existing system. The logical design phase defines user specification for the flow of data and information within the system. It also puts focus on user interface. In other words, this phase defines what the system will be required to do and how the system will be implemented. The physical design phase follows and here the developer designs the files and details of the computer program modules. The programming phase consists of the actual design and coding of the programs. Initial tests on system performance are performed here as well. The implementation consists of the cutover period where the complete system is implemented and tested in the user's environment. Finally, the post-implementation phase determines if the system is successfully meeting requirements. It is also determines whether or not the anticipated benefits are being obtained (Brookes et al., 1982).

Harpool, Culp, and Galehorse (1987) proposed another example of the ISDLC. They posited five phases: project planning and preliminary structured analysis; detailed structured analysis; system design; system development and implementation; and system installation, evaluation, and support. Each phase has required activities and completion of one phase leads to the initiation of the next.

During the project-planning phase a problem or need is identified. Here the current system is evaluated and a problem definition is developed before moving on to the next phase. In the detailed structured analysis phase, the developer refines the problem definition, develops alternative solutions, prepares cost benefit and risk analysis, and recommends the best alternative. Once a system is recommended the developer designs a new system to meet the user's needs and objectives during the system design phase. The deliverable products from this stage are the system specifications. Once the

specifications are determined a new system is developed that meets design specifications. During this system development and implementation phase the new system is coded, tested, and preliminary plans for installation are developed. In the final stage, system installation, evaluation, and support, the system is turned over to the user. The new system is formally installed and evaluated in light of the original user needs and objectives (Harpool et al., 1987).

Gordon and Gordon (1999) posited seven phases of the ISDLC and briefly described three development pathways. They described the following phases: needs assessment, alternative analysis, design, development, implementation, and maintenance. To move through the life cycle stages, system developers can use three development pathways. These are described as the waterfall approach, the spiral approach, and prototyping.

The needs assessment phase focuses on gathering data about user needs and ranking needs by importance. Here it is determined whether or not improving the existing information system needs can satisfy user needs. Another facet of this phase is output, input, and procedure analysis. This analysis develops initial plans for what the system can accomplish in terms of output and input, and what procedures are required to use the system. Once a rough plan is determined, a structured analysis will provide diagrams of the existing and proposed systems and their capabilities (Gordon & Gordon, 1999).

The alternative analysis phase allows the system developer to consider alternate designs and the advantages and disadvantages of each. The main focus here is determining the trade-offs between designs. The most prevalent trade-off is user needs

versus cost. Cost increases as more user needs are satisfied. The phase ends with a preliminary design of the system (Gordon & Gordon, 1999).

The design phase provides the detailed specifications that communicate the design to programmers. There are many facets to design. Interface design highlights the content and form of the input and output. The data design creates the model of data supporting the system (i.e., database). The process design focuses on the computational and logical processes underlying the system. The physical design is the hardware used to deliver the system. And finally, the test design tests the system to ensure proper function (Gordon & Gordon, 1999).

The development phase answers the question as to whether or not the developers should purchase a system or develop their own. Once this decision is made it is necessary to create or purchase the hardware and software. Testing also takes place during this phase to ensure the system works as designed. There are different types of tests to perform. System testing tests the entire system under realistic conditions. Performance testing tests the system's outputs. Usability testing tests user satisfaction with system interface. Once the system is developed and tested, it is time for implementation (Gordon & Gordon, 1999).

The implementation phase activates the new system. At this point a pilot test may be accomplished. This test allows a small portion of system users to use the system as they would in reality. This allows the developers to phase in the new system while working out any problems. The developers can also choose to perform a direct cutover where the new system replaces the old system overnight. Another important facet of this

phase is training the system's users. Once the system is in use, maintenance is required to keep the system functioning as needed (Gordon & Gordon, 1999).

This final phase, the maintenance phase, serves to continuously fix any system errors or "bugs". In this phase the system can also be modified with new features to improve performance. These new features could even be beyond the original needs assessment. This phase could seemingly last the lifetime of the system (Gordon & Gordon, 1999).

The phases in each of these models, while different, provide similar overall guidance to system development. However none of these models provide a methodology to accomplish the appropriate phases. To move through the phases of the ISDLC, developers need an approach. Gordon and Gordon (1999) posited the development pathways (i.e., the waterfall approach, the spiral approach, and prototyping). Peters (1987) also described the waterfall approach and prototyping.

Information Systems Development Life Cycle Approaches

The traditional approach to the ISDLC contains numerous phases and provides a framework for system development. As stated before, authors may posit different phases but they all contain similar components. The first two examples of the ISDLC above use the traditional approach which requires that the steps of each phase must be completed before moving on to the next phase (Brookes et al., 1982; Harpool et al., 1987). These methods also do not provide a detailed representation of the system or a methodology to system development. They provide a guideline of the required steps but no guidance as to how to complete those steps (Aktas, 1987).

Furthermore, the traditional approach assumes that new systems progress smoothly and sequentially through the phases when, in fact, all the steps in these phases are not necessarily completed in sequence (Gordon & Gordon, 1999). Therefore, problems with this traditional approach to the ISDLC have led to other approaches (Aktas, 1987). These approaches work in conjunction with the ISDLC and provide guidance for system developers to move through the life cycle. Here, for example, are some of the approaches.

The waterfall approach. The waterfall approach follows the ISDLC in sequence and, in some ways, is similar to the traditional approach. The approved results or outputs of one phase are fed into the next phase but the waterfall approach allows some interaction between the phases in the form of overlap with respect to time (Gordon & Gordon, 1999; Peters, 1987). A graphical model is found in Figure 1.

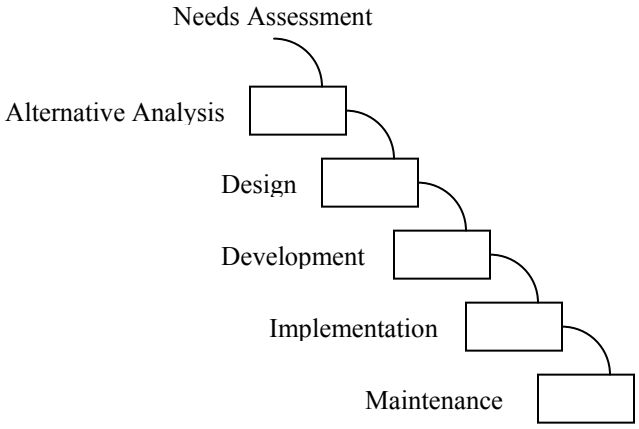

Figure 1. The waterfall model. From "Information Systems: A management approach" by Gordon and Gordon (1999).

System development, in this case, never moves backward. This approach is easy to manage and the sequence allows the developer to set deadlines and monitor progress

but there are disadvantages as well (Gordon & Gordon, 1999). As with the traditional approach, this approach is highly inflexible. Changes or updates to the system must be made post hoc, which can increase costs and cause delays (Gordon & Gordon, 1999). Furthermore, no portion of the system is delivered until the end of the project. These are self-imposed constraints that can create tension between the developer and the customer because of changing customer expectations. By the time the system is complete and available, the customer may want or need different system requirements (Gordon & Gordon, 1999; Peters, 1987).

Prototyping. This approach is used extensively in engineering and provides a good methodology for information systems as well (Peters, 1987). Prototyping focuses on user interface and allows the user to view progress early and often (Gordon & Gordon, 1999; Peters, 1987). Users meet with developers periodically to discuss system requirements. The design and development phases are repeated until users' needs are satisfied (see Figure 2). Developers create a prototype of the system based on the requirements. Dummy data is sometimes entered to show the user system function. This approach is excellent for use with small to medium systems (Gordon & Gordon, 1999). Just as with the other approaches, there are advantages and disadvantages to prototyping.

Prototyping provides plenty of advantages. First of all, the amount of time between analysis and implementation is decreased. The new system addresses user needs and shows the benefits of the system before cost and effort get out of control. It allows users to articulate what they do not like about the system. This, in turn, leads to system refinement and improvement (Gordon & Gordon, 1999; Peters, 1987).

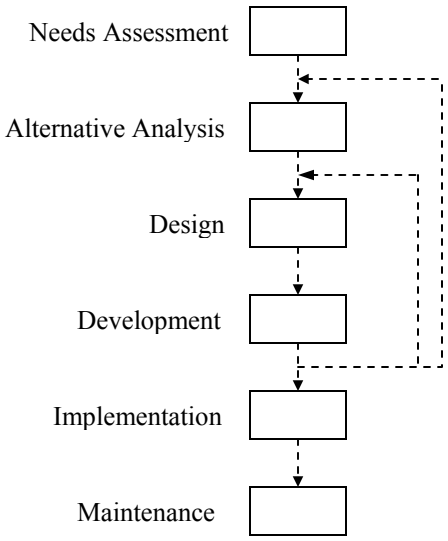

Figure 2. The prototyping model. From "Information Systems: A management approach" by Gordon and Gordon (1999).

Prototyping is not without its disadvantages. Users may raise their expectations of the system beyond budgets. For instance, users may continue to ask for more features, causing runaway development, which leads to higher costs (Gordon & Gordon, 1999; Peters, 1987). Therefore, cost savings using this type of system are not guaranteed. Finally, full system functionality may be delayed until the end of the project (Gordon & Gordon, 1999).

In both cases, these approaches provide more flexibility than the traditional approach. Furthermore, each has its advantages and disadvantages and system developers can choose the correct method for their particular needs. Developers can choose an approach based on their given circumstances (Peters, 1987). Each of these methods has seen success. These approaches define how to move through the ISDLC but do not provide the tools to develop a system's structure. A structured approach to

analysis and design can provide the necessary tools for system development (Aktas, 1987).

Structured Approach to Analysis and Design

Aktas (1987) presented a structured approach to the ISDLC. The structured approach provides the system developer with the necessary tools and techniques to use in conjunction with the ISDLC to successfully produce an information system. To present this structured approach, Aktas (1987) proposed a system life cycle and highlighted the tools available for system developers.

Aktas' (1987) performed a content analysis of four ISDLCs. He then noted their similarities and found that the process was very similar to those of engineering systems. The phases were: planning, analysis, physical design, implementation or construction, and maintenance.

During the planning phase the developer sends a request for a system study, conducts the initial investigation, and conducts a feasibility study. The developer gathers information about the problem and requirements and determines solutions to the problem. Furthermore, he or she determines constraints to system development.

In the analysis phase, the problem is redefined. The developer then works to understand the existing system (if applicable) or requirements for the new system. In doing this, he or she determines user requirements for the new system. During the final step of the analysis phase, the developer builds a conceptual model of the recommended system based on user requirements. There are many tools available for the developer to build the conceptual model (e.g., hierarchy charts and data flow diagrams).

The third phase, the design phase, produces a system design and detailed design. The developer takes the conceptual design from the analysis phase and converts it into actual specifications for the system. Once the specifications are set, the developer builds, tests, and installs the system. This is known as the implementation phase. Also during this phase, he or she operates the system looking for refinement opportunities. The last step of the implementation phase focuses on the post-implementation review. Post-implementation review consists of determining whether or not the system is meeting user requirements and making the necessary updates or changes to finalize the system.

The final phase of the life cycle is the maintenance phase. Here the developer performs enhancements to the system as required by the user. This stage continues until a new system is required. See Figure 3 for the life cycle model.

Unlike with the traditional approach to the life cycle model, the system developer is free to move back and forth between phases. This allows for customer feedback during each phase, ensuring fewer post hoc changes and refinements. Furthermore, portions of the system can be delivered before the end of the project. Each of these advantages can reduce costs, delays, and tension between the developer and the customer.

As stated before, the life cycle only provides vague guidelines for system development. The system developer needs tools and techniques to ensure system development is successful (Aktas, 1987). Hierarchy charts and data flow diagrams are examples of these tools. Multi-dimensional data models represent the underlying data structure.

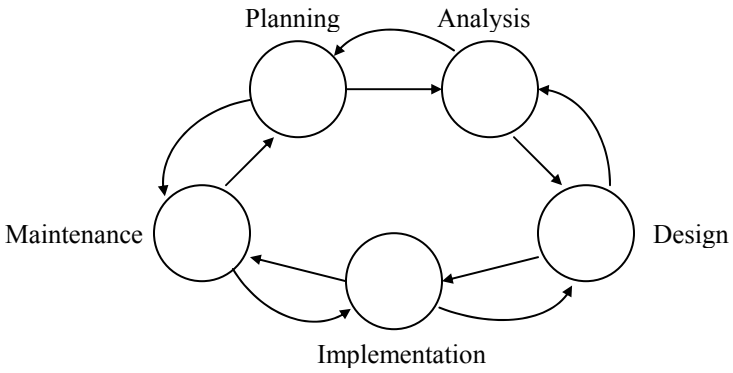

Figure 3. Five phases of the information systems life cycle. From "Structured Analysis and Design of Information Systems" by Aktas (1987).

Hierarchy charts. A hierarchy chart (or function chart) shows the hierarchical relationships of the system's components. This type of chart is similar to an organizational chart where each lower level is a subset of the level above it. Major loops and decisions are not shown in a hierarchy chart. A hierarchy diagram shows the overall structure of the system and its components or functions. Descriptions of the components and functions are included with the hierarchy chart (Aktas, 1987). Hierarchy charts provide a concise view of the overall system and its function. See Figure 4 for an example of a hierarchy chart.

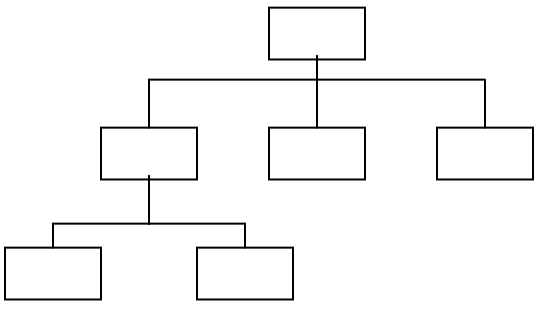

Figure 4. The structure of a hierarchy chart.

Data flow diagrams. Data flow diagrams (DFDs) are used to model the flow of data between processes and data stores (Gordon & Gordon, 1999). They provide a logical map of a proposed or existing system and are used during the analysis phase of the system development life cycle to build the architectural (conceptual) design of the system.

DFDs have many capabilities. They are good for partitioning systems into subsystems and showing how data flows throughout the system. They identify data stores and in-flowing and out-flowing data. External entities, or sources of the system, are also represented (Aktas, 1987). Various symbols are used to define data flow, processes, external entities, and data stores. These symbols are relatively universal and Microsoft Visio© provides the capability to draw DFDs. The symbols and their nomenclature can be found in Figure 5.

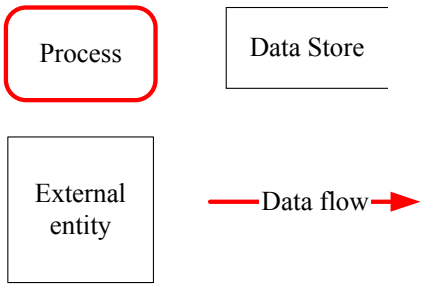

Figure 5. Data flow diagram symbols.

DFDs can be used to show different levels of the system. The context diagram shows the system boundaries. A zero-level diagram provides an overview of the system, its major processes and data flows. Each major process is decomposed and shown on a lower level DFD. These are referred to as Level 1 diagrams. If required, processes from Level 1 diagrams can be further decomposed and presented in Level 2 diagrams. This

process is repeated until the proper level of detail is accomplished. Any one diagram, however, should be limited to seven (plus or minus two) processes. Data flows can also be decomposed and represented on lower level diagrams. See Figure 6 for an example of a data flow diagram.

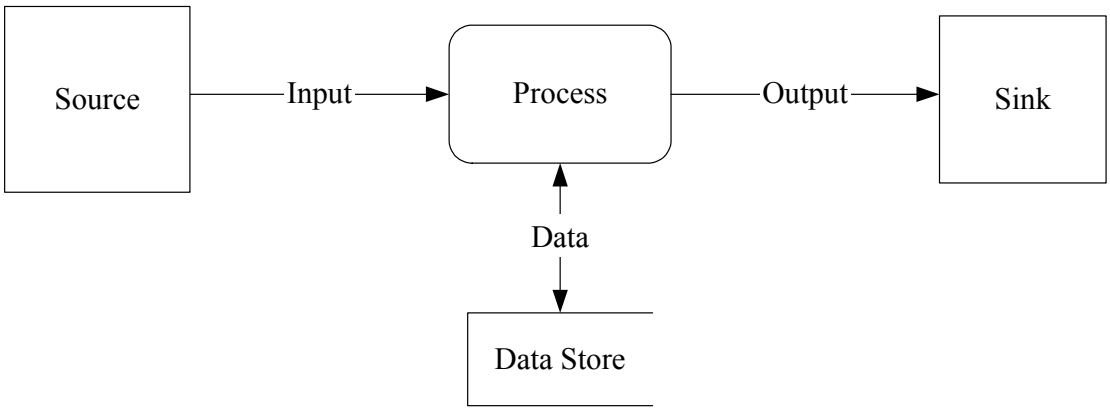

Figure 6. Example of data flow diagram.

In this example the source inputs information. The source could be any external entity such as an employee or customer. The system processes the information. During the process data is sent to and retrieved from the data store, usually a database. The system then provides an output of information to the sink. The sink is also an external entity and could be the same employee or customer that input the original information.

While DFDs are useful for system representation, they also have their limitations. Aktas (1987) posits that DFDs do not show the composition of the data, data access requirements of data stores, decisions, loops, calculations, or quantities for data and/or processes. Despite these limitations, Aktas (1987) presents some reasons to use DFDs. DFDs can help analysts summarize the system and its key components and functions. Analysts can also gain an understanding of the relationships within the system. DFDs are an excellent communication tool. Users and analysts can use them to discuss system

requirements and development. Finally, by setting up the logical framework with a DFD, the system developer can determine the physical characteristics of the system and the feasibility of its implementation.

Multi-dimensional data model. While hierarchy charts and DFDs provide a representation of the overall system structure, multi-dimensional data models can be used to represent the underlying data structure. These models are powerful tools that provide views of large relational databases from multiple dimensions, allowing managers to view data in different ways (Gordon & Gordon, 1999; Laudon & Laudon, 2002). The multi-dimensional view provides analysis through flexible access to data by hiding the complex query syntax from the user and providing a quick query response to summarized, high-level data (Connolly & Begg, 2002).

Multi-dimensional databases are compact and easy to understand and are optimal for visualizing and manipulating data with many inter-relationships. Furthermore, they minimize data storage requirements. To optimize database efficiency, dimensions are created and pre-aggregated into a hierarchical structure. For instance, if tracking timeframes, dimensions are created for years, quarters, months, days, and hours. Data in this format can be consolidated, drilled down, or sliced and diced. In other words, the data can be viewed to the level of detail required by the user or from different viewpoints (Connolly & Begg, 2002).

Multi-dimensional structures store data and relationships and can be represented by models that are intuitively analytical and easy-to-use. Data can be structured as a three-dimensional cube, which represents cells of data in an array. Data can be visualized as cubes with each side representing a dimension. Laudon and Laudon (2002) provided

an example. A company supplies four different products across three regions. Managers may want information about actual and projected sales for each product across the three regions, requiring a multi-dimensional analysis. See Figure 7 for an example of the data model showing product versus region.

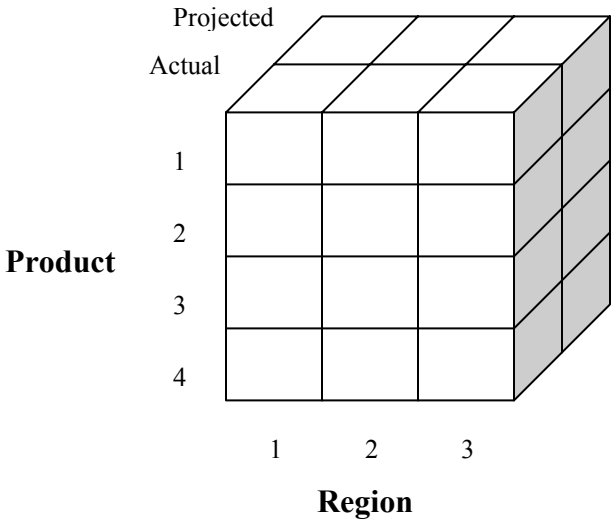

Figure 7. Example of a multi-dimensional data model. From "Management information systems: managing the digital firm" by Laudon and Laudon (2002).

The ability to rotate the cube to get different view of the data is the key to the multi-dimensional model. This was referred to above as slicing and dicing the data. For instance, if the cube is rotated 90 degrees, the face shows product versus actual and projected sales. Many views are possible, allowing managers to gain a good perspective of product sales across regions (Laudon & Laudon, 2002).

Information System Usability

A well-designed information system should be usable. It is necessary to assess usability to draw conclusions about your system. Commonly, usability assessments are

conducted by asking participants to use the system of interest in specific scenarios. If the goal of the system is user satisfaction, subjective usability measures can be used. Subjective usability measures assess attitudes toward system attributes such as ease of use and quality of interface (Lewis, 1995). Some posit that attitudes towards these attributes affect user satisfaction and acceptance of the system and whether or not people will continue to use it (Davis, 1989; Lewis, 1995). Therefore, usability is an important factor to consider during system development.

Usability is a multi-dimensional construct. It can be defined and measured using a multitude of variables or constructs. While these constructs may be presented under different nomenclature, those introduced by Davis (1989) and Lewis (1995) presented constructs that they feel measure system usability. Davis (1989) presented perceived ease of use and usefulness in his technology acceptance model. He posited that these are responsible for system acceptance behaviors. Lewis (1995) presented overall system usability as a combination of system usefulness, information quality, and interface quality. These constructs can be used to measure a system's overall usability.

Davis (1995) defined perceived ease of use as "the degree to which the prospective user expects the target system to be free of effort." A system that is flexible, easy to learn, and easy to become skillful using will most likely be considered easy to use. Perceived usefulness, as defined by Davis (1995), is "the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context." A system that allows the user to improve his or her performance, productivity, and effectiveness on the job will most likely be considered useful.

In order to measure user satisfaction with overall system usability, Lewis (1995) posited three usability constructs: system usefulness, information quality, and interface quality. While there are no formal definitions of these constructs in the literature, they each focus on different and important areas of system usability. System usefulness consolidated the Davis (1995) constructs perceived ease of use and usefulness. Information quality dealt with how the system presented information. A system with good information quality presented information in a clear and understandable manner, allowed the user to find information easily, and provided help when the user made a mistake or had a problem. Interface quality focused on the interaction the user had with the system. A user expected a system with good interface quality to have all required functions and capabilities. Those functions and capabilities also provided a pleasant interaction with the system. Screen graphics and icons were examples of interface items that affected interface quality.

Despite the fact that usability is a difficult concept to define, Davis (1989) and Lewis (1995) presented constructs to measure it. These measures provide valuable information to managers who are looking to measure user satisfaction of a system's usability and its affect on the acceptance of that system.

Chapter Summary

This chapter provided an overview of developmental feedback and the feedback process to behavior change, presented the theory and development of the feedback instruments, and highlighted the advantages and limitations of web-based surveys. The chapter shifted gears and focused on system development, specifically the systems development life cycle, the structured approach to analysis and design, and the tools

necessary for successful analysis and design. Finally, the chapter highlighted system usability, some constructs that can be used to define it, and its importance to user satisfaction of a system's usability and system acceptance.

III. Methodology

As stated in Chapter I, the objective of this research were to determine the theoretical framework of an effective developmental feedback program and to develop and implement a worthy web-based program for Aeronautical Systems Center, Air Force Security Assistance Center, and Air Force Materiel Command. A structured approach to the information systems life cycle was used to design the web-based developmental feedback system. The methodology used for this research completed four phases of the five-phase information systems life cycle depicted in Table 3. These were the planning, analysis, physical design, and implementation phases.

The system development phases were tailored from Aktas (1987) to meet the requirements of this study. It is important to note that these phases and their steps were not necessarily followed sequentially; they were accomplished iteratively. For instance, work on some phases or steps required returning to the previous phase or step and revising what had been accomplished. The results for the completed phases and their steps are found in Chapter IV.

Phase 1. Planning

The purpose of the planning phase was to gather information about the research problem and general system requirements. It was also used to set the criteria for a solution. An initial investigation and feasibility study were conducted to meet the requirements of this phase.

Table 3

Structured Approach to Systems Development

Phase	Steps
1. Planning	1.1. Initial investigation
	1.2. Feasibility study
2. Analysis	2.1. Redefine the problem
	2.2. Determine system requirements
	2.3. Architectural design
3. Physical design	3.1. Actual system design
4. Implementation	4.1. System building
	4.2. Testing
	4.3. Installation
	4.4. Operations
	4.5. Post-implementation review
5. Maintenance	5.1. Maintenance and enhancements

Note. Adapted from "Structured Analysis and Design of Information Systems," by Aktas (1987).

The feedback program developed by Patton (2002) had originally met all customer requirements and provided a good framework for the web-based program. It was known that the program needed to be automated to exploit the advantages a web-based program had over a paper-based program, mainly time savings, cost savings, and geographical reach. Thus, the purpose of the initial investigation was to reveal general

requirements and features of an effective automated program that would still meet customer requirements.

After general requirements were determined, the researcher moved on to the feasibility study. The main focus of the feasibility study was to answer the question, could a web-based system with the general requirements and features noted in the initial investigation be developed? To answer this question, the criteria for system development were identified and are presented in Chapter IV. If a system that met the proposed criteria could be developed, the researcher would deem that system development was feasible and would move to the analysis phase of the life cycle.

Phase 2. Analysis

The analysis phase consisted of redefining the problem, determining system requirements, and building an architectural design.

Redefining the Problem

It was necessary to design a web-based program that was easy to use and would provide the necessary tools for a leader to move through the feedback process and improve his or her leadership behaviors. This system needed to provide savings in time and cost over a traditional paper-based program. Finally, a large population should have access to the system through the website.

Determining System Requirements

System requirements were developed during this phase and defined what the system needed to do. The needs were synthesized into a baseline of system level requirements that could be translated into an architectural design. The first investigative question was used to establish the requirements baseline.

Investigative question 1. What system capabilities are dictated by developmental feedback requirements that will allow the leader to easily move through the feedback process to behavior change?

System requirements were extracted from the literature review, the Patton (2002) study, and a brainstorming exercise and were used to develop the requirements baseline. This baseline represented the theoretical framework of an effective developmental feedback program and defined system level capabilities that would allow a leader to easily move through the feedback process to improve his or her leadership behaviors.

The developmental feedback functions (i.e., feedback collecting, results reporting, and action planning) from the literature review were defined as the capabilities an effective developmental feedback program should have. An analysis of the Patton (2002) study was used to obtain specific examples of the required functions (i.e., feedback instruments, reports, action planning guide). Finally, the researcher brainstormed possible system features that would make the system self-sufficient and easier for a leader to use.

Architectural Design

Once the requirements baseline was established, the architectural design was developed to represent the overall system structure and its processes. The architectural design was a user orientation of the system design. Investigative question 2 was used to develop an architectural design of the web-based developmental feedback system.

Investigative question 2. How do the requirements affect system architecture?

System architecture was developed applying a structured approach to the requirements baseline. A hierarchy chart was developed to represent overall system

structure. A series of data flow diagrams was used to shoe different levels of the system, their functions, and their the flow of data between their processes and data stores. Finally, three-dimensional data models were developed to represent the underlying data structure of the system. Once this conceptual design once established, it was possible to develop actual system specifications.

Phase 3. Physical design

During the physical design phase, the architectural design was translated into an actual system design. Investigative question 3 was used to develop an actual system design.

Investigative question 3. How does the system architecture affect the actual system design?

While the architectural design provided functional requirements and specifications, the system design provided actual system specifications. In other words, specifications of the website, feedback instrument, feedback reports, and on-line workbook were developed during this phase. These specifications were derived from the requirements baseline and system architecture and resulted in a series of templates. These templates provided basic specifications for content of each web page, e-mail, report, and workbook page for the entire system. Only the requirements for each page were provided on the template. The system programmer determined graphics design.

Phase 4. Implementation

The implementation phase consisted of system building, testing, installation, operations, and post-implementation review. Investigative question 4 was used to construct the actual system.

Investigative question 4. How do you translate the architectural and physical designs into a working information system?

System Building

Once the system specifications were developed, an experienced programmer was required to build the actual system. Two contractors that worked for the graduate school programmed the system from the architectural and physical designs. They used the architectural design to determine the overall "picture" of the system and its requirements. The physical design templates were used to construct the actual web pages, database, and reports.

Testing

Once the system was developed, it was tested for functionality and ease of use. Thirty-seven students and faculty members from the graduate school were recruited to test the system. Participants were given an overview of the system, its function, and the link to the system via e-mail. No system navigation instructions were given to the participants.

Students were given scenarios to complete. For instance, one student was assigned as a leader while others were assigned as his assessors (i.e., peers and team members). The "leader" used the system to obtain feedback from the assessors. The assessors completed the LCI-Observer. The results of this portion of the test were used to

determine whether or not the system was functioning as designed. For instance, the researcher used some of the responses to test the scale values to ensure values were being properly entered into the database.

Faculty members were instructed to use the system as a way to assess their leadership behaviors. They were given the liberty to choose their own assessors and were requested to use the system equivalent to its intended purpose. This was used to view system function in a real world scenario.

All participants (students and faculty) were instructed to identify any bugs in the system and provided feedback on its ease of use. To measure ease of use, the researcher added four items to the end of the LCI-Observer (e.g., "I found this web survey easy to use"). The ease of use scale is described in further detail later in this chapter. There was an open-ended item at the end of both feedback instruments and personnel were encouraged to provide comments about the system. Participants were also encouraged to provide any feedback about the system to the research team via e-mail or in person if necessary.

Installation

Since there was no previous version of the web-based developmental feedback system, the current system was installed for the test by the school's programmers. To do this, the programmers activated the web site and its functions. The only requirements installed after testing were those items changed or updated as a result of the system test.

Operations

Once the system was tested and the updates were installed, the system was fielded. The system was originally fielded to students and faculty at the graduate school.

It was also advertised to graduate students at another school in the area. Potential participants were given an overview of the system, its function, and the link to the system via e-mail. To access the system, leaders clicked on the link provided in the e-mail. The leaders were then presented with the home page and could operate the system as desired. The system was self-sufficient and required no researcher actions to operate. The system did have contact information that allowed users to contact the researcher with questions, feedback, or problems. All questions or problems were resolved as necessary. The researcher retrieved data from the system via the school's programmer. The programmer extracted the data from the database and provided a spreadsheet to the researcher.

Post-implementation Review

Once the system was operational it was necessary to obtain information on the program and information system. Particularly, the researcher wanted to obtain data on the perceived utility of the feedback and perceived usability of the system. Investigative question 5 was used to assess these variables.

Investigative question 5. How do you assess the perceived utility of the feedback and usability of the information system?

To measure feedback utility, the researcher relied on comments provided by leaders and observers at the end of the surveys. All comments were analyzed for perceptions of utility from the leader and observer perspectives. Furthermore, the LCI-Observer contained two items at the end of the assessment that were used to measure utility from the observer perspective. An analysis of the descriptive statistics from the two items combined with the analysis of the comments was used to formulate

conclusions about the usefulness of the feedback. The researcher felt that leaders and observers would find the feedback useful for leadership development.

To measure system usability, any comments provided by leaders and observers that related to ease-of-use issues were noted. Furthermore, the observer assessment contained four items that were used to measure perceived usability from the observer perspective. An analysis of the comments and descriptive statistics was used to determine perceived ease of use. The researcher felt that people would find the system easy to use.

Perceived utility. Brett and Atwater (2001) posited in their feedback model that prior to behavior change the feedback recipient must find the feedback useful. Useful feedback (i.e., feedback that motivates the recipient to set goals) will most likely lead to goal setting, a prerequisite to behavior change (Locke & Latham, 1990). Therefore, perceived usefulness of the feedback is a necessary requirement for goal setting.

Leaders and observers provided comments as to the usefulness of the feedback provided by the system. Comments from leaders and observers were analyzed to determine perceived utility (i.e., usefulness) of the feedback. Furthermore, observers rated their perceptions of the utility of the feedback they provided. The utility items used a 7-point Likert response scale ranging from 1=Strongly disagree to 7=Strongly agree. The two items were, "I feel I have worked long enough with this person to adequately assess his/her leadership behaviors" and "I believe the information collected by this survey can help leaders become more effective".

Perceived usability. Observers reported the degree to which they felt the system was free of effort. Items were adapted from Davis's (1989) perceived ease of use scale

and Lewis's (1995) system usefulness scale. Davis described perceived ease of use and perceived usefulness as two separate constructs. Lewis described a construct called system usefulness, which was a combination of perceived ease of use and usefulness. Perceived usefulness focused on improving a user's productivity and effectiveness on the job. In this study, since the feedback program, not the system itself, was designed to improve a leader's performance, the usefulness construct was not relevant. Therefore, the ease of use items from Lewis's system usefulness scale were combined with Davis's perceived ease of use scale to form the scale for this study. There was some overlap between some items and the scale for this study included four items (i.e., "The survey questions were easy to understand"; "Learning to use this web survey was easy for me"; "I found it easy to get the web survey to do what I wanted it to do", "I found this web survey easy to use"). The ease of use scale had a reliability coefficient of .80, surpassing the required value of .70 (Huck & Cormier, 1996) and providing evidence that the scale is reliable.

Phase 5. Maintenance

The maintenance phase is ongoing and the results were beyond the scope of this study.

Chapter Summary

This chapter provided the methodology used to design the web-based developmental feedback program. In particular, the relevant phases and steps of the information system development life cycle for this study were discussed. The results for each of the phases are discussed in Chapter IV.

IV. Results of the Life Cycle Phases

This chapter contains the results of the first four stages of the information system development life cycle (i.e., planning, analysis, physical design, and implementation). The planning phase was designed to conduct the initial investigation for the study. Also during this phase, the researcher completed a feasibility study. Once it was determined that the system was feasible, the researcher moved to the analysis phase of the life cycle. During this phase, the problem was redefined and the system requirements baseline and architectural design were developed. From the architectural design the researcher was able to develop the physical design of the system and complete phase three of the life cycle. Programmers used the architectural and physical designs to implement and install the system. A limited assessment of feedback utility and system usability was conducted at the end of phase four.

Phase 1. Planning

The planning phase consisted of an initial investigation and a feasibility study. During the initial investigation the researcher gathered information about the research problem and general system requirements. The feasibility study set the criteria for a solution.

As stated in Chapter III, the paper-based feedback program developed by Patton (2002) had originally met all customer requirements and provided a good framework for the web-based program. A web-based program would automate the functions of the paper-based program and exploit the advantages of electronic data input and output and the Internet. The functions of the paper-based program served as templates to possible

system inputs, outputs, and features. The feedback instruments would provide the inputs to the system and the feedback reports would provide the outputs. This program also had an action plan workbook that was used by the leaders to set goals based on their feedback. Therefore it was determined web-based program could be modeled after Patton's feedback program.

By automating the feedback instruments, reports, and action plan workbook, the web-based system would require certain added features to provide a similar feedback process as the paper-based program. These are discussed in more detail later in the chapter. Now that the general requirements for the system were established, the researcher needed to know if it was feasible to proceed with the study.

To determine the study's feasibility, the researcher developed certain criteria the system would have to meet. The criteria were as follows. The system had to exploit the advantages of a web-based program over a paper-based program. In other words, the system had to produce cost savings, time savings, and achieve a broad geographical reach. The system had to be self sufficient and easy to use. That is, a leader should be able to move through the feedback process with little or no outside help. The system had to be accessible by personnel Air Force-wide and should be compatible with the majority of Air Force computers and browsers. Finally, due to the lack of funds, the system needed to be developed by one of the graduate school's programmers.

After a short interview with a programmer from the graduate school it was determined that all the criteria could be met and accomplished "in-house". The web-based system would achieve electronic data input and output and would save the researcher from performing these functions manually, thus saving time. The system

would be available on the World Wide Web and would achieve a broad geographical reach. In light of this, personnel Air Force-wide would have access to the system. Furthermore, the software used to develop the system was compatible with all Air Force computers and browsers. The researcher deemed that the study was feasible and moved to the analysis phase of the life cycle.

Phase 2. Analysis

This section highlights the results of the analysis phase of the development life cycle. This phase consisted of redefining the problem, determining system requirements, and building an architectural design.

Redefining the Problem

Given that the system design was feasible, it was necessary to design the system to provide the necessary tools for a leader to move through the feedback process and improve his or her leadership behaviors. With the problem redefined, it was deemed that the study would still provide the required system, it was then necessary to determine what the system needed to do.

Determining System Requirements

The purpose of this step was to answer investigative question 1 and established a requirements baseline for the system. The baseline defined what the system needed to do.

Investigative question 1. What system capabilities are dictated by developmental feedback requirements that will move the leader through the feedback process to behavior change?

The requirements were extracted from the literature review, the Patton (2002) study, and a brainstorming exercise. The developmental feedback functions (i.e., feedback collecting, results reporting, and action planning) from the literature review were defined as the capabilities an effective developmental feedback program should have. An analysis of the Patton (2002) study was used to obtain specific examples of the required functions (i.e., feedback instrument, reports, action planning guide). Finally, the researcher brainstormed possible system features that would make the system self sufficient and easy for the leader to use.

Effective developmental feedback is designed to encourage leaders to improve their leadership behaviors. As stated above, an effective program should provide three functions that will provide the necessary tools to move the leader through the feedback process and improve his or her leadership behaviors. These three functions were identified from the literature as: feedback collecting, results reporting, and action planning.

Feedback collecting. The requirements for collecting feedback were adapted from the literature review and the Patton (2002) study. Leaders and their raters (also called observers) provide developmental feedback through a feedback instrument. The main requirement for collecting feedback is to ensure that the leader will perceive it as accurate. To ensure this, both the instrument and raters must have certain characteristics.

The instruments chosen for this system were the Leadership Commitments Inventory (LCI) and a stakeholder assessment. The LCI has not been validated but was based on two valid instruments (i.e., LPI and UFI) and was developed using statistical methods. Furthermore, the purpose for deploying the LCI with this system was to test its

reliability and validity. The stakeholder assessment will also be deployed with the system to provide a means to test the criterion validity of the LCI.

The LCI focused on behaviors that are important to the sponsoring organizations, letting the leader and raters know the critical behaviors for success. The instrument was also easily translated to a web-based environment. Given these characteristics, if the LCI was a valid instrument, it would theoretically provide accurate feedback.

No instrument can provide accurate feedback without raters. Good developmental feedback programs are designed for the leader to initially perform a self-assessment and then request feedback from observers. As a result, two versions of the LCI (Self and Observer) were required. The system needed to allow the leader to perform a self-assessment and then request feedback from his or her boss, peers, direct subordinates, indirect subordinates, team members, and customers. To inform the leader of this requirement, the system needed to have easily accessible guidance for obtaining feedback.

To increase feedback accuracy and interrater reliability and to ensure rater anonymity, the leader requires that between three and five raters in each category (except the boss category) complete the LCI-Observer. To guarantee confidentiality, feedback must be processed and stored by the system and its database, preferably on the graduate school's web server.

Results reporting. Once feedback is collected it must be presented for the leader to receive and understand it. Feedback reports provide this function. Reports and their characteristics are keys to the perceived accuracy and usefulness of the feedback. Therefore this system needed to provide reports that would present clear and

understandable feedback information. Requirements for the reports were adapted from the literature review and Patton study (2002).

To provide the best view of the feedback, three types of reports were required for this system: summary, comparison, and stakeholder. These reports should be adapted to a computer screen but also printable. The summary report needed to provide a graphical representation summarizing the results at the practice, commitment, and item level for each observer category. This would allow the leader to make immediate interpretations of the feedback and how he or she performed in a specific area.

The comparison report needed to provide a graphical representation allowing the leader to compare his or her perceptions to the perceptions of others. The leader should be able to compare results in each category (e.g., self to peers, self to direct subordinate, etc.). Since the LCI was designed to measure leadership at the commitment level these comparisons needed to be provided at the commitment level. Furthermore, to make it easy for the leader to determine where discrepancies occurred, the commitments needed to be listed in order of greatest discrepancy to least discrepancy.

The stakeholder report needed to provide a graphical representation summarizing the results of the stakeholder assessment. This would allow leaders to make an immediate interpretation of their customer's satisfaction with the performance of the unit.

Other requirements for the reports function dealt with particular system features. Since the system was to be self-sufficient, the reports capability needed guidance about the three types of reports and how to retrieve and read the reports. Finally, to ensure anonymity of the raters, the system should not produce results for a specific category

until at least three people from that category provide feedback (once again excluding the boss category).

Action planning. Presenting the feedback alone will not result in behavior change. Leaders must set specific, difficult goals before behavior change can take place. Action planning provides this function. This system needed to provide a facility to allow leaders to develop action plans based on the feedback reports. Since it was not logistically possible to provide one-on-one facilitated or workshop development sessions to all users, the system needed to provide a development workbook or self study guide. The workbook needed to assist leaders in analyzing reports, extracting their strengths and weaknesses, and developing action plans.

Since leaders would most likely not be familiar with action planning, the workbook needed to provide guidance on the action planning process (i.e., building, sharing, and implementing the action plan). To guide leaders in building an action plan, the workbook needed an action plan template and a sample action plan. The action plan template needed to give the leader the capability to set improvement goals in each leadership area. The workbook also needed to provide lists of suggested actions and readings as tools to guide a leader's improvement in a specific area. The suggested actions could be used as goal statements in the action plan. Finally, to make it easy for the leader to navigate, the workbook needed to separate the actions and readings at the practice level.

Other system requirements. Since the system was to be self-sufficient, there needed to be some added features that would allow a leader to securely move through the entire developmental feedback process with little or no assistance. To get the leader

started, the system needed to provide some background on developmental feedback and the current study. It also needed to provide definitions of the leadership behaviors that are highlighted in the program. Maybe most importantly, it needed to provide an overview of how to navigate the feedback process using the web-based system.

In order to provide confidentiality of the feedback information, the system needed to allow the leader to have secure access to the system and feedback information. In order to obtain assistance while using the system, there needed to be a contact e-mail to allow users to contact the research team or technical support with problems, questions, or concerns. Once users completed a session, they needed to have a means to exit the system.

Once the requirements for the system were developed, they were integrated into a requirements baseline. The requirements baseline (Appendix A) served as the outline for the architectural (conceptual) design of the system.

Building the Architectural Design

System architecture was developed applying a structured approach to the requirements baseline. The architectural design was developed to represent the overall system structure and its processes and was a user orientation of the system design. The design was developed using a hierarchy chart, a series of data flow diagrams, and three-dimensional data models. The completed architectural design of the web-based developmental feedback system answered investigative question 2.

Investigative question 2. How do requirements affect system architecture?

Hierarchy chart. A hierarchy chart was developed to represent overall system structure. It was designed to show how the required functions would relate to each other. The hierarchy chart is found in Figure 8.

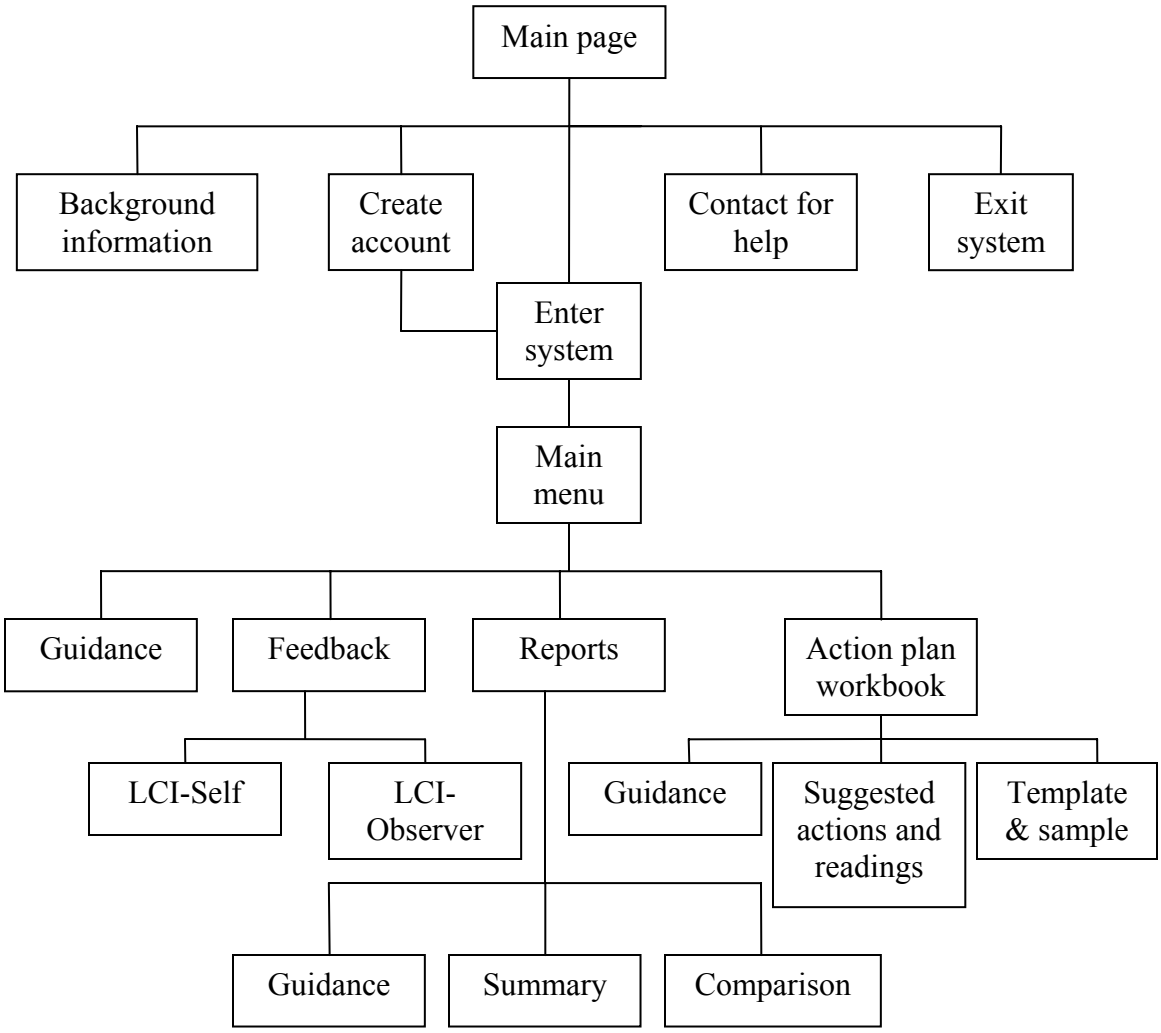

Figure 8. Hierarchy chart of web-based developmental feedback system.

The overall system structure showed that a user without a secure account could access the main page and top-level features. This was designed so that leaders could obtain information about the developmental feedback program and the current study without

creating a secure account. The contact and exit system features were to be accessible throughout the system so that the user could request help or exit the system at any time.

After getting an overview, leaders decide whether or not they want to participate in the program. If they choose to participate they create a secure account and enter the system. After entering the system, a leader gains access to guidance about the developmental feedback process, feedback instruments, feedback reports, and the action-planning workbook. These features will be discussed in more detail in the next section. Finally, the chart shows that if they have already created an account, they simply enter the system and access the functions they need. Once the overall system structure was established, it was necessary to view system functions and their processes.

Data flow diagrams. A series of data flow diagrams (DFDs) was used to show different levels of the system, their functions, and the flow of data between their processes and data stores. Higher-level diagrams were developed first and were then decomposed into lower level diagrams. The higher level diagrams gave an overview of the processes and data flows while the lower level diagrams provided more detail. Four levels of diagrams were used: context, level 0, level 1, and level 2.

The context diagram gave a simple view of the system's boundaries and presented the purpose of the system. The context diagram can be found in Figure 9. This diagram shows that the leader uses the system to move through the developmental feedback process. After moving through this process the leader should have enough information to develop and implement an action plan. The system will not produce an action plan for the leader; it will simply provide the leader with the necessary tools to develop one. This diagram also shows that observers and stakeholders provide inputs to the system and

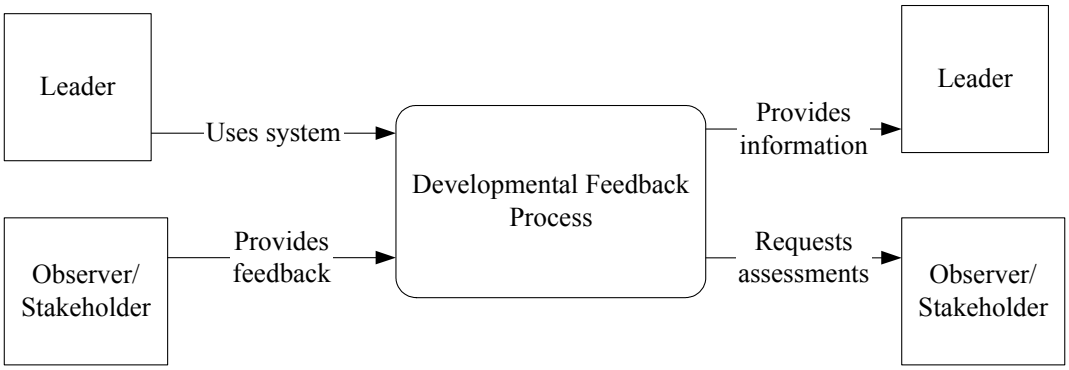

Figure 9. Context diagram.

receive outputs from the system as well. Observers and stakeholders receive requests for feedback from the system and input feedback to the system.

The level 0 DFD provided an overview of the entire system, its major processes and data flows. The level 0 DFD can be found in Figure 10. This diagram, while seemingly complex, shows the many processes a leader must use throughout the system. The major processes were defined by the numbers one (1.) through six (6.).

The diagram shows that the leader can request background information (process 1.) or create an account (process 2.) without actually entering the system. They simply must have access to the web page. The contact and exit functions were not deemed major processes and therefore were not included in the level 0 diagram. They were designed, however, to be available to the leader at any time.

Once a leader creates a secure account he or she can access the main system features by entering the system (process 3.). To enter the system the leader must provide the correct user name and password. This feature ensures the leader's feedback is confidential and only accessible by the leader. Once the leader successfully enters the

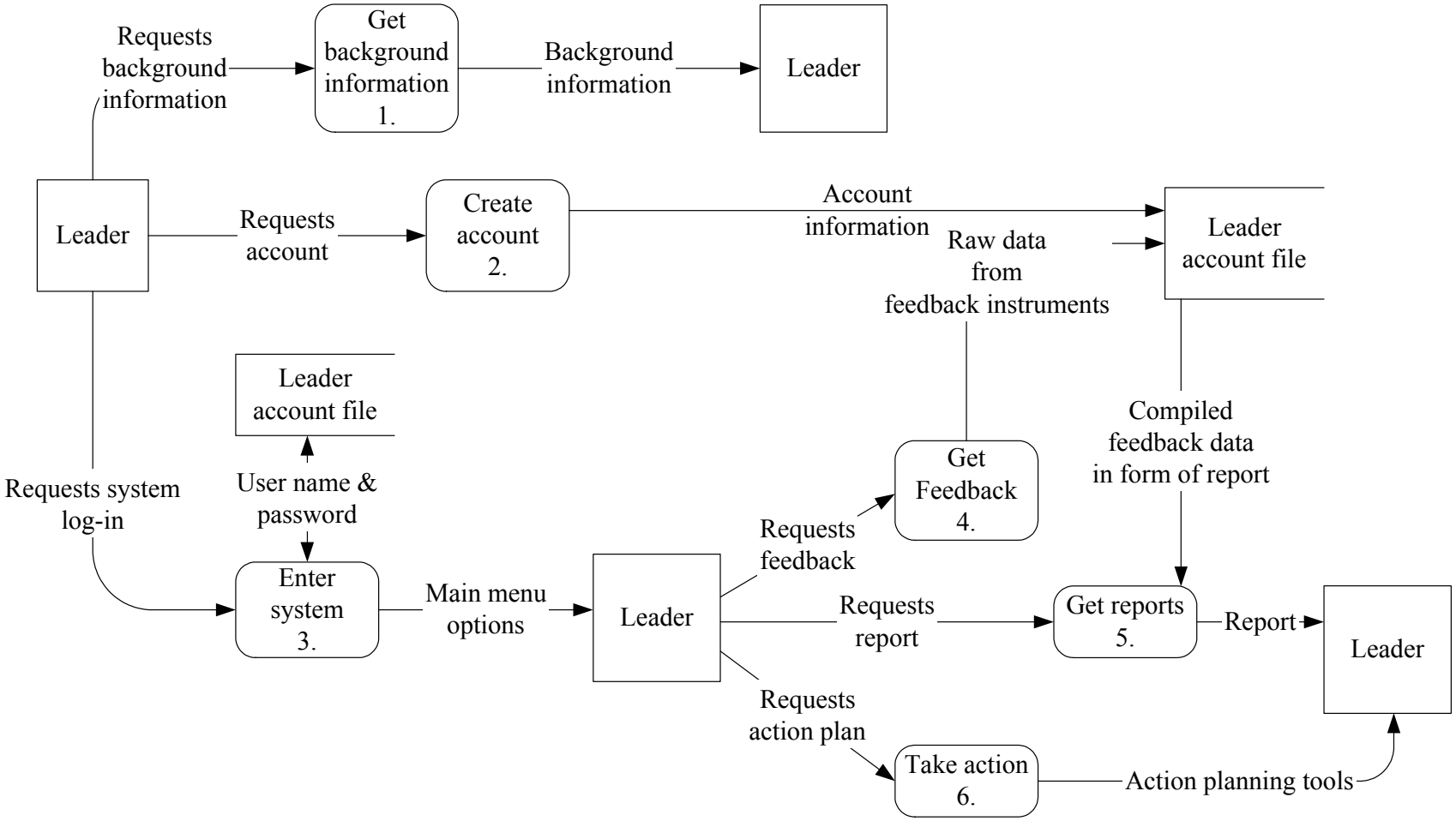

Figure 10. Level 0 DFD (System overview).

system, he or she now has access to the feedback instruments, feedback reports, and the action-planning workbook. The leader requests feedback via the feedback instruments (process 4.). The raw response data goes directly into the leader's account file in the database. When the leader requests a report the raw response data is compiled by the system and presented to the leader in a report format (process 5.). The leader can also request the action-planning workbook that provides the necessary tools for developing and executing a leadership improvement action plan (process 6.). Now that the system overview was established it was necessary to decompose each of the major processes.

The level 0 diagram was decomposed in to six level 1 diagrams, one for each major process. The first level 1 diagram shows the "get background information" process (1.) and can be found in Figure 11.

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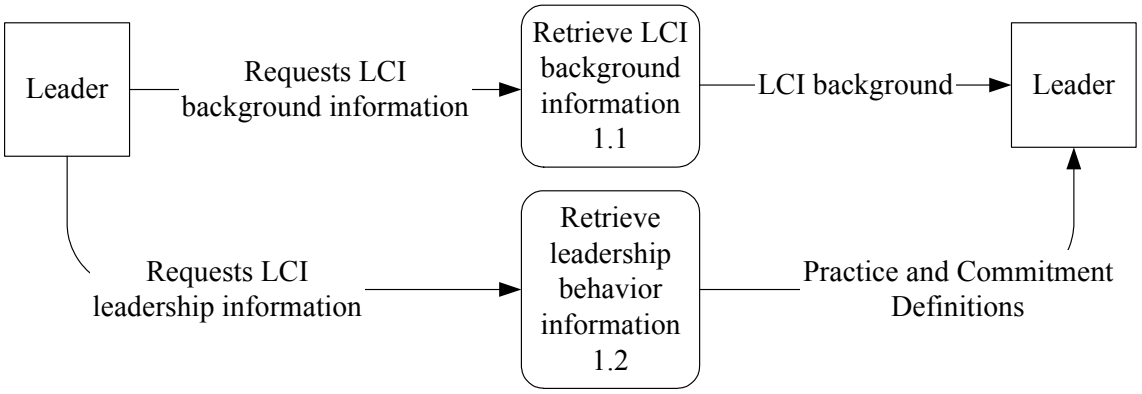


Figure 11. Level 1 DFD for process 1 (Background information).

The leader is not required to provide any information to request background information. He or she simply requests the appropriate link and the information becomes available on the screen. There are two types of background information that can be accessed by the leader, LCI background information and leadership behavior information. These are

presented to the leader in the form of LCI background and leadership practice and commitment definitions, respectively.

The next level 1 diagram showed the "create account" process (2.) and can be found in Figure 12.

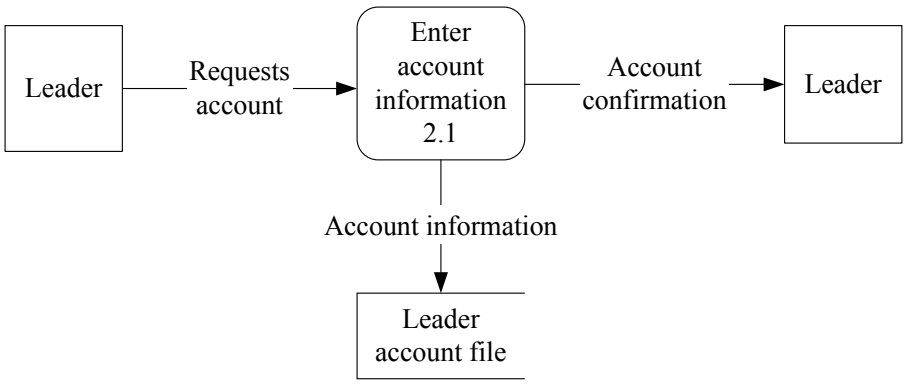


Figure 12. Level 1 DFD for process 2 (Create account).

When the leader decides to use the system, he or she requests an account. They are required to enter specific information that will allow the system to identify them in the future. The required information was determined to be: first name, last name, e-mail address, user identification, and password. Once this information is entered, the create account function establishes an account file for the leader and inputs the leader's account information into his or her database file. Once the information is entered into the account file, the leader gets a confirmation that the account has been created. The account information allows the leader to access the system in the future and allows the system to retrieve a leader's feedback data to create reports.

Once the leader has created an account they have access to the main system functions, particularly the developmental feedback functions. To access the tools they

must enter the system (process 3.). The level 1 diagram for "enter system" can be found in Figure 13.

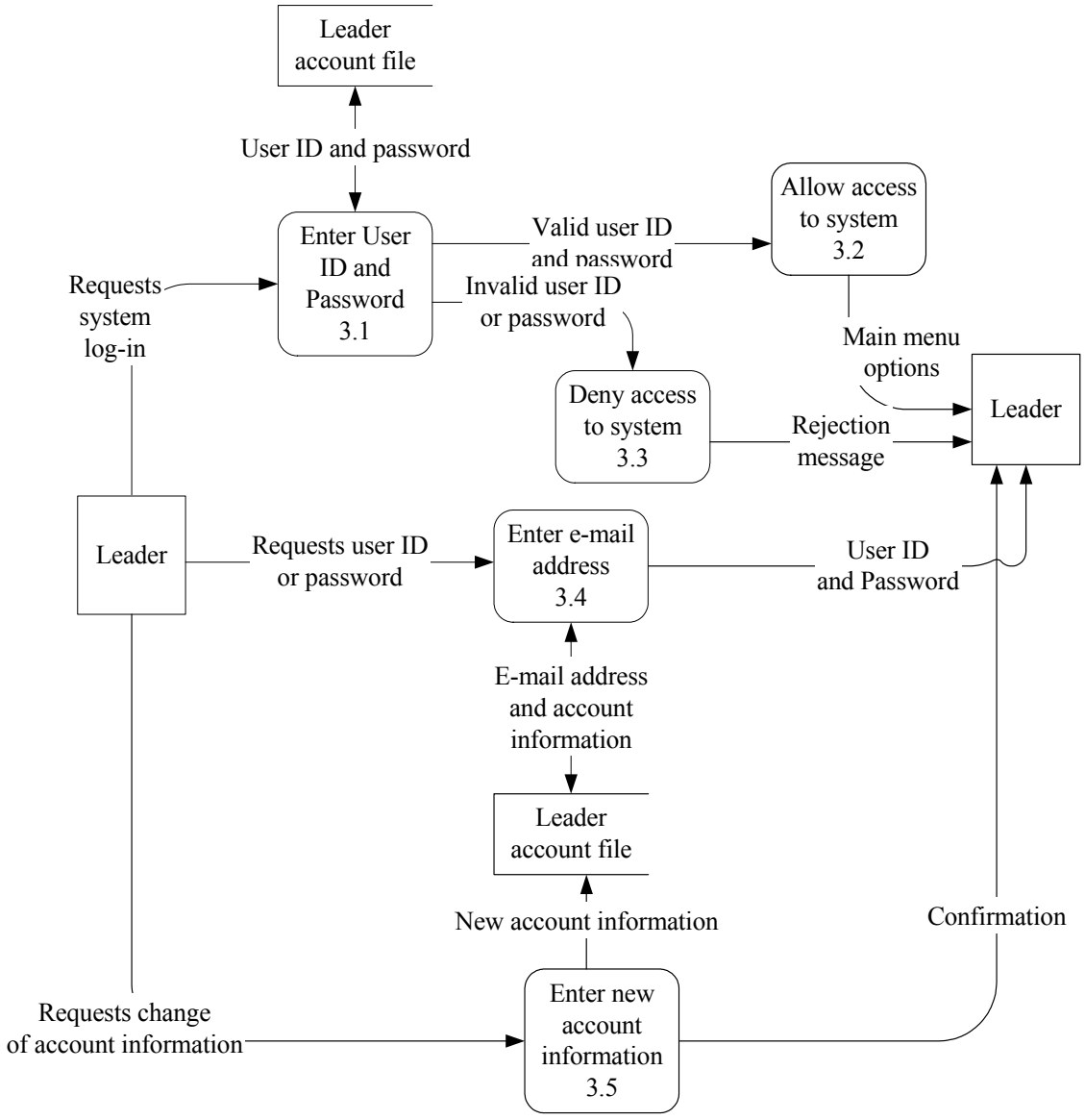


Figure 13. Level 1 DFD for process 3 (Enter system).

To enter the system the leader requests system login. He or she is then prompted to enter the proper user identification and password. This information will be checked against the account information in the leader's account file. If the user identification and password

are valid the system provides the leader with certain options (i.e., guidance, get feedback, reports, and action planning tools).

If the user identification or password is incorrect the leader receives a rejection message and is prompted to reenter the correct information. If the leader forgets the user identification or password he or she can request the information. He or she is then prompted to enter his or her e-mail address. If a valid email address is entered the system accesses the leader account file and provides the requested account information to the leader via an e-mail message. The leader then has access to the system.

Some leaders may need to change the information in their account files. Therefore, the system has a feature that allows the leader to change account information. The leader requests the change and is prompted to enter the new information. The new information is updated in the leader's account file. Once the information is updated, the leader receives a confirmation message that information has been changed.

When a leader enters the system, he or she is given a number of options. He or she can obtain guidance about the use of the system, get feedback, get reports, or take action. He or she is able to contact the researchers or exit the system when necessary. Leaders obtain feedback through one of the feedback instruments. This is accomplished through the "get feedback" process (4.). The level 1 DFD is found in Figure 14. Figure 14 shows that a leader is able to create a new assessment or add to an existing one. A leader will create a new assessment the first time he or she requests feedback. In this case, the system will input feedback data into the leader's account file. A leader will also create a new assessment if he or she wishes to obtain feedback subsequent to his or her initial assessment. For instance, the leader would like to see if the perceptions of his

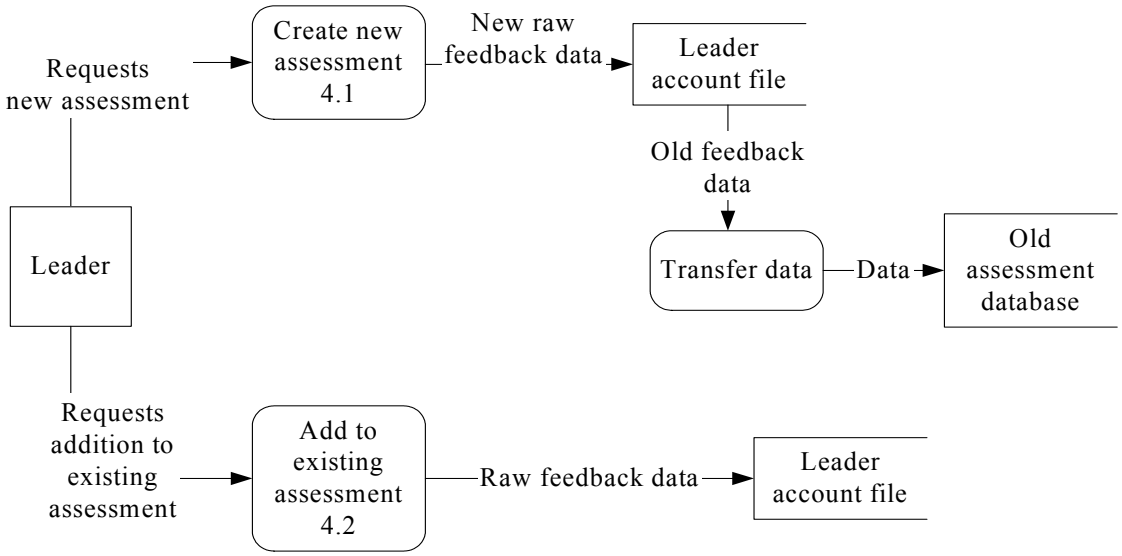


Figure 14. Level 1 DFD for process 4 (Get feedback).

or her leadership behaviors have improved. In this case, all old feedback data is transferred into another database and the new feedback data takes its place.

If a person already has an existing assessment and would like to obtain feedback from more personnel, he or she can add to the existing assessment. In this case the system inputs the new feedback data into the leader's account file. It should be noted that the leader should only be able to add to an existing assessment for a specific time period after he or she began the assessment. This allows the leader to obtain timely and accurate feedback.

The processes "create a new assessment" and "add to an existing assessment" were decomposed into level 2 diagrams. The level 2 diagram for "create a new assessment" can be found in Figure 15. When a leader requests a new assessment he or she can get feedback via the LCI-Self, LCI-Observer, and stakeholder assessment. To obtain a self-assessment the leader requests the LCI-Self. The system provides them with the questionnaire in web form. The leader then completes the items on the questionnaire.

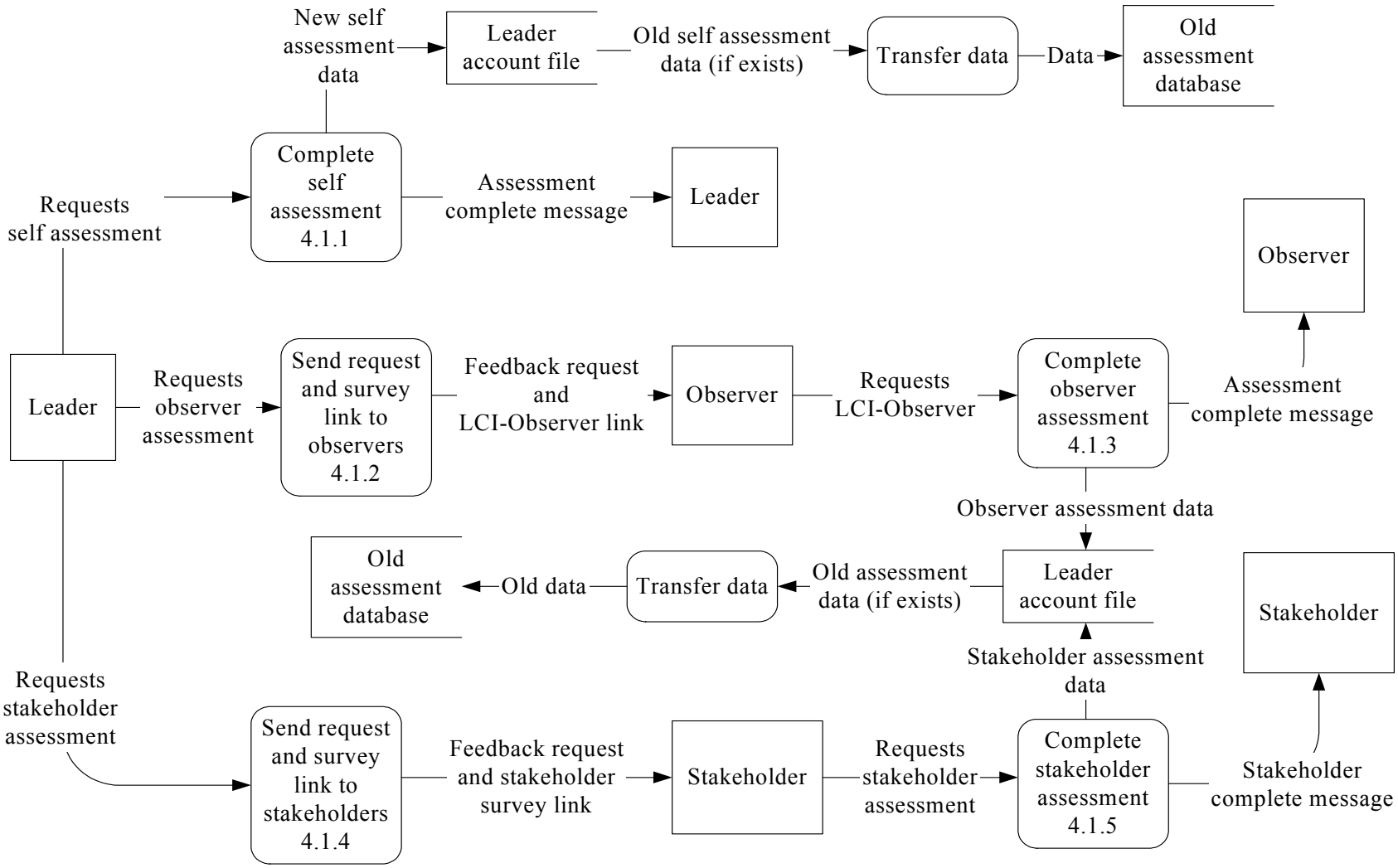


Figure 15. Level 2 DFD for process 4.1 (Create new assessment).

As the leader completes the assessment the data is fed to the leader's account file. If the assessment is not the leader's first one, all old self-assessment data is transferred to a separate database and the new data replaces it. Once the leader has completed the self-assessment he or she receives a message that the assessment is complete.

Leaders also attain feedback data from observers and stakeholders (customers). The leader must request observer and stakeholder feedback through the system. Once the feedback is requested, the system provides the leader with a feedback request e-mail template. The leader enters the appropriate e-mail addresses and sends the message. The observers receive the e-mail that contains a link that, when selected, directs them to the LCI-Observer. At this time, observers are required to enter the appropriate code from the e-mail message to identify to which leader's account the feedback should be stored. They are also required to enter their relationship to the leader. As they complete the questionnaire the data is input to the appropriate leader's account file. Once again, if the new assessment is not the leader's first one, all old self-assessment data is transferred to a separate database and the new data entered. Once the observer has completed the assessment he or she receives a message that the assessment is complete. The same process is used for the stakeholder assessment except that the e-mail feedback request and stakeholder questionnaire are worded differently.

The "add to existing assessment" process (4.2) is very similar to the "create new assessment" process and can be found in Figure 16. The only difference lies in the storage of the data. When the leader adds to the existing assessment the data is input to the leader's account file. No old data is transferred to another database.

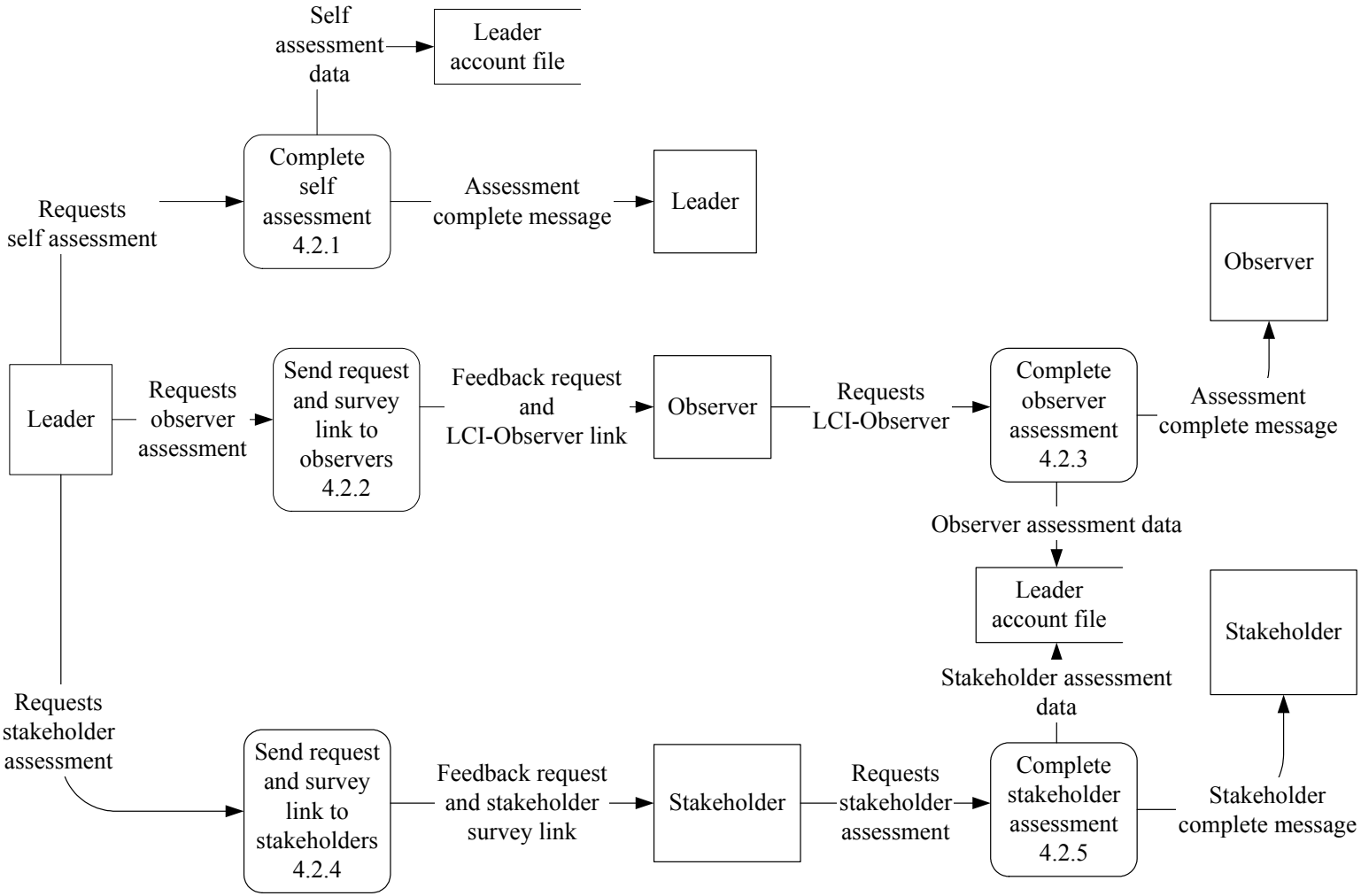


Figure 16. Level 2 DFD for process 4.2 (Add to existing assessment).

Once leaders have feedback data it is possible for them to retrieve reports. The level 1 diagram for the "reports" process can be found in Figure 17.

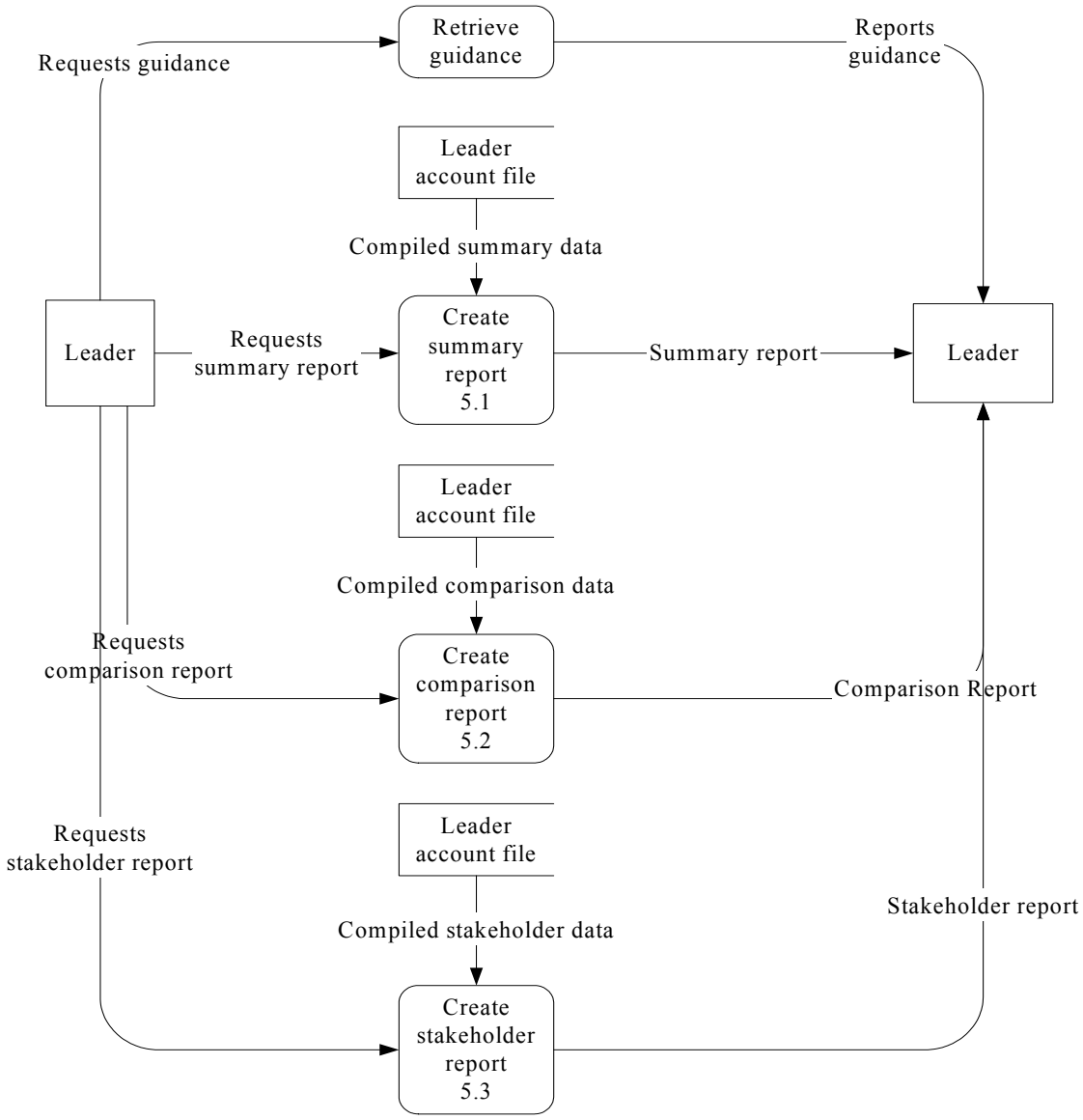


Figure 17. Level 1 DFD for process 5 (Reports).

The leader has four options when he or she requests reports. He or she can retrieve guidance about the reports and the reports themselves. The three types of reports are summary, comparison, and stakeholder.

When the leader requests guidance for the reports the system provides the leader with information about each of the reports. When a leader requests a report the system retrieves the raw data from the leader's account file, compiles it per the requested type of report, and presents it to the leader on the computer screen. Printable versions of each report are also available. Once the leader has reports in hand he or she is ready to take action (see Figure 18).

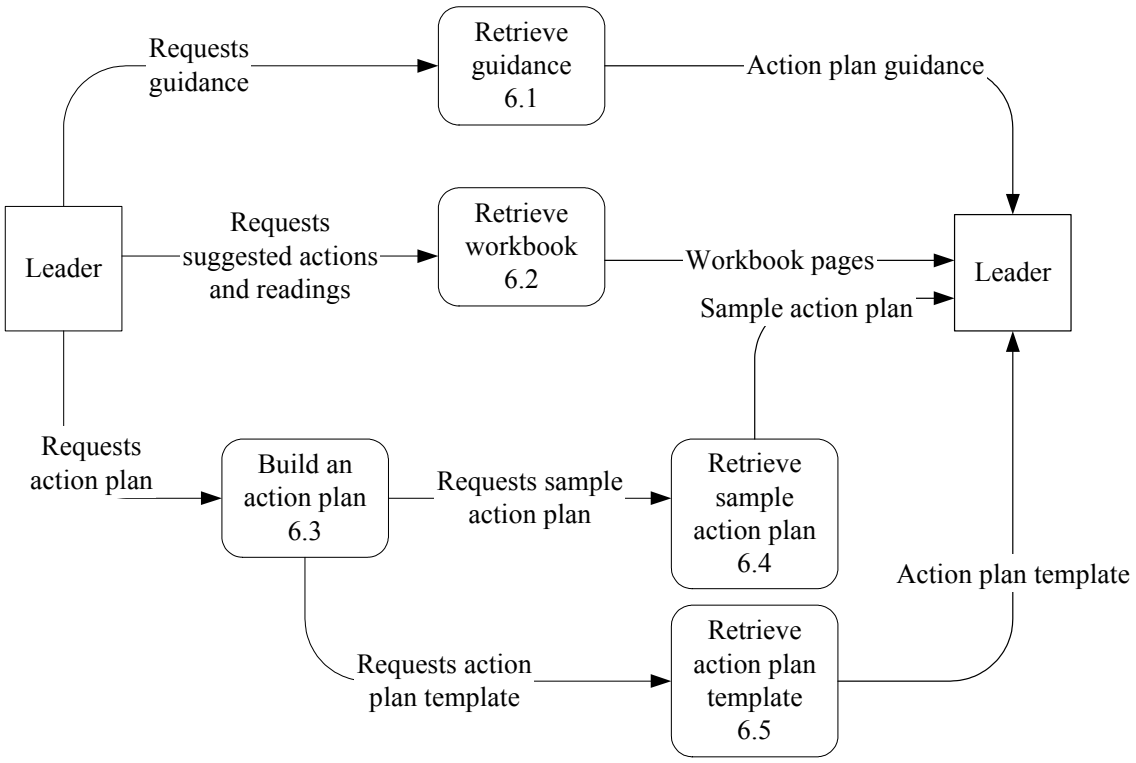


Figure 18. Level 1 DFD for process 6 (Take action).

As necessary, the leader can retrieve guidance about the action planning process. In this case, the leader requests guidance and the system provides the leader with action planning information. Once the leader understands the action planning process he or she may want to obtain ideas for goals setting. To do this, when the leader requests suggested actions and readings the system provides that information to the leader. In this

case, the system provides a series of workbook pages that provide suggested actions and readings to improve leadership behaviors in a specific area. For instance, a leader is deemed weak in the commitments that define the "Challenge the process" leadership practice. A page is available that provides suggested actions and readings to improve the commitments and behaviors that define "Challenge the process".

Furthermore, if the leader requests a sample or template action plan, the system provides copies of these that the leader can edit or tailor to his or her liking. The sample action plan provides an example of a completed action plan. The template action plan provides a document that allows the leader to input his or her improvement goals.

The system was designed to move the leader through the developmental feedback process while providing the necessary tools for him or her to develop an action plan. At this point the leader has reached the far boundary of the system and must use his or her intuition to put the action plan on paper. The DFDs showed the different levels of the system, their functions, and the flow of data between their processes and data stores.

Database models. While the hierarchy chart and DFDs provided the overall system structure, the database models were used to represent the underlying data structure. This section presents the database models that provide a multi-dimensional view of the data. It also presents the table used to store the leaders' account information.

Three-dimensional (3-D) database models were developed to represent the cells of data in an array. Two models were created to represent the data structure, one for the LCI feedback data and one for the stakeholder feedback data. The representation of the LCI feedback data can be found in Figure 19.

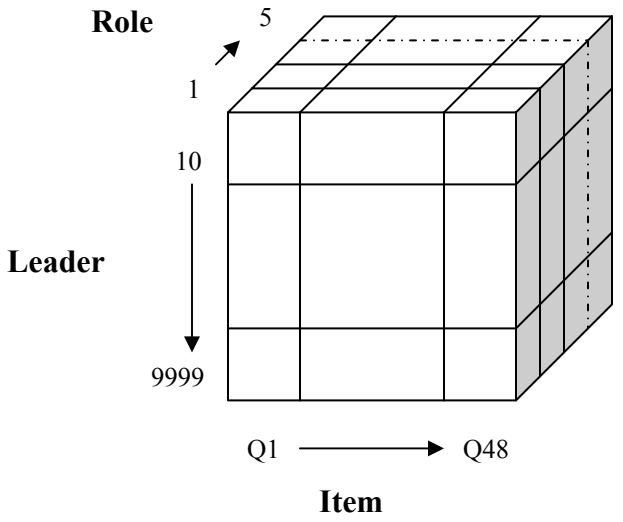


Figure 19. Three-dimensional data model for LCI-Self and Observer data.

A number (ranging from 10 to 9999) represents each leader and is assigned when an account is created. This number is used by the system when observers complete an assessment and ensures the feedback data is sent to the proper leader's account file. The role represents the relationship of the observer to the leader (i.e., 1=boss, 2=peer, 3=direct report, 4=indirect report, and 5=team member). The self and boss roles will only hold one row of data while the other roles can hold numerous rows of data (annotated by the dotted line). This signifies that the leader will have feedback from more than one person in each of those categories. The assessment item columns store the individual scores for each item of the assessments. In the case of the LCI, there are 48 items. If there are three or more observers for a specific category the system should compile and present the information in a report when requested. Otherwise, the leader must obtain more observers to view the compiled data in a report.

To avoid confusion, a separate model was created for the stakeholder assessment. The stakeholder database model (found in Figure 20) is similar to the LCI database model.

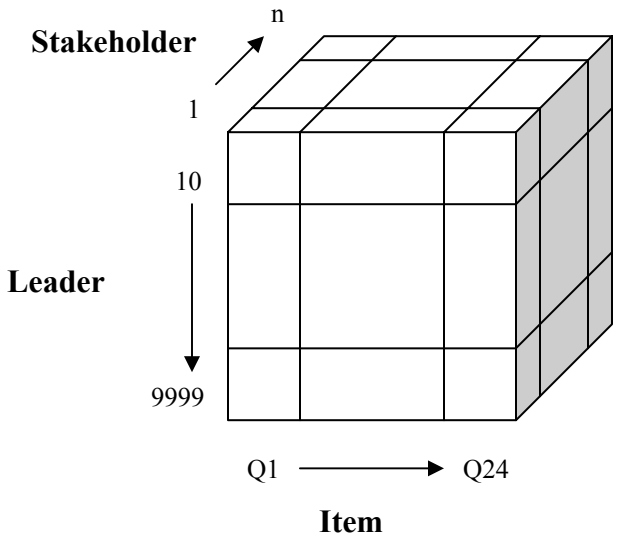


Figure 20. Three-dimensional data model for stakeholder data.

The feedback data is still represented in the same manner but the difference is that the stakeholder assessment only has 24 items. Furthermore, there is only one role (stakeholder). However, at least three stakeholders must input information for the database to compile the data and present it in a stakeholder report to the leader.

A table was created to represent each leader's account information. The template table is found in Figure 21. The account ID is the number (10 to 9999) assigned to the leader when he or she created the account. The DateSubmitted field is the date the account was created. The TimeSubmitted is the time the account was created. The FirstName and LastName fields are the leader's first and last names. The Email field is

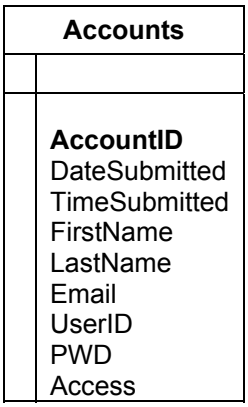


Figure 21. Accounts table.

the leader's e-mail address. The UserID is the user identification created by the leader. The PWD field is the leader's password. The Access field allows access to the account via the user identification and password.

Phase 3. Physical design

During the physical design phase, the architectural design was translated into an actual system design. The purpose of investigative question 3 was to develop an actual system design.

Investigative question 3. How does the system architecture affect the actual system design?

The physical design of the system provided the theoretical framework of a worthy web-based developmental feedback system that provided the necessary tools for a leader to move through the feedback process and improve his or her leadership behaviors.

While the architectural design provided functional requirements and processes, the system design provided actual system specifications. In other words, specifications of the website, feedback instrument, feedback reports, and on-line action planning tools were developed during this phase. These specifications were derived from the

requirements baseline and system architecture and resulted in a series of templates. These templates provided basic specifications for content of each web page, e-mail, report, and workbook page for the entire system. Only the requirements for each page were provided on the template. The system programmer determined graphics design and web usability features. The description of the website in this chapter is hierarchical in nature and presents the information as the leader would view it while using the real system for the first time.

Home Page

Since the system was web-based, it required a home page. The home page provides evidence that the user has reached the correct website and is available throughout the website. It also provides access to certain functions without requiring secure entry to the system, particularly the first three processes defined in the architectural design. Therefore, it needed links for the user to obtain background information, create an account, and enter the system. Beyond that it also needed links for the user to exit the website and contact the researchers for help. The home page template can be found in Figure 22.

The title in Figure 22 was developed to ensure users could identify they had reached the correct website. To further enhance the users experience with the website, it needed a standardized background. The background needed to display the title of the web page throughout the website. The title displays “The Leadership Commitments Inventory” followed by “A developmental feedback tool” on each page of the website. Furthermore, the researcher felt it was necessary to display the leadership practices

Title

Welcome to the Leadership Commitments Inventory!
A developmental feedback tool

Required links

About the LCI

Commitment Definitions

Create account

Login

Exit

Contact Us

Figure 22. Home page template with title and required links.

in some manner throughout the site, giving it an aesthetic appearance. The practices are displayed as building blocks to show that developmental feedback is a building process to better leadership behaviors. The building blocks template can be found in Figure 23. The building blocks were the only graphic designed by the researcher. The system programmer designed all other graphics and color schemes. As Figure 22 shows, the home page was designed to house links for the user to obtain background information, create and account, and enter the system. It also provided links to allow the user to exit the system and contact the researchers for help.

Get background information. The first two links were designed to provide background information for the user. The "About the LCI" link provided background information about developmental feedback and the current study. It also provided

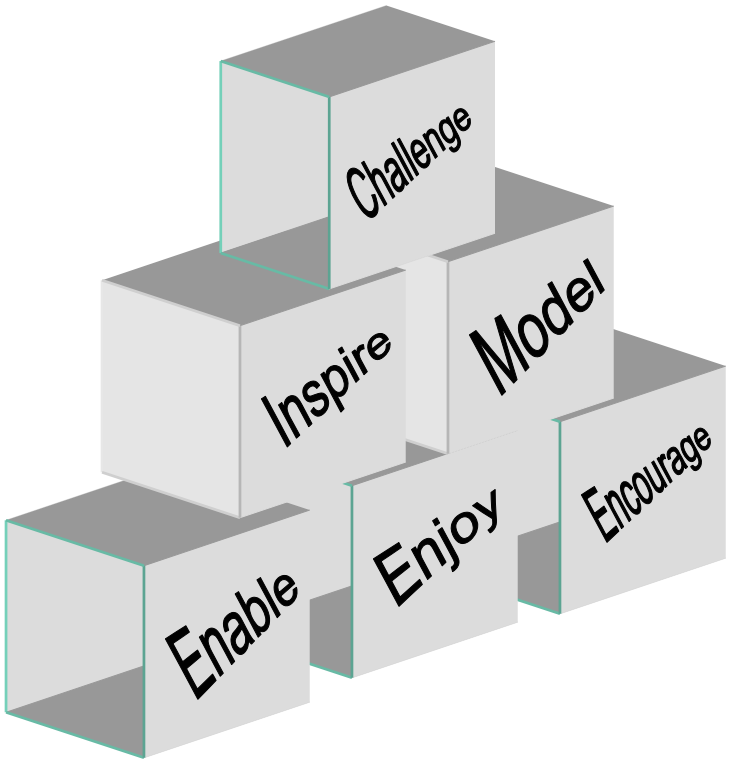


Figure 23. Building blocks for standardized website background.

information on the importance of participating in a developmental feedback program (see Appendix B for "About the LCI" page template). The "Commitment Definitions" link was designed to provide information about the relevant leadership practices and commitments that are the focus of this developmental feedback program. The information was also designed to show users the leadership behaviors that are relevant to their organizations (see Appendix C for the "Commitment Definitions" page template).

Create account. The "Create account" link was designed to allow users (leaders) to create a secure account to access the developmental feedback functions. When the user selects the "Create account" link, a web page appears that requires him or her to enter specific information. This information allows the system to identify the user and allows the user secure access to the system. The required information was determined to

be: first name, last name, e-mail address, user identification, and password. The user is required to enter his or her password twice to ensure its correctness. Furthermore, the system only allows unique user names.

Once the information is submitted the user receives a confirmation that the account has been created. This message reads, "Your account has been created and an email has been sent to the email address specified with your newly created account information." The confirmation provides a link directly to the login area so the user can login to the system. At this time the system assigns the user with a user identifier. This is a number between 10 and 9999 that identifies the leader to the database. The user is unaware of this number until he or she attempts to obtain feedback.

Enter system. The "Login" link provides secure access to the system and its developmental feedback functions (i.e., feedback, reports, and action planning). When the user selects this link they are directed to the login area. Once in the login area the user is required to enter a user identification and password and submit the information. If the information is correct he or she will be directed to the main menu page, which will be described later. If the submitted information is incorrect the user is prompted that he or she has entered the incorrect information. This message reads, "Password or user identification does not exist." At this point, a link is available to allow the user to return to the login area.

If the user forgets his or her user information or password he or she is able to obtain that information and gain access to the system. A "Forgot Password?" link (located in the login area) provides this function. When the user selects this link he or she is presented a web page with the statement "Please enter the following information in

order to log into the Leadership Commitments Inventory system." After this statement is a space to allow the user to enter his or her e-mail address. Once the user enters the e-mail address and clicks the "Retrieve password" link he or she is directed to a page with the statement "Your account information and password has now been sent to the email address specified." The confirmation also provides a link directly to the login area so the user can login to the system. At this point the user is able to retrieve his or her first name, last name, and user identification from the e-mail message.

Users can also change their account information. The "Change Account Information" link (also located in the login area) allows users to change account information without creating a new account, which allows them to maintain their current feedback. When a user selects this link he or she is directed to an account information page that displays current account information. The page contains a prompt that tells the user to change desired information. Once the information is submitted the user receives a confirmation that the account information has been changed. This message reads, "Your account has been updated and an email with your new account information has been sent to the email address specified." The confirmation also provides a link directly to the login area so the user can login to the system.

Exit and contact links. If at any time the user wishes to exit the system, he or she should have access to an exit link. This link allows the user to exit the system at any time. When the user selects this link, his or her web session is terminated immediately.

Some users may require help with system use or the developmental feedback process. The "Contact us" link (in Figure 23) allows the user to contact the researcher and system administrators. When the user selects this link, he or she is directed to an e-

mail template. The template is blank except for the "To" block. The e-mail address in the "To" block is lci@afit.edu. Once the user completes the e-mail template and clicks the send button, the message is sent to the relevant parties.

The home page was designed to provide information and functions that do not require secure access to the system. To obtain secure access to more system features the user is required to login. Once the user logs in to the system, he or she has access to the main menu options.

Main Menu Page

The main menu page must be accessed through the home page's login function and was designed to allow the user access to the developmental feedback tools, particularly processes four through six in the architectural design. To get started, the user can obtain guidance about the developmental feedback process and how to use the system. Following that, he or she can obtain feedback, feedback reports, and action planning tools. Therefore, the main menu has links to guidance, feedback, reports, and action planning tools. To ensure the user could still exit the system or contact the researchers and system administrators when desired, these functions were also required for the main menu page. The main menu page template can be found in Figure 24. The title and web page background for the main menu page are exactly the same as the home page. The main menu page allows the user access to six links. These links are presented on the page in the same order as Figure 24. This is the optimal order to complete the developmental feedback process and encourages the leader to select links in the proper order. The following is a description of each of the links.

Title

Welcome to the Leadership Commitments Inventory!
A developmental feedback tool

Required links

How to get started

Get feedback

LCI Reports

Taking action

Exit

Contact us

Figure 24. Main menu page template with title and required links.

How to get started. Users can access guidance about the developmental feedback process and its functions. The "How to get started" page was designed to provide that information. When the user selects the appropriate link, he or she is directed to a web page that contains information about the developmental feedback process and its functions (i.e., feedback, reports, action planning). This page provides enough information about the system function to allow the user to feel comfortable with using the system throughout the process. The "How to get started" page information can be found in Appendix D.

Get feedback. Once the user obtains guidance he or she is encouraged to obtain feedback. The "Get feedback" pages were designed to provide all the necessary information and features to allow the user to obtain accurate developmental feedback. When the user selects the link he or she is directed to a page that contains two links:

"Create a new assessment" and "Add to an existing assessment". The template for this page can be found in Appendix E.

If this is the first time the user has visited the site or it has been at least 30 days since the user's last assessment, he or she creates a new assessment by selecting the "Create new assessment" link. This link directs them to the "Get Feedback" instructions and feedback instrument links. If this is not the user's first assessment, this link should prompt the database to transfer all existing feedback to the old feedback database. The data transferred is time stamped to facilitate future feedback retrieval. The user's account is now free of old data and he or she is able to begin a new assessment.

If the user would like to add more assessments to the existing data file and it is within 30 days of the original request for feedback, he or she adds to the existing assessment. The "Add to existing assessment" link directs him or her to the "Get Feedback" instructions and feedback instrument links. The difference from the "Create new assessment" link is that this link opens the existing assessment database and inputs data accordingly. No old data is removed from the existing database.

As stated, once the user selects the "Create new assessment" or "Add to existing assessment" link, he or she is directed to the "Get Feedback" instructions and options page (Appendix F). The instructions are available on this page along with three links to obtain feedback. These links allow the user to obtain feedback via the LCI-Self, LCI-Observer, and stakeholder assessment.

To obtain a self-assessment the leader selects the LCI-Self link. When the user selects this link he or she is directed to the LCI-Self feedback instrument. The template for the LCI-Self can be found in Appendix G. The data from this instrument is fed into

the user's account file. The user is provided with a cover page that explains the purpose, use, and participation requirements of the LCI-Self. Following the cover page is the instructions page, which explains that the LCI-Self was designed to allow leaders to document perceptions of their own behavior and that the inputs to the electronic survey go directly to the survey control point. Once the user has read the instructions he or she is able to click a continue button that goes to the first page of the survey. The user is prompted to "Please read each statement carefully and indicate the extent to which you engage in each of the behaviors. Answer in terms of how you typically act with the people in your unit and on behalf of your unit."

Each page of the survey instrument contains no more than four items. Each item has a full response scale with an option button for each response choice. Each page has a continue link that brings up the next page of the survey. Each page also tells the user how far along in the survey he or she is. For example, a message is visible at the bottom of a page that states, "50% completed". The final page of the survey allows the user to input comments or feedback. Once the user has completed the LCI-Self he or she should receive a confirmation that the information has been submitted. Likewise, he or she is able to select a link that takes them back to the "Get feedback" instructions and options page.

Once the user returns to the "Get feedback" instruction and options page, he or she is able to request feedback from observers (i.e., their boss, peers, direct reports, indirect reports, and team members). To request feedback from observers the user must select the LCI-Observer link. When the user selects this link he or she is directed to an e-mail template (Appendix H). At this point the system automatically inserts the user's

identifier number and signature block into the e-mail template. The user must then input his or her observers' e-mail addresses in the "To" block of the template. After that, in the body of the e-mail template and where prompted, the user inputs the names of his or her observers and their relationships. Once the user has accomplished these items he or she sends the e-mail.

When the observer receives the e-mail he or she must select the link contained in the body of the e-mail to access the LCI-Observer (Appendix I). The LCI-Observer is similar to the LCI-Self except that when the cover page appears on the screen the observer must input the leader's user identifier number (from the e-mail) and the relationship to the leader. The possible relationships (also called roles) to the leader are boss, peer, direct report, indirect report and team member. Each choice has an option button that allows the observer to select the appropriate relationship. Once the correct information is submitted the observer is directed to a page that presents the information he or she entered and asks whether or not it is the proper leader and relationship. The observer selects "yes" or "no" and proceeds to the survey instrument. If the observer enters "no" they are directed to the cover page to re-enter the user identifier number and relationship. If the observer fails to enter the user identifier number or relationship the system prompts the observer to enter the information. Once the LCI-Observer is completed the data is input to the appropriate user's (leader's) account file.

If the user wishes to obtain stakeholder data he or she selects the stakeholder link on the "Get feedback" page. When the user selects the link he or she is directed to an e-mail template similar to the LCI-Observer e-mail template. This template is available in Appendix J. There are a couple differences in the process. First, when the stakeholder

selects the link from the e-mail he or she is directed to the stakeholder assessment (see Appendix K). Second, when the stakeholder assessment cover page appears on the screen, the stakeholder is only required to enter the leader's user identifier number (not a relationship). Once the survey is completed and submitted the data is input to the appropriate user's (leader's) account file.

When the user has completed a self-assessment and has received feedback from three or more observers in a particular category, he or she is able to obtain summary and comparison feedback reports. If the user has received feedback from three or more stakeholders he or she is able to obtain a stakeholder report.

LCI reports. The "LCI Reports" link was designed to provide the necessary guidance and reports and allow users to view and analyze their feedback. When a user selects the link he or she is directed to the "LCI Reports" page that contains assessment response information and four links (see Figure 25).

The title contains assessment response information that shows the user how many total responses he or she currently has and how many responses he or she has for each feedback category. This allows the user to determine whether or not he or she has data in a specific category and whether or not he or she can request a report. The letters A-F are counts for each assessment category. The "SUM(A:E)" adds up the total responses for LCI-Observer survey.

To obtain reports it is first recommended that the user obtain guidance about the reports and their interpretation. The "Understanding the Reports" page provides this guidance. When the user selects the "Understanding the Reports" link, he or she is directed to a page that contains information about each of the three reports and how to

Title

LCI Reports

Your current leadership assessment is based on SUM(A:E) responses.

A Boss; B Peer; C Direct Report; D Indirect Report; E Team Member

You also have F stakeholder responses.

Required links

Understanding the Reports

Summary Report

Comparison Reports

Stakeholder Report

Figure 25. LCI Reports page template with title and required links.

obtain them. This page also contains information about reading and interpreting the reports. The "Understanding the Reports" page information can be found in Appendix L.

A summary of the feedback scores is obtained from the "Summary Report" link. The summary report includes summaries of the 6 practices, 12 commitments, and 48 items (behaviors). The report also contains a column for each feedback category or role (i.e., self, boss, peer, team member, direct and indirect report) and is labeled according to the template in Appendix M.

When the user first selects the "Summary report" link he or she are directed to the "Summary Feedback" page that displays his or her summary data for the practices and commitments. To protect the observers' anonymity, all scores listed under a specific observer category (with the exception of the boss category) are the average scores of at least three observers. If there is a category that is not applicable to the user or a category

that has not received feedback from three observers, no information appears in that category's column. The user is able to click on the empty column's header to hide the column. Furthermore, if a user wishes to obtain the practice or commitment definitions for reference, the summary report contains a link to the "Commitment Definitions" page (Appendix C).

The user is also able to get summary information for each specific item (leadership behavior). To accomplish this, each practice or commitment header is a link to a summary of behaviors for that practice and its commitments (see Appendix N). The "Behavior Feedback" page contains scores for each of the individual behaviors. As stated above, scores listed under observer categories (with exception to the boss category) are the average scores of the observers' responses for each item. On this page, each practice or commitment header is a hyperlink that takes the user to the definitions page for reference, if necessary.

The comparison reports allow the user to relate perceptions of his or her leadership behaviors to the perceptions of the observers. The reports contrast the user's score with the score of the user's boss, or with the average score of the user's peers, team members, direct reports, and indirect reports for each of the 12 leadership commitments. In other words, five reports are available (i.e., self to boss, self to peers, self to direct reports, etc.). Each comparison is a different report.

The "Comparison Reports" link directs the user to the "Comparison Reports" menu. This menu has links to the five available reports. Each link directs the user to the chosen report. The template for the "Comparison Reports" menu page is found in Figure 26 and the comparison report template can be found in Appendix O.

Title

Comparison Reports

Required links

Self to Boss

Self to Peers

Self to Direct Reports

Self to Indirect Reports

Self to Team members

Figure 26. Comparison reports page template with title and required links.

The reports provide the user with the self-assessment score and the average observer score for each of the 12 commitments. It also provides a pictorial bar graph of the scores. Each score is computed by taking the average across all items relating to that commitment. The observers' scores are combined to ensure anonymity. The report also provides the difference between the self-assessment and observer scores. To compute the difference the self-assessment score is subtracted from the observer score for that commitment. Negative numbers are acceptable. The commitments are ranked on the report based on the difference from lowest to highest. The final column of the report provides an indication of the variability of the responses and is computed as the standard deviation of the observer scores.

The final report available to the user is the stakeholder report. This report presents the scores and comments from the stakeholder assessment and is located at the "Stakeholder Report" link on the "LCI Reports" page (previously depicted in Figure 25).

When the user selects the link he or she is directed to the report (see Appendix P for report template).

This report provides an item-by-item summary of the stakeholder assessment. The scores are computed by calculating the average score of the observers' responses for each item. The report also provides an indication of the variability of the responses, which is computed as the standard deviation of the observers' scores. The last section of the report provides a summary of the written comments as provided by the observers.

This section described the reports that are available to the user. It should be noted that the system should be able to produce a printable version of each report. The printable versions of the report should be presented in an organized and easily readable manner. Once the user obtains the desired reports he or she is able to proceed to the next step in the process, action planning.

Taking Action. The "Taking Action" link was designed to provide some necessary tools to encourage the user to set goals and take action from the feedback. Particularly, the tools include guidance for taking action, suggested actions and readings for goal setting, and action plans. When the user selects the link he or she is directed to the "Taking Action" page. The template for this page can be found in Figure 27.

The user should have access to action planning information and the "Guidance for Taking Action" link provides this function. When the user selects this link he or she is directed to the "Guidance on Taking Action" page. This page provides information about building an action plan, sharing the feedback and action plan with others, and following through with the action plan. The template and information for the guidance page can be found at Appendix Q.

Title

Taking Action

Required links

Guidance for Taking Action

Suggested Actions and Readings

Build an Action Plan

Figure 27. Taking Action page template with title and required links.

To access the suggested actions and readings for each of the six leadership practices, the user selects the "Suggested Actions and Readings" page link. This link directs the user to the "Suggested Actions and Readings" menu page. The template for this page can be found in Figure 28.

Title

Suggested Actions and Readings

Required links

Model the Way

Inspire a Shared Vision

Challenge the Process

Enable Others to Act

Encourage the Heart

Enjoy the Workplace

Figure 28. Suggested Actions and Readings page template with title and required links.

Each of the required links directs the user to a separate window and a page that provides the definition of the practice, some suggested actions to improve behaviors relevant to that practice, and some suggested readings that focus on the leadership behaviors pertaining to that practice. Furthermore, each link name contains the practice and its commitments. Each page is downloadable and printable. Finally, there should be a printable version of the entire workbook. A "Suggested actions and readings" page for each practice can be found in Appendix R.

The final link on the "Taking Action" page provides information for the user to build an action plan. Specifically, the "Build an Action Plan" link directs the user to the "Build an Action Plan" page, which contains two links. The template for the "Build an Action Plan" page can be found in Figure 29.

Title

Build an Action Plan

Required links

Sample Action Plan

Action Plan Template

Figure 29. Build an Action Plan page template with title and required links.

When the user selects the "Sample Action Plan" link, he or she is directed to a separate window and page containing the sample action plan. When the user selects the "Action Plan Template" link he or she is directed to a separate window and page containing a blank action plan template. These actions plan are also downloadable and printable.

Sample and template action plans can be found in Appendixes S and T, respectively.

The "Taking Action" page was designed to provide the user with the proper tools to set goals using an action plan. The "Taking Action" function also stands as the far boundary of the system. From here, it is up to the user to follow the action plan and take action to change leadership behaviors.

Phase IV. Implementation

The implementation phase consisted of system building, testing, installation, operations, and post-implementation review. Investigative question 4 was used to construct the actual system.

Investigative question 4. How do you translate the architectural and physical designs into a working information system?

This question was answered with the first four steps of the implementation phase (i.e., system building, testing, installation, and operations).

System Building

The graduate school's programmers programmed all system requirements. The system was developed and implemented using Dream Weaver (Version MX) and Cold Fusion (Version 5.0) software packages, created by Macromedia. The database was created using SQL Server 2000 by Microsoft. The school's programmers designed all graphics using Fireworks by Macromedia. The system can be accessed on the Internet at http://en.afit.edu/env/lci/.

Currently the feedback collecting and action planning functions are working and available on the website. As designed, the leader accesses the main system functions

through the home page and main menu page. Screen shots of these pages are found in Figure 30.

Home page

Main menu page

Figure 30. Screen shots of web site home page and main menu page.

A leader can get background information, create an account, log in to the system, exit the system, and contact the system administrator and researcher. Both feedback instruments collect data and input it to the database. The system also provides action-planning tools for the leader to use.

There are some features of the system that have not been implemented. The feedback collecting function that allows the leader to create a new assessment or add to an existing assessment has not been implemented. Currently, the system only allows leaders to create a new assessment when they create a new account. From then on the system adds to a leader's current assessment. The stakeholder assessment function is not available. Finally, the system will not compile feedback data and present any of the feedback reports. Reports, when necessary, are developed manually by the researcher and sent to leaders via e-mail. With most of the system functioning, the researcher proceeded with testing to obtain evidence of the system's functionality and ease of use.

Testing

The results of the testing phase revealed only minor problems or concerns with functionality. The problems were identified as follows. The get feedback e-mail template needed to be modified so that observers could get to the survey link quickly, without reading a lengthy e-mail. The exit link was not functioning. The background "building blocks" were too dark. Some of the survey questions were difficult to put into the correct perspective. Finally, there was no exit button at the end of the observer assessment. These problems were all corrected before putting the system into full operation. Particularly, the e-mail template was modified, the exit link was activated, the

"building blocks" were lightened, the relevant survey questions were re-worded, and an exit link was added to the end of the observer assessment.

The system was performing all other functions as designed. Ease of use data was available from 35 observers and the results were as follows. The skewness and kurtosis values of the distribution (S=-3.5; K=16.4) fell outside normality range, indicating that statistics other than the mean and standard deviation should be reported. The mode for the ease of use scale was 7.00 and the median was 6.50. The minimum and maximum values were 2.25 and 7.00, respectively. The minimum value only occurred one time. The 34 other values were 5.50 or greater, or toward the agreement end of the 7-point scale. There were no comments given by users having difficulty with system operation. These results indicated that the web survey was easy to use, particularly from the observers' point of view. Since the testing phase revealed that the system was functioning as designed and was seemingly easy to use, it was possible to install all available functions.

Installation

The school's programmers installed the system functions on the web site as the researcher approved them. All functions described during the system-building step were installed before the testing phase. After the testing phase, the school's programmers installed all updated functions. To facilitate the next step of this phase, system operations, the test feedback data was removed from the database. Leaders' account files remained in tact and leaders who had participated in the test phase did not have to create a new account to participate in the operational phase. Once this step was complete the system was ready for operations.

Operations

The system was fielded to students and faculty at two different graduate schools in the area. Leaders were encouraged to use the system to obtain feedback concerning their leadership behaviors. To date, sixty-eight leaders have used the system to complete a self-assessment and obtain feedback. Two hundred ten observers have fully completed the LCI- Observer. Data were compiled from these people to assess the reliability and validity of the feedback instruments. The system continues to operate without the full reports function. At this time, the reports will be compiled manually and presented to leaders via e-mail. Once programmed, this function will be available automatically.

Post-implementation Review

Once the system was operational it was necessary to obtain information on the program and information system. Particularly, the researcher wanted to obtain data on the perceived utility of the feedback and usability of the system. Investigative question 5 was used to assess these variables.

Investigative question 5. How do you assess the perceived utility of the feedback and usability of the information system?

To measure feedback utility, the researcher relied on comments provided by leaders and observers at the end of the assessments. All comments were analyzed for perceptions of feedback utility from the leader and observer perspectives. Furthermore, the LCI-Observer contained two items at the end of the assessment that were used to measure perceived utility from the observer perspective. An analysis of the descriptive statistics from these items combined with the analysis of the comments was used to formulate conclusions about the utility (i.e., usefulness) of the feedback.

Of the comments submitted by leaders and observers, fifteen dealt with feedback utility. One observer felt the survey would "identify personal strengths and leadership qualities." This was the only positive comment about utility. Of the remaining fourteen comments, ten comments addressed that observers felt the survey did not tailor to the relationship they had with the ratee and needed a "not applicable" or "no opinion" scale option.

The remaining four comments were individual recommendations and were difficult to categorize. Those comments are described individually as follows. One observer addressed that the ratee did not have the discretion to perform certain leadership behaviors. Another observer felt the feedback instrument missed "subtleties and nuances" related to leadership. One person suggested that an appropriate item at the end of the instrument might be, "I found this survey applicable to the ratee." That person also suggested providing some alternatives that allow the observer to show a behavior was not observed. That person felt a "not observed" scale option was different from "sometimes" or "almost never observed." Finally, an observer felt the survey should have a "when appropriate" scale option because some situations or positions prevent a leader from performing specific behaviors.

Perceived utility was measured from the observer viewpoint using two items at the end of the LCI-Observer assessment. The perceived utility items were "I feel I have worked long enough with this person to adequately assess his/her leadership behaviors" and "I believe the information collected by this survey can help leaders become more effective." Skewness values for the items were -1.3 and -1.2, respectively. Generally, the data were skewed to the agreement end of the 7-point Likert scale, as expected. This

range of skewness allowed the researcher to assume that the data were normally distributed (Neter, J., Kutner, M., Nachtscheim, C., & Wasserman, W., 1996). Kurtosis values for the items were 1.47 and 1.69, respectively. From this, the researcher concluded that the data have slightly higher peaks than a normal distribution. Still, all of the data fell within the acceptable range for the normality assumption.

Means for the two items were 5.58 and 5.59, respectively. Standard deviations were 1.43 and 1.29. Results indicated that observers tended to agree that the feedback they provided would be useful to the leaders. Particularly, observers felt they had worked with the leader long enough to accurately assess his or her leadership behaviors and felt the feedback provided could help leaders become more effective.

To measure system usability, the researcher measured the observers' perceptions of the system's ease of use. Any comments provided by leaders and observers that related to ease of use issues were noted. The LCI-Observer contained four items at the end of the assessment that were used to measure perceived usability from the observer perspective. An analysis of the comments and descriptive statistics was used to determine perceived usability.

Eight comments indicated there were no major problems with the system's ease of use. Two comments indicated the survey was easy to understand and complete. Three comments indicated that the text in the survey was still hard to read. Two of those comments indicated the "building blocks" in the background were too dark. Two people were unable to or did not know how to return to the previous page once they clicked the "continue" button at the bottom of the survey page. One of these people suggested putting a back button next to the continue button. A final comment indicated that the

beginning of the survey was too slow. The observer suggested no solution to this problem.

Perceived usability (i.e., ease of use) was also measured from the observer viewpoint using the ease of use scale at the end of the LCI-Observer assessment. Ease of use data was available from 210 observers and the results were as follows. The skewness value for the scale was -2.29, indicating the data were skewed to the agreement end of the 7-point Likert scale, as expected. This range of skewness allowed the researcher to assume that the data were normally distributed (Neter, J., Kutner, M., Nachtscheim, C., & Wasserman, W., 1996). The kurtosis value for the scale was 8.62. From this, the researcher concluded that the data have a high peak. However, the data fell outside the acceptable range for the normality assumption, indicating that statistics other than the mean and standard deviation should be reported.

The mode for the ease of use scale was 6.00 and the median was 6.25. The minimum and maximum values were 2.00 and 7.00, respectively. Two hundred of the 209 scale values were 5.00 or greater. These results provided evidence that observers tended to agree that the system was easy to use. The combination of the comments and descriptive statistics lead the researcher to conclude that, from the observer's perspective, the system was easy to use.

This concluded the implementation phase and requirements for the study. The maintenance phase is ongoing and was beyond the scope of this study.

Chapter Summary

This chapter contained results of the planning, analysis, physical design, and implementation phases of the information system development life cycle. The planning

phase conducted the initial investigation for the study and determined that the study was feasible. Once it was determined that the study was feasible, the researcher moved to the analysis phase of the life cycle. During this phase, the problem was redefined and the requirements baseline and system architectural design were developed. The physical design was derived from the requirements baseline and system architecture and resulted in a series of templates. Particularly, the physical design was made up of a series of templates and specifications for the website, feedback instruments, feedback reports, and action planning tools. The physical design was subsequently used to build the actual system. Many steps of the implementation phase were accomplished. While the system was not fully implemented, enough of the system was implemented for leaders to obtain feedback. Reports can be manually generated until the automatic reports function is implemented. Comments and data from the initial feedback utility and system usability assessment indicate that the feedback is useful and the system is easy to use, particularly from the observers' perspective. The implementation of the system completed the requirements for this study.

V. Limitations, Conclusions, and Recommendations

This chapter provides some limitations to the study. It further provides conclusions and recommendations to ensure successful implementation and maintenance of the web-based developmental feedback program. It also highlights some lessons learned from the system development process.

Limitations

No study is without limitations. This study is no exception and four limitations were discovered. First, the data structure design could have been designed with more detail. While the architectural design provided a good view of the underlying data structure, the researcher did not fully develop the physical design of the data structure. A physical design would have showed how the system queried the database and how the database compiled data for feedback reports. A physical design structure would have given the programmers an easier time developing the database and implementing the reports function.

Second, a good cross section of Air Force officers and a diverse group of MBA students from first line supervisors to middle managers used the system. Feedback from their perspectives was important to the study because they are a large target group for the system. However, the researcher was not able to get any senior managers to use the system. It would have been beneficial to have additional feedback about the system and its function from their perspectives.

The third limitation dealt with the utility and usability assessment. The utility and ease of use items from the observer assessment were not included in the self-assessment.

The original objective was to complete a full utility and usability assessment using a separate questionnaire. Since the full assessment was not accomplished, the researcher missed an opportunity to obtain some utility and usability data from the leaders' perspectives by including the items in the self-assessment.

Finally, the researcher could not assess whether or not the reports, action planning tools, and stakeholder functions were valid because they had not been implemented. Without these functions in place and functioning, the researcher had no way of assessing if the functions actually helped move leaders through the feedback process to improve their leadership behaviors. With the limitations noted, the researcher was now able to present some conclusions and recommendations.

Conclusions and Recommendations

Conclusion 1

The results of four phases of the information systems development life cycle were presented in Chapter IV. The overall objective of this study was to develop an effective web-based system for the developmental feedback programs of Aeronautical Systems Center, Air Force Security Assistance Center, and Air Force Materiel Command. Specifically, this study developed a web-based system that performed three distinctive functions: 1) on-line collection instruments for self and observer assessments, 2) automatic feedback data entry for each leader and across leaders for the researcher, and 3) on-line workbook to aid leader self-analysis and development of action plans. These functions were designed to move leaders through the feedback process to improve their leadership behaviors.

The fact that the system did not compile feedback data and create reports was, as stated before, a major limitation to this study. The reports function was necessary for the researcher to fully assess the utility of the feedback and usability of the system from the leaders' perspectives. Furthermore, it would have provided evidence about the overall effectiveness of the program.

Recommendation 1

The first recommendation is that the reports function be implemented (as designed) as soon as possible, along with the rest of the relevant functions that were not implemented. Once the reports function is implemented, a large, diverse group of personnel from many different organizations should use the system to obtain feedback and reports. When leaders have viewed the results of their feedback and made attempts to set goals and develop action plans, they should be able to provide information on their perceptions of the feedback process and system function during the full utility and usability study.

The feedback utility study could be used to determine the extent to which leaders perceived the feedback provided was accurate and useful. The utility study could also determine whether or not the program provided the leader with the necessary tools to set goals and improve their leadership behaviors. The system usability study could be used to determine the extent to which leaders were satisfied with the system and its function. The study could determine the extent to which leaders found the system easy to use. Furthermore, the study could determine whether or not leaders were satisfied with the quality of the information provided by the system and interface with the system.

Results from the limited utility and usability assessment items indicated that, in general, observers felt that the feedback provided by the system could be useful to leaders trying to improve their effectiveness. There was also evidence that observers felt the web survey used to obtain the feedback was easy to use. At this point some of the feedback utility and usability comments provided by observers should be addressed.

Conclusion 2

Many observers felt that a "not applicable", "not observed", or "no opinion" scale option should be implemented. Even if observers had not observed the leader performing certain behaviors, it seems they were reluctant to choose the "almost never observed" scale option because they felt it would reflect badly on the person being assessed. They felt a "not applicable", "not observed", or "no opinion" choice would result in more accurate feedback. This choice would portray to the leader that they did not have the opportunity to observe a specific behavior or they felt the leader did not have the discretion to perform a specific behavior.

One observer also suggested adding a "when appropriate" scale option. This person cited specific examples of behaviors that leaders could only perform when appropriate (e.g., "I encourage the open exchange of ideas and information"). Once again, this observer was reluctant to provide truthful feedback because he or she felt it would reflect badly upon the leader. A "when appropriate" choice would make the observer feel like they provided more accurate feedback than if they used one of the other options.

Recommendation 2

This researcher recommends a "not observed" option replace the "almost never " option to allow the observers to annotate they had not observed a specific behavior. This might serve to ease their minds that they are not damaging the leader's reputation.

Along the same lines, one observer suggested that a "when appropriate" option should be available. This researcher agreed with the observer that some leadership behaviors should only be used when appropriate. This is particularly true in the military environment. For instance, some leaders need to be directive and decisive in certain situations that do not allow them to gather the opinions of their coworkers and subordinates before they make the decision. This does not necessarily mean they do not enable their people, it simply means decisive action had to be taken at that particular time. Therefore, I recommend that the instructions for the LCI should be changed to instruct leaders and observers to rate the extent to which the behaviors are done when appropriate. The self-assessment instructions should read, "Please read each statement and indicate the extent to which you engage in each of the behaviors when appropriate. Answer in terms of how you typically act with and on behalf of your unit." The observer assessment instructions should read, "Please read each statement and indicate the extent to which you have observed this person doing each of the behaviors when appropriate. Answer in terms of how you typically acts with you, with people in your unit, and on behalf of you and your unit."

Along with the aforementioned updates to the instrument rating scale, this researcher felt that leaders and observers should be in the right frame of mind before participating in the program. Thus, a short training video should be added to the main

menu page. This video would appear the first time a leader logs in to the system and would always be available via the main menu. The video would feature a senior leader that would welcome leaders to the program. The leader would highlight the importance and benefits of the program and its impact on the organization while encouraging leaders to seek honest feedback. The leader would also encourage leaders to make personal contact with their observers before seeking feedback to get the observers in the right frame of mind for the program. Leaders should encourage observers during a meeting or phone conversation to provide honest feedback. They should also explain that low ratings are not necessarily a bad reflection of a person's leadership skills and will not damage a reputation, given that the program is developmental and the feedback is confidential.

To further get leaders in the right frame of mind for the program a small section should be added to the "Understanding the reports" page. This section would prompt a leader to ask certain questions when interpreting reports. Specifically, the leader could ask "Is this behavior applicable to me?" or "Does this behavior matter (given the context of my duty)?" If an area is not applicable, the leader could discard the results. A better solution, however, would be for the leader to share the results of that feedback with observers to ensure the area is not applicable. This action would provide evidence that observers also felt the behavior was not applicable and did not observe the leader performing the behavior, prompting them to rate him or her low in those areas.

These updates to the leadership commitments inventory and leader/observer interaction, if implemented, could go a long way to encourage observers to provide accurate and useful feedback by using the entire rating scale.

Conclusion 3

The fact that the ease of use data and comments were generally positive was a direct result of designing the system with usability in mind. Changes and updates were made throughout the design process to accommodate usability and "customer" requirements. The researcher worked closely with the system programmers throughout all phases of the development life cycle to ensure the system was self-sufficient and easy for leaders to use.

Recommendation 3

Therefore, this researcher recommends that during the maintenance phase the system be continually monitored and updated to improve system functions and usability, moving it closer to its intended purpose. During this phase, leaders and observers could continue to provide information about the feedback process and system. The program could be updated on a periodic basis, implementing recommended changes from the feedback received. The result, a usable system that remains self-sufficient and provides leaders with the proper development tools, could go a long way to ensure success for many leaders and their organizations.

Final recommendations

To start the maintenance phase the researcher performed a final assessment of the system and its functions. One item surfaced that could potentially improve the usability of the system and its function. Another item identified a potential application for the system.

First, the "get feedback" function should be split into two separate functions. One function would provide instructions and a link for the leader to complete a self-

assessment. The other function would provide instructions and links for the leader to obtain feedback from observers and stakeholders. This breaks up the lengthy "get feedback instructions and options" page and provides a more logical structure for leaders to obtain feedback. These choices would be implemented to the main menu page and all other functions would work as designed.

Second, the web-based developmental feedback program could have an application here at the graduate school. Instructors could use this program to obtain feedback from their bosses, students, and fellow faculty members and use it improve their leadership behaviors. To do this, the current LCI feedback instrument would need to be updated to reflect behaviors relevant to instructors and their profession. This application would allow quick and easy compilation of data and would provide students with an anonymous voice. Instructors could use the feedback to improve items such as course layout and class lectures. Students would respect the fact that instructors are actively trying to improve areas of weakness.

Lessons Learned

There were many lessons learned throughout the systems development process. First and foremost, the life cycle should be treated as a dynamic and flexible process. At times, it seemed like program and system requirements were changing daily. It was necessary to work closely with the system programmers to ensure they were kept aware of the changes and required updates. However, due to the dynamic nature of the process, changes will be necessary. To avoid numerous changes, present items for implementation only after they have been thoroughly reviewed. Too many changes will lengthen the development time line.

Closing Remarks

The purpose of this study was to develop a web-based developmental feedback program that would provide the necessary tools to allow a leader to improve his or her leadership behaviors. The success of a program such as this begins with its ability to provide feedback that leaders accept as accurate. Otherwise, they never get past the first step of the feedback process. However, no program can be effective without buy in from the people who are using it. Leaders must want to improve their leadership behaviors and organizations must encourage their leaders to improve.

The system was designed to provide an effective and inexpensive platform for organizations to conduct developmental feedback programs. It could also provide a template for organizations that desire to design and build their own programs. This study sets merely the groundwork for a multitude of follow-on study in this area.

Appendix A: *Requirements Baseline*

1. ***System Requirements***. The system must be self-sufficient and allow the leader to securely move through the feedback process with little or no outside assistance. It should also provide information that will help the leader determine whether or not he or she wants to participate in the program.

1.1 Background information. The system should provide background information on the current study and developmental feedback.

1.1.1 Leadership Commitments Inventory. The system should provide background information on the Leadership Commitments Inventory and how it relates to a developmental feedback program. The system should also provide information on the background of this study.

1.1.2 Definitions. The system should provide definitions of the relevant leadership behaviors for this developmental feedback program.

1.2 System overview. The system should provide information that will familiarize a leader with system features and use.

1.3 Confidentiality. The system must maintain confidentiality of information. Furthermore, the user must be confident that their information is safe. The system must allow leaders to have secure access to the system and their feedback information.

1.3.1 Access to account information. Leaders should have unrestricted access to their secure accounts and information.

1.4 Contact. The system should provide a contact e-mail account that will allow users to contact the research team or technical support with problems, questions, or concerns.

1.5 Exit system. The system should allow the leader to exit the system when desired.

2. ***Feedback Collecting***. The system should collect accurate feedback.

2.1 Feedback instruments. The instrument deployed with the system should be reliable, valid, and focus on relevant leadership behaviors. It should also be designed for self and observer assessments.

2.1.1 Leadership Commitments Inventory (Self). The feedback instrument (based on two reliable and valid instruments) was designed for leaders to perform a self-assessment of their leadership behaviors. Its reliability and validity will be tested with system use.

2.1.2 Leadership Commitments Inventory (Observer). This feedback instrument (based on two reliable and valid instruments) was designed for observers (i.e., boss, peers, direct

subordinate, indirect subordinate, and team members) to rate a leader's leadership behaviors. Its reliability and validity will be tested with system use.

2.1.3 Stakeholder assessment. This feedback instrument was designed for stakeholders (customers) to rate the leader's organization's performance and customer service. The stakeholder assessment was also designed to test criterion validity of the LCI.

2.2 Anonymity. System must ensure raters' anonymity. To do this, each leader must have at least three observers for a specific category (excluding boss category) rate his or her leadership behaviors using the LCI-Observer.

2.3 Confidentiality. System must maintain confidentiality of all feedback information. The graduate school must maintain authority over all system information.

2.4 Guidance. System must provide guidance for completing a self-assessment and obtaining feedback from observers and stakeholders.

3. ***Results Reporting***. The system must provide clear, useful, and understandable reports with relevant feedback information.

3.1 Summary Report. The summary report should provide a graphical representation of summarized results at the practice, commitment, and behavior level for the self category and each observer category. The summary practice score is the average of its two commitment scores. The commitment score is the average of its four items (behaviors). The behavior score is represented as an average of the observer scores for that behavior. There should be summary practice, commitment, and behavior scores for each category (i.e., boss, peers, subordinates, team members).

3.2 Comparison Report. The comparison report should provide a graphical representation allowing the leader to compare his or her perceptions with observers' perceptions. In other words, the leader should be able to compare his or her scores with average observer scores at the commitment level for each category (e.g., self to boss, self to peers, etc.).

3.3 Stakeholder Report. The stakeholder report should provide a graphical representation of summarized results of the stakeholder assessment. The summary scores are the average scores of each assessment item across the stakeholders.

3.4 Anonymity. System must ensure raters' anonymity. To do this, the system must not provide summary or comparison information for an observer category until at least three observers in that category have provided feedback (excluding boss category). The system must not produce a stakeholder report until at least three stakeholders have provided feedback.

3.5 Guidance. The system must provide guidance about the three types of reports, what they are used for, and how to retrieve and read them.

4. ***Action planning***. The system must provide action-planning tools that will allow leaders to set goals and improve their leadership behaviors.

4.1 Workbook or Self Study Guide. The workbook should assist leaders in the action planning process.

4.1.1 Guidance on the action planning process. This function should provide guidance for leaders to build, share, and implement an action plan.

4.1.2 Action plan template. This function should provide the leader with a template action plan so they do not have to create one of their own. The action plan should give the leader the capability to set improvement goals.

4.1.3 Suggested actions and readings. This function should provide lists of suggested actions and readings that leaders can use to improve specific leadership areas. This function should be easy to navigate and the information should be provided in an organized manner (e.g., at the practice level).

Appendix B: *About the LCI page*

Background on the LCI

Aeronautical Systems Center (ASC) and Air Force Security Assistance Center (AFSAC) senior leaders placed significant emphasis on providing tools to enhance supervisors' performance as leaders. They concluded that feedback was an integral part of supervisory maturity and began an effort to institute a developmental feedback program. A primary goal for the program was to be consistent with the six leadership principles presented by ASC during their annual Leadership Symposiums. Five of the six ASC leadership principles are based on the practices described in Kouzes and Posner's (1995), *The Leadership Challenge.* The sixth leadership principle was created to capture the important leadership behaviors that encourage having fun in the workplace.

The ASC Developmental Feedback team reviewed several commercial products that could be used to garner information from subordinates including the Leadership Practices Inventory (LPI) developed by Kouzes and Posner (1995). The cost of commercial surveys, inflexibility of formats, and insufficient coverage of all six leadership principles led ASC to explore the possibility of Air Force Institute of Technology (AFIT) assistance. AFIT responded by developing observer and self-rating versions of a feedback instrument based on the commitments presented in Kouzes and Posner's (1995), *The Leadership Challenge*. The resulting instrument was named the Leadership Commitments Inventory (LCI). The AFIT research team also designed a pilot program to assess the reliability and validity of the feedback and self-assessment instruments. Over 100 supervisors and nearly 1,000 direct reports participated in the pilot program. A status brief of the pilot program is available at http://en.afit.edu/env/lcistatusbrief/.

This year the program has been extended into a developmental feedback program and is now available to any organization that wants to use it. Leaders can get feedback from direct and indirect reports, team members, peers, and bosses using an updated version of the LCI developed from the results of the pilot program. The program remains purely developmental and specific results are kept confidential. No one in the leadership chain will ask for or see any leader's feedback.

Your participation matters

Assessment by supervisors, peers, team members, and subordinates can be extremely informative. Each person you work with has a unique, and often essential, perspective on your effectiveness. People observe your interactions with others and most importantly with themselves. The Leadership Commitments Inventory (LCI) is based on behaviors that all supervisors can do and can learn to do better. You can learn more about these behaviors by reading Kouzes and Posner's book *The Leadership Challenge*, or any of the many other references we have provided at this web site. As you request feedback from the members of your unit, please encourage them to give you an honest assessment. Let them know that their anonymity is assured, and that no one in your

management chain will receive copies of your feedback. Also let them know that when you get your personalized feedback you will spend some time making sense of it and then share your feedback and action plans with them. You will be given tools to help guide you through the process. Taking a few minutes up front to share your views and encouragement on developmental feedback will give your employees and coworkers the confidence that their opinions matter to you.

Most of us do not understand the impact our actions have on others and we are not always sure our work is appreciated. Developmental feedback is one way to get some of this information. This program will not address all of the issues involved with being a leader, but it is a great start. The challenges are enormous. However, we believe that it will bring each of us one step closer to what the Air Force expects of us as today's and tomorrow's leaders.

Appendix C: *Leadership Practice and Commitment Definitions page*

The Leadership Commitment Inventory (LCI) is designed to measure the six leadership practices at the commitment level and determines the extent to which the leader engages in these leadership behaviors.

Model the way

Leaders who **Model the Way** demonstrate high standards and establish clear expectations for individual performance. To model the way, the leader must Share Personal Values and Set the Example. Leaders **Share Personal Values** after they learn what makes them tick. They clarify and communicate their values so that others know what they stand for. **Sets the Example** refers to daily behaviors that demonstrate and teach those values and standards. Leaders who do what they say, spend time on what is important, and lead by example, appear credible to others.

Inspire a shared vision

Leaders who **Inspire a Shared Vision** convey a vivid image of the future and develop a general understanding of that vision among the organization's members. Commitments for this practice are Create a Vision and Attract Others to a Common Purpose. **Create a Vision** refers to leadership behaviors that convey a vivid image of the organization's future. **Attract Others to a Common Purpose** refers to leadership behaviors that show and communicate how aspirations are mutually beneficial to work group members and the organization.

Challenge the process

Leaders who **Challenge the Process** encourage their people to search for opportunities to change the status quo, experiment, take risks, and learn from the mistakes. The commitments that define this practice are Seeks Innovation and Take Risks and Learn From Mistakes. **Seek Innovation** refers to leadership behaviors that search for and encourage others to search for opportunities to improve the efficiency and effectiveness of the organization. **Take Risks and Learn From Mistakes** refers to leadership behaviors that create opportunities for team members to experiment with new ideas in order to gain critical knowledge about the best ways to add value to the customer.

Enable others to act

Leaders who **Enable Others to Act** foster teamwork among their organization's members, and create an environment of mutual respect and trust. These leaders focus on the commitments of Promote Cooperation and Empower. **Promote Cooperation** refers to leadership behaviors that encourage the open exchange of information and ideas among work group members, promote good working relationships with outside organizations, and build teams both within and outside our organization. **Empower**

refers to leadership behaviors that provide members with the necessary resources, support, and skills to take control of their jobs and make significant inputs to the organization.

Encourage the heart

Leaders who **Encourage the Heart** set high expectations, recognize individuals for their progress and contributions, provide rewards for exceptional performance, and celebrate the accomplishments of the work group. They **Recognize Individual Contributions** and reward individual progress and contributions that meet high standards of performance. They also **Celebrate Team Accomplishments**, personally highlighting and recognizing the work group's attainment of key objectives and goals.

Enjoy the workplace

Leaders who **Enjoy the Workplace** create a playfully productive atmosphere at work by encouraging humor and promoting fun activities. These leaders **Allow Humor to Reduce Stress and Boredom** by encouraging humor to break tension and create an enjoyable workplace. Likewise, they **Promote Fun Activities to Relax and Unwind** and encourage creative and fun activities to increase morale and job satisfaction.

Appendix D: *How to Get Started page*

Thank you for participating in the Developmental Feedback Program. This web-based version has been designed to make the entire feedback process easier for leaders looking to improve their leadership skills. This page offers guidance to get you started. There are three steps to the developmental feedback process: getting feedback, analyzing feedback reports, and building an action plan.

Getting feedback

Your first step is to get feedback. From the main menu, simply click the "Get Feedback" link and you will be instructed to first complete a self-assessment using the Leadership Commitments Inventory-Self (a.k.a. LCI-Self). This self-assessment will give you a basis to compare your own perceptions of your leadership behaviors with the perceptions of others. It will also give you an idea of the leadership behaviors being measured. After completing the self-assessment, you should return to the "Get Feedback" page to request feedback from your boss, peers, team members, and direct and indirect reports. An indirect report is defined as someone who is two levels below you in the organization.

There are two types of feedback to request. First, you can request feedback via the LCI-Observer. It measures the same behaviors as your self-assessment, but from an observer's perspective. Once two people in each of the peer, team member, and direct/indirect report categories have completed the LCI-Observer survey, you will be able to get reports for that category. For example, if two peers complete the LCI-Observer you will be able to view a report of their feedback. The same holds for each observer category. The other type of feedback you can request is stakeholder feedback. The stakeholder survey allows people to assess your unit's performance. These responses are also anonymous and you will be able to view a report of the feedback as soon as two people complete the stakeholder survey. There are no categories for this survey.

LCI Reports

Your next step in the process is to view and analyze your feedback reports. These reports are available via the LCI reports icon in the main menu. Once you've read "Understanding the Reports" on the reports page, choose the reports you want to view and analyze. Print out the reports you want as these will help you build your action plan.

Taking Action

Once you and your respondents have measured (through the survey instrument) the extent you act in ways consistent with the 12 leadership commitments, the last steps in the feedback process are to build an action plan based on the feedback, share the feedback and action plan with others, and follow through with the action plan. From the main menu, click the "Taking Action" link to find ways you can implement changes to

your leadership behaviors. There is guidance on building an action plan and sharing feedback with others. Also there are lists of suggested readings that highlight leadership behaviors consistent with the 12 commitments.

We hope this gives you a good idea of how to navigate your way through the LCI web site and the leadership development process. If you have any questions or problems during the process, please feel free to contact the Air Force Institute of Technology Leadership Commitments Inventory (LCI) Research Team at lci@afit.edu.. We are always looking for ways to improve the developmental feedback process and this web site. If you have any feedback for us, please contact us. Thank you.

Appendix E: *Get feedback page*

Title

Get feedback

(Prompt statement) If this is the first time you have visited the site OR it has been 30 days since your last assessment, please click the link below.

(Required link) Create new assessment

(Prompt statement) If you would like to add more assessments to your existing data file and it is within 30 days of your original request for feedback, please click the link below.

(Required link) Add to existing assessment

If you have questions during this process please contact the AFIT Research Team at lci@afit.edu.

Appendix F: *Get feedback instructions and options page*

Title

Get feedback

We recommend you first complete a self-assessment. This will allow you to compare your own perceptions of your leadership behaviors with the perceptions of others. To complete a self-assessment, please choose the LCI-Self icon below.

Next, you can request feedback from your boss, peers, team members, and direct and indirect reports by choosing the "LCI-Observer" link below. Enter the addresses of those you want feedback from and send the e-mail containing the link to the survey. Those who receive the e-mail will have the option of providing you feedback on your leadership behaviors through the LCI-Observer survey. The responses will be automatically tabulated and available for you via the LCI Reports icon in the main menu. In order to protect the anonymity of your peers, team members, and direct/indirect reports, two people must complete the survey in a particular category before reports for that category will be available. So if you want feedback for a specific category please send the e-mail to at least two people represented by that category. If a category doesn't apply, that's OK, you can still get feedback and reports from people in the other categories.

Finally, you can request stakeholder feedback from people. The stakeholder survey allows people who receive products or services from your unit to provide feedback on your unit's performance. Request this feedback by choosing the "Stakeholder" link below. You will perform the same steps as above. Once again, the responses will be automatically tabulated and available for you via the LCI Reports icon in the main menu. To protect anonymity in this case, two people must complete this survey before reports will be available. There is no category specific feedback.

If you have questions during this process please contact the AFIT Research Team at lci@afit.edu.

Required Links

LCI-Self
LCI-Observer
Stakeholder

Appendix G: LCI Self Assessment

Cover Page

Air Force Institute of Technology

Leadership Commitments Inventory

Self

Privacy Notice

The following information is provided as required by the Privacy Act of 1974:

Purpose: To obtain information regarding leaders' perceptions of their own leadership behaviors.

Routine Use: The survey results will be used to provide developmental feedback for individual leaders. No analysis of individual responses will be conducted and only members of the Air Force Institute of Technology research team will be permitted access to the raw data.

Participation: Participation is **VOLUNTARY.** No adverse action will be taken against any member who does not participate in this survey or who does not complete any part of the survey.

Instructions

This questionnaire is part of a leadership development program managed by the Air Force Institute of Technology (AFIT). The Leadership Commitments Inventory-Self provides you the opportunity to assess your own leadership behaviors. This survey will provide information that will allow you to compare your perceptions of your leadership behaviors to the perceptions of others.

We have developed an electronic survey to reduce material costs associated with collecting and entering data. Several steps have been taken to protect your anonymity. First, your responses will be sent directly to the AFIT survey control point. No one in your organization will see your completed survey. Second, you are the only person who will be able to access your feedback.

Please contact us at lci@afit.edu if you have any questions about this survey.

We thank you for your participation.

Please read each statement carefully and indicate the extent to which you engage in each of the behaviors. Answer in terms of how you typically act with and on behalf of your unit. Use the blank space at the beginning of each statement to record the number of your choice.

1	2	3	4	5	6	7
Almost never	Once in awhile	Occasionally	Sometimes	Usually	Quite often	Almost always

___ 1. I communicate to others what I am passionate about.

___ 2. I act in ways that are consistent with my stated values.

___ 3. I clearly explain a vision of the team's future.

___ 4. I appeal to each member's desire to contribute to the success of the organization.

___ 5. I devote time to discuss innovation and change.

___ 6. I am willing to experiment with new ideas.

___ 7. I assign tasks that require team members to cooperate with each other.

___ 8. I allow others to decide the best way to get their jobs done.

___ 9. I publicly reward individual members when they do a good job.

___ 10. I make sure leaders know about the unit's successes.

___ 11. I allow humor to break through during tense moments.

___ 12. I encourage simple, quick, and fun activities that lift spirits at work.

1	2	3	4	5	6	7
Almost never	Once in awhile	Occasionally	Sometimes	Usually	Quite often	Almost always

___ 13 I share my personal values with team members.

___ 14. I lead by example.

___ 15. I create vivid images that help convey our mission.

___ 16. I help focus the team on a common purpose.

___ 17. I encourage others to seek out better ways of doing things.

___ 18. I encourage people to take risks.

___ 19. I build long-term relationships with others outside of the unit.

___ 20. I give others important work to do on critical tasks.

___ 21. I reward only those who meet or exceed challenging standards.

___ 22. I show appreciation for the team's hard work.

___ 23. I encourage non-offensive humor as a way to make the workplace more fun.

___ 24. I find ways to offset hardships caused by work with some fun outcome or activity.

1	2	3	4	5	6	7
Almost never	Once in awhile	Occasionally	Sometimes	Usually	Quite often	Almost always

___ 25. I clarify to others what leads me to become impatient.

___ 26. I make decisions that are consistent with my stated values.

___ 27. I portray the unit as having an important impact on the future.

___ 28. I help team members relate their own aspirations with the unit's mission.

___ 29. I look for ways that challenge the status quo.

___ 30. I find ways to turn setbacks into learning events.

___ 31. I encourage the open exchange of information and ideas.

___ 32. I grant team members the appropriate authority to do their work.

___ 33. I tailor rewards to things we each individually value.

___ 34. I take part in celebrating team accomplishments

___ 35. I am not afraid to laugh at myself.

___ 36. I take advantage of lulls in the schedule for relaxing and fun activities.

1	2	3	4	5	6	7
Almost never	Once in awhile	Occasionally	Sometimes	Usually	Quite often	Almost always

___37. I share with others what keeps me awake at night.

___38. I set a personal example of what is expected of unit members.

___39. I provide a vision that helps the team stay energized, focused, and confident.

___40. I direct my team member's attention to common goals that can be supported by all members of the group.

___41. I look for ways to improve the unit's effectiveness.

___42. I take measured risks based on the team's capabilities.

___43. I persuade the team to cooperate with others in order to build strong partnerships.

___44. I make sure that the team has the ability to make good judgments on its own.

___45. I take note of high performers.

___46. I take time out to publicly recognize the unit's endeavors.

___47. I am willing to laugh and have fun with others.

___48. I am willing to take a break during busy periods to do something fun as a unit.

Appendix H: *E-mail template for LCI-Observer*

To: Blank

From: user's e-mail address is automatically input by system

Subject: Request for your feedback

Body of e-mail:
[INSERT OBSERVERS' NAMES],

Please help me get an honest assessment of my leadership practices. Click the link below and you will be guided through the survey process. You will be prompted to provide my identification at the beginning of the survey. My user identifier is [generated number]. You will also be asked to select your relationship to me. Please select [INSERT BOSS, PEER, DIRECT REPORT, INDIRECT REPORT, TEAM MEMBER].

The survey should take about 10 minutes. If you have any questions concerning the survey process please contact the administrators at lci@afit.edu.

<http://en.afit.edu/env/lci/lci_observer.cfm>

The developmental feedback survey is based on Kouzes and Posner's book, The Leadership Challenge. The purpose of the survey is to obtain information regarding your perceptions of my leadership behaviors. The survey contains items measuring 12 different leadership commitments. Answer every question based on the extent you see me typically engaging in each behavior. All of the questions are applicable. If you don't think a statement applies, then it is probably because I don't do this type of behavior very often.

The administrators of this program have taken several steps to protect your anonymity and ensure that my feedback is only accessible by me, for leadership development. I will not have access to your specific assessment. Your responses will be combined with the responses from the other peers, direct reports, indirect reports, and team members I have chosen. Further, my assessment will be only accessible by me. No one in my leadership chain will ask for a copy of my developmental feedback report.

Thank you for your participation.

[SIGNATURE BLOCK] (User's name is automatically input by system)

Appendix I: *LCI Observer Assessment*

Air Force Institute of Technology

Leadership Commitments Inventory

Observer

Privacy Notice

The following information is provided as required by the Privacy Act of 1974:

Purpose: To obtain information regarding employees' perceptions of their leaders', peers', subordinates', and team members' leadership behaviors.

Routine Use: The survey results will be used to provide developmental feedback for individual leaders. No analysis of individual responses will be conducted and only members of the Air Force Institute of Technology research team will be permitted access to the raw data.

Participation: Participation is **VOLUNTARY.** No adverse action will be taken against any member who does not participate in this survey or who does not complete any part of the survey.

Please input code provided to you in the email here. (Ex. 10, 101, 1234....) _____*.

* *Please choose the option that best states your relationship to*

- ☐ **Boss**
- ☐ **Peer**
- ☐ **Direct Report**
- ☐ **Indirect Report**
- ☐ **Team Member**

Instructions

This questionnaire is part of a leadership development program managed by the Air Force Institute of Technology (AFIT). The Leadership Commitments Inventory provides you the opportunity to give a leader, peer, subordinate, or team member specific feedback on his or her leadership behaviors. Your response to this questionnaire will be combined with the responses of the other members of your unit. The AFIT team will provide this person feedback on his or her performance. AFIT will also provide guidance to this leader to help him or her interpret the feedback, develop plans to act on the feedback, and share the action plans with you.

We have developed an electronic survey to reduce material costs associated with collecting and entering data. Several steps have been taken to protect your anonymity and ensure that this person cannot identify your survey responses. First, your responses will be sent directly to the AFIT survey control point. No one in your organization will see your completed survey. Second, this person will receive an assessment of his or her leadership behaviors based on the combined scores of all the people that participated. In order to protect your privacy, a minimum of two people within each observer category must respond for this person to receive any feedback at all. Third, no one other than this person will be able to access his or her feedback. This protects his or her privacy.

Please contact us at lci@afit.edu if you have any questions about this survey. We thank you for your participation.

Please read each statement carefully and indicate the extent to which you have observed this person doing each of the behaviors. Answer in terms of how this person typically acts with you, with people in your unit, and on behalf of you and your unit.

1	2	3	4	5	6	7
Almost never	Once in a while	Occasionally	Sometimes	Usually	Quite often	Almost always

___ 1. Communicates what he or she is passionate about.

___ 2. Acts in ways that are consistent with stated values.

___ 3. Clearly explains a vision of the team's future.

___ 4. Appeals to each member's desire to contribute to the success of the team.

___ 5. Devotes time to discuss innovation and change.

___ 6. Willing to experiment with new ideas.

___ 7. Assigns tasks that require team members to cooperate with each other.

___ 8. Allows team members to decide the best way to get their jobs done.

___ 9. Publicly rewards individual members when they do a good job.

___ 10. Makes sure leaders know about the team's successes.

___ 11. Allows humor to break through during tense moments.

___ 12. Encourages simple, quick, and fun activities that lift spirits at work.

1	2	3	4	5	6	7
Almost never	Once in a while	Occasionally	Sometimes	Usually	Quite often	Almost always

___ 13. Shares personal values with team members.

___ 14. Leads by example.

___ 15. Creates vivid images that help convey the team's mission.

___ 16. Helps focus the team on a common purpose.

___ 17. Encourages others to seek out better ways of doing things.

___ 18. Encourages people to take risks.

___ 19. Builds long-term relationships with others outside of the team.

___ 20. Gives team members important work to do on critical tasks.

___ 21. Rewards only those who meet or exceed challenging standards.

___ 22. Shows appreciation for the team's hard work.

___ 23. Encourages non-offensive humor as a way to make the workplace more fun.

___ 24. Finds ways to offset hardships caused by work with some fun outcome or activity.

1	2	3	4	5	6	7
Almost never	Once in a while	Occasionally	Sometimes	Usually	Quite often	Almost always

___ 25. Clarifies to others what leads him or her to become impatient.

___ 26. Makes decisions that are consistent with his or her stated values.

___ 27. Portrays the team as having an important impact on the future.

___ 28. Helps team members relate their own aspirations with the team's mission.

___ 29. Looks for ways that challenge the status quo.

___ 30. Finds ways to turn setbacks into learning events.

___ 31. Encourages the open exchange of information and ideas.

___ 32. Grants team members the appropriate authority to do their work.

___ 33. Tailors rewards to things each team member individually values.

___ 34. Takes part in celebrating team accomplishments.

___ 35. Not afraid to laugh at himself/herself.

___ 36. Takes advantage of lulls in the schedule for relaxing and fun activities.

1	2	3	4	5	6	7
Almost never	Once in a while	Occasionally	Sometimes	Usually	Quite often	Almost always

___ 37. Shares with team members what keeps him or her awake at night.

___ 38. Sets a personal example of what is expected of team members.

___ 39. Provides a vision that helps the team stay energized, focused, and confident.

___ 40. Directs our attention to common goals that can be supported by all team members.

___ 41. Looks for ways to improve the team's effectiveness.

___ 42. Takes measured risks based on the team's capabilities.

___ 43. Persuades team to cooperate with others in order to build strong partnerships.

___ 44. Makes sure team members have the ability to make good judgments on their own.

___ 45. Takes note of high performers.

___ 46. Takes time out to publicly recognize the team's endeavors.

___ 47. Willing to laugh and have fun with others.

___ 48. Willing to take a break during busy periods to do something fun as a team.

We are always looking for ways to improve the developmental feedback process and our web site. Please read the statements carefully and indicate the extent to which you agree or disagree with each of the items.

1 Strongly Disagree	2 Disagree	3 Slightly Disagree	4 Neither Agree nor Disagree	5 Slightly Agree	6 Agree	7 Strongly Agree

___49. I feel I have worked long enough with this person to adequately assess his/her leadership behaviors.

___50. I believe the information collected by this survey can help leaders become more effective.

___51. The survey questions were easy to understand.

___52. Learning to use this web survey was easy for me.

___53. I found it easy to get the web survey to do what I wanted it to do.

___54. I found this web survey easy to use.

Please feel free to give us additional comments or feedback.

Appendix J: *E-mail template for Stakeholder Assessment*

To: Blank

From: user's e-mail address is automatically input by system

Subject: Request for your feedback

Body of e-mail:
[INSERT STAKEHOLDERS' NAMES],

Please help me get an honest assessment of my team's effectiveness. Click the link below and you will be guided through a survey that measures your perceptions of our responsiveness, professionalism and performance. You will be prompted to provide my identification at the beginning of the survey. My user identifier is [generated number].

The survey should take about 10 minutes. If you have any questions concerning the survey process please contact the administrators at lci@afit.edu.

http://en.afit.edu/env/lci/stake1.cfm

The administrators of this program have taken several steps to protect your anonymity and ensure that my feedback is only accessible by me, for my teams' development. I will not have access to your specific assessment. Your responses will be combined with the responses from the other critical stakeholders I have chosen. Further, my assessment will be only accessible by me. No one in my leadership chain will ask for a copy of my unit's report.

Thank you for your participation.

[SIGNATURE BLOCK] (User's name is automatically input by system)

Appendix K: *Stakeholder Assessment*

This questionnaire is part of a leadership development program for leaders. The items provide you an opportunity to give the leader feedback on his or her unit's performance. To assure your anonymity, your response to this questionnaire will be combined with the responses of other stakeholders before feedback is given to the leader.

Think about all the different organizations you interact with on a regular basis and use the following scale to rate the quality of your interactions with this unit compared to the others.

1	2	3	4	5	6	7
One of the worst units	**Far worse than most units**	**Not as good as most units**	**About the same as most units**	**Better than most units**	**As good as the best units**	**Better than any other unit**

____ 1. Information I get from this unit is free from error.

____ 2. I can readily make sense of the information I get from this unit.

____ 3. Information provided by this unit is up to date.

____ 4. The information I get from this unit is complete.

____ 5. I can count on the quality of information I get from this unit over time.

____ 6. The products and services from this unit are delivered when I need them.

____ 7. The unit adapts products and services to meet my unique requirements.

____ 8. This unit's products and services are free from error.

____ 9. I can count on the quality of the products and services I get from this unit over time.

____ 10. The products and services I get from this unit meet my needs.

____ 11. I find that members of this unit are courteous.

____ 12. Members of this unit are knowledgeable about their area of expertise.

____ 13. Members of this unit conduct themselves in a professional manner.

____ 14. Members of this unit respond to my requests quickly.

____ 15. The members of this unit easily adapt to unexpected requirements.

____ 16. Members of this unit listen to my requests before acting.

____ 17. Members of this unit seem to care about what I have to say.

We would also like to convey your general feelings about this unit and its products. Read each item carefully and use the following scale to indicate the extent you agree with each statement.

1	2	3	4	5	6	7
Strongly Disagree	**Disagree**	**Slightly Disagree**	**Neither Agree or Disagree**	**Slightly Agree**	**Agree**	**Strongly Agree**

____ 1. Overall, I am satisfied with the relationships I have the members of this unit.

____ 2. Overall, I am satisfied with the products and services I get from this unit.

____ 3. I get high quality products and services from this unit.

____ 4. If given alternatives, I would turn to this unit to provide the products and services I need.

Please identify three things that this unit does exceptionally well.

1._____

2._____

3._____

Please identify three areas where this unit could improve.

1._____

2._____

3._____

Please include any other comments you wish to share with the leader.

_____

_____

Thank you for your participation!

Appendix L: *Understanding the Reports page*

These reports summarize your responses to the Leadership Commitments Inventory -Self (a.k.a. LCI-Self) as well as the feedback you received from others. The LCI surveys collect information using 48 examples of effective leadership behaviors. The behaviors are grouped to form six leadership practices and 12 leadership commitments.

The menu provides choices for three different reports: Summary, Comparison, and Stakeholder. Choose the report you wish to view by clicking the appropriate link. Below are explanations of the reports and how to analyze them. If you have questions about the reports please feel free to contact the Air Force Institute of Technology Leadership Commitments Inventory (LCI) Research Team at lci@afit.edu.

Summary Report

The summary report is the first report you'll want to view. This report provides you an overall picture of frequency that you and others think you engage in actions consistent with the 12 leadership commitments.

The "Summary Feedback" page provides information at the practice and commitment levels. The "Your Score" column provides the results of your self-assessment. The other categories (i.e., Boss's Score, Peers' Scores, etc.) show your respondents' scores. These scores are based on the same 7-point scale as the self-assessment.

1	2	3	4	5	6	7
Almost never	Once in a while	Occasionally	Sometimes	Usually	Quite often	Almost always

To protect your respondents' anonymity, all scores listed under these categories (with the exception of the Boss's category) are the average scores of your respondents. If there is no information in a particular category simply click on that header to hide the column. The "Definitions" link on this page will take you to the practice/commitment definitions for reference, if necessary.

You can also get information for specific leadership behavior for any commitment by clicking on the practice or commitment label. Each practice and commitment links you to the "Behavior Feedback" page and a summary of behaviors for that practice. The behavior summary contains scores for each of the individual behaviors, which are written from an observer's perspective. As stated above, scores listed under the other categories (with the exception of the Boss's category) are the average scores of your respondents. Each practice or commitment header is a link that will take you to the definitions page for reference, if necessary.

Comparison Report

Comparison reports allow you to relate your perceptions with others. These reports contrast your score with the score of your boss, or with the average score of your peers, team members, direct reports, and indirect reports for each of the 12 leadership commitments. We derived each score for peers, team members, and direct/indirect reports by calculating the average across all items relating to that commitment. The responses of your respondents in each category were combined in order to protect anonymity. The table presents the difference between your self-assessment and your respondents ratings. The commitments are then ranked based on this difference from lowest to highest. A negative difference implies that you rated yourself higher than the average rating of your direct reports. The bar graph is a pictorial representation of this difference. In the final column you will find an indication of the variability of the responses. "Their Spread" is the standard deviation of the responses. A large value in this column (e.g., greater than 1.5) indicated that the people providing you feedback tended to offer very different responses to a particular item, commitment, or practice.

In some cases you may find that your own perceptions are not the same as your respondents. Pay particular attention to these areas. You will find that this can be a good place to start as you work to develop your leadership skills.

Stakeholder Report

Many feel that a unit's performance is directly related to its leadership. The stakeholder survey is designed to measure the respondents' perceptions of unit performance. In this case, it can give you a good idea of the strengths and weaknesses of your organization and provide you with information you can act upon to improve your organization.

This report presents your respondents' scores to the stakeholder survey. We derived each score by calculating the average across all items on the survey. Items focusing on quality of information, products, services, responsiveness, and professionalism are based on the 7-point scale below.

1	2	3	4	5	6	7
One of the worst units	Far worse than most units	Not as good as most units	About the same as most units	Better than most units	As good as the best units	Better then any other unit

Items focusing on general feelings about the unit and its products were measured with the 7-point scale below.

1	2	3	4	5	6	7
Strongly disagree	Disagree	Slightly disagree	Neither agree or disagree	Slightly agree	Agree	Strongly agree

As you'll see, there are also three items for the respondents to provide written feedback. These items allow respondents to provide comments on what the unit does well and how it could improve. It also allows respondents to provide any general comments they wish to share with the leader. All the comments for each question are listed under the appropriate category.

We hope this gives you a good idea of how to view and analyze the reports available to you. If you have any questions or problems during the reports process, please feel free to contact the Air Force Institute of Technology Leadership Commitments Inventory (LCI) Research Team at lci@afit.edu.. We are always looking for ways to improve the developmental feedback process and this web site. If you have any feedback for us, please contact us. Thank you.

Summary Feedback						
Principles	Your Score	Boss's Score	Peers' Score	Direct Reports' Score	Indirect Reports' Score	Team Members' Score
MODEL THE WAY						
INSPIRE A SHARED VISION						
CHALLENGE THE PROCESS						
ENABLE OTHERS TO ACT						
ENCOURAGE THE HEART						
ENJOY THE WORKPLACE						
Commitments	Your Score	Boss's Score	Peers' Score	Direct Reports' Score	Indirect Reports' Score	Team Members' Score
MODEL						
Shares personal values						
Sets the example						
INSPIRE						
Creates a vision						
Attracts others to a common purpose						
CHALLENGE						
Seeks innovation						
Takes risks and learns from mistakes						
ENABLE						
Promotes cooperation						
Empowers others						
ENCOURAGE						
Recognizes individual contributions						
Celebrates team accomplishments						
ENJOY						
Opens door for humor						
Promotes fun activities						

Behavior Feedback						
Practices, Commitments & Behaviors	Your Score	Boss's Score	Peers' Score	Direct Reports' Score	Indirect Reports' Score	Team Members' Score
MODEL THE WAY						
Shares personal values						
1. Communicates what he or she is passionate about.						
13. Shares personal values with team members.						
25. Clarifies to others what leads his or her to become impatient.						
37. Shares with team members what keep him or her awake at night.						
Sets the example						
2. Acts in ways that are consistent with stated values.						
14. Leads by example.						
26. Makes decisions that are consistent with his or her stated values.						
38. Sets a personal example of what is expected of team members.						

Behavior Feedback						
Practices, Commitments & Behaviors	Your Score	Boss's Score	Peers' Score	Direct Reports' Score	Indirect Reports' Score	Team Members' Score
INSPIRE A SHARED VISION						
Create a vision						
3. Clearly explains a vision of the team's future.						
15. Creates vivid images that help convey the team's mission.						
27. Portrays the unit as having an important impact on the future.						
39. Provides a vision that helps the team stay energized, focused, and confident.						
Attract others to a common purpose						
4. Appeals to each member's desire to contribute to the success of the team.						
16. Helps focus the team on a common purpose.						
28. Helps team members relate their own aspirations with the team's mission.						
40. Directs our attention to common goals that can be supported by all team members.						

Behavior Feedback						
Practices, Commitments & Behaviors	Your Score	Boss's Score	Peers' Score	Direct Reports' Score	Indirect Reports' Score	Team Members' Score
CHALLENGE THE PROCESS						
Seek innovation						
5. Devotes time to discuss innovation and change.						
17. Encourages others to seek out better ways of doing things.						
29. Looks for ways that challenge the status quo.						
41. Looks for ways to improve the team's effectiveness.						
Take risks and learn from mistakes						
6. Willing to experiment with new ideas.						
18. Encourages people to take risks.						
30. Finds ways to turn setbacks into learning events.						
42. Takes measured risks based on the team's capabilities.						

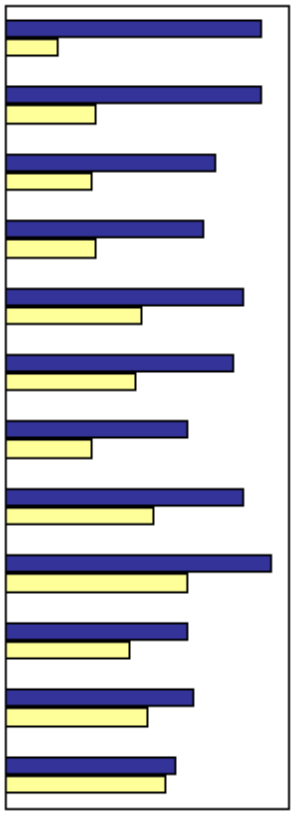
Behavior Feedback						
Practices, Commitments & Behaviors	Your Score	Boss's Score	Peers' Score	Direct Reports' Score	Indirect Reports' Score	Team Members' Score
ENABLE OTHERS TO ACT						
Promote Cooperation						
7. Assigns tasks that require team members to cooperate with each other.						
19. Builds long-term relationships with others outside of the team.						
31. Encourages the open exchange of information and ideas.						
43. Persuades team to cooperate with others in order to build strong partnerships.						
Empower						
8. Allows team members to decide the best way to get their jobs done.						
20. Gives team members important work to do on critical tasks.						
32. Grants team members the appropriate authority to do their work.						
44. Makes sure team members have the ability to make good judgments on their own.						

Behavior Feedback						
Practices, Commitments & Behaviors	Your Score	Boss's Score	Peers' Score	Direct Reports' Score	Indirect Reports' Score	Team Members' Score
ENCOURAGE THE HEART						
Recognize individual contributions						
9. Publicly rewards individual members when they do a good job.						
21. Rewards only those who meet or exceed challenging standards.						
33. Tailors rewards to things each team member individually values.						
45. Takes note of high performers.						
Celebrate team accomplishments						
10. Makes sure leaders know about the team's successes.						
22. Shows appreciation for the team's hard work.						
34. Takes part in celebrating team accomplishments.						
46. Takes time out to publicly recognize the team's endeavors.						

Behavior Feedback						
Practices, Commitments & Behaviors	Your Score	Boss's Score	Peers' Score	Direct Reports' Score	Indirect Reports' Score	Team Members' Score
ENJOY THE WORKPLACE						
Allow humor to reduce stress and boredom						
11. Allows humor to break through during tense moments.						
23. Encourages non-offensive humor as a way to make the workplace more fun.						
35. Not afraid to laugh at himself/herself.						
47. Willing to laugh and have fun with others.						
Promote fun activities to relax and unwind						
12. Encourages simple, quick, and fun activities that lift spirits at work.						
24. Finds ways to offset hardships caused by work with some fun outcome or activity.						
36. Takes advantage of lulls in the schedule for relaxing and fun activities.						
48. Willing to take a break during busy periods to do something fun as a team.						

Comparison Feedback

	Your Score	Their Score	The Difference	Their Spread
Sets the example (Model)	4.5	0.9	-3.6	0.2
Attracts others to vision (Inspire)	4.5	1.6	-2.9	1.0
Celebrates team accomplishments (Encourage)	3.7	1.5	-2.2	1.1
Creates a vision (Inspire)	3.5	1.6	-1.9	1.2
Recognizes individual accomplishments (Encourage)	4.2	2.4	-1.8	1.2
Takes risks and learns (Challenge)	4.0	2.3	-1.7	1.6
Shares personal values (Model)	3.2	1.5	-1.7	1.1
Empowers others (Enable)	4.2	2.6	-1.6	1.1
Opens door for humor (Enjoy)	4.7	3.2	-1.5	1.3
Promotes cooperation (Enable)	3.2	2.2	-1.0	0.9
Promotes fun activities (Enjoy)	3.3	2.5	-0.8	0.8
Seeks innovation (Challenge)	3.0	2.8	-0.2	1.3



Appendix P: *Stakeholder Report Template*

Stakeholder feedback		
Quality of information, products, and services	**Their scores**	**Their spread**
Information I get from this unit is free from error.		
I can readily make sense of the information I get from this unit.		
Information provided by this unit is up to date.		
The information I get form this unit is complete.		
I can count on the quality of information I get from this unit over time.		
I can count on the quality of the products and services I get from this unit over time.		
Responsiveness		
The products and services from this unit are delivered when I need them.		
The unit adapts products and service to meet my unique requirements.		
This unit's products and services are free from error.		
The products and services I get from this unit meet my needs.		
The members of this unit easily adapt to unexpected requirements.		
Members of this unit listen to my requests before acting.		
Members of this unit seem to care about what I have to say.		
Professionalism		
I find that members of this unit are courteous.		
Members of their unit are knowledgeable about their area of expertise.		
Members of this unit conduct themselves in a professional manner.		
Helps focus team on a common purpose.		
Feelings about unit and its products		
Overall, I am satisfied with the relationships I have with the members of this unit.		
Overall, I am satisfied with the products and services I get from this unit.		
I get high quality products and services from this unit.		
If given alternatives, I would turn to this unit to provide the products and services I need.		
Written Comment Items		
Please identify three things that this unit does exceptionally well.		
Please identify three areas where this unit could improve.		
Please include any other comments you wish to share with the leader.		

Appendix Q: *Guidance on Taking Action page*

Once again, thank you for participating in the Developmental Feedback Program. You have reached the final step in the process and it is time to take action. Here is a little guidance on how to build an action plan based on the feedback, share the feedback and action plan with others, and follow through with the action plan.

Building an action plan

We have provided an action plan template and a sample action plan so that you can build an action plan based on your feedback results. You will be able to use the reports to determine your perceived strengths and weaknesses. After this, read the suggested actions lists and look at the suggested readings. These will give you ideas on how to implement changes in your leadership behaviors. Remember that just because you scored well on a commitment does not mean you can ignore it. There is always room for improvement. Print the action plan template and use it how you see fit. Or we suggest you create your own template and customize an action plan to yourself.

Sharing the feedback and action plan with others

Once you have reviewed your feedback and developed your action plan, it is time to share the results with others, particularly those who provided you with the feedback. You'll want to schedule a meeting and ensure people know you appreciate the honest feedback they gave you. At the meeting it is important to explain that the feedback was anonymous. Briefly discuss the leadership commitments and behaviors associated with those commitments. Show them the reports to give them an idea of your scores for the commitments. Share your perceived strengths and weaknesses and how you plan to improve certain areas. Let them know of future plans, programs, and actions that may affect them. Discuss the comparison report and the gaps between your scores and the scores of the respondents. Search for more feedback on commitments that had large gaps. And finally, ask for more feedback. This meeting will go a long way toward letting your people know you respect their viewpoint.

Follow through with the action plan

This one is pretty self-explanatory. Finish what you started. Complete all action on your original action plan and then create a new one. This is an ongoing process that only stops when you do. Six months or so from now, return to the website to get more feedback. See if your leadership behaviors have improved!!

We hope this gives you a good idea of how to take action. If you have any questions or problems during the process, please feel free to contact the Air Force Institute of Technology Leadership Commitments Inventory (LCI) Research Team at lci@afit.edu. We are always looking for ways to improve the developmental feedback process and this web site. If you have any feedback for us, please contact us. Thank you.

Appendix R: *Suggested Actions and Readings pages*

MODEL THE WAY

Leaders who **Model the Way** demonstrate high standards and establish clear expectations for individual performance. They **Share Personal Values** by clarifying and communicating their values so that others know what they stand for. They **Set the Example** by demonstrating daily behaviors that teach their values and standards. Leaders who do what they say, spend time on what is important, and lead by example appear credible to others.

The following are a few ways to Model the Way:

- Know what is important to you and spend your time in congruence with this importance
- Review your personal values frequently
- Set high performance standards
- Set personal goals and work toward them daily
- Accept responsibility and strive for excellence
- Ensure goals are specific, measurable, attainable, and challenging
- Ensure organization members participate in goal setting process
- Focus on the effort of improvement; actual improvement will follow
- Learn to both reward and correct people
- Focus on your priorities; remember not everything can be the most important
- Keep track of the promises and commitments you make and carry through with them
- Consider team members' values and ethics
- Lead from the front
- Do something dramatic to convey your values

Here are some readings that will help you find more ways to Model the Way:

Kouzes, J.M., & Posner, B.Z. (1993). Credibility: How leaders gain and lose it, why people demand it. San Francisco: Jossey-Bass.

Scwarzkopf, H.N., with Pietre, P. (1992). It doesn't take a hero. New York: Bantam.

Maister, D.H., (2001). Practice what you preach: What managers must do to create a high achievement culture. New York: Free Press.

Maxwell, J.C. (1999). The 21 indispensable qualities of a leader: Becoming the person others will want to follow. Nashville: Thomas Nelson, Inc.

Axelrod, A. (1999). Patton on leadership: Strategic Lessons for corporate warfare. Paramus, NJ: Prentice Hall.

Blanchard, K., Robinson, D., & Robinson, J. (2002). Zap the gaps! Target higher performance and achieve it! New York: HarperCollins.

INSPIRE A SHARED VISION

Leaders who **Inspire a Shared Vision** convey a vivid image of the future and develop a general understanding of that vision among the organization's members. These leaders **Create a Vision** that conveys a vivid image of the organization's future. Likewise, they **Attract Others to a Common Purpose** by showing and communicating how aspirations are mutually beneficial to work group members and the organization.

The following are a few ways to Inspire a Shared Vision:

- Write down your vision
- Help employees develop strong ties with each other
- Mark milestones publicly
- Track progress and share data with everyone
- Use new technologies to help people see your vision
- Tell vivid stories over and over about the new organizational vision
- Create a moral compass to bring integrity and fuel to the vision
- Create an intuitive compass to fire up those committed to the vision
- Create a historical compass and build vision on the past positives
- Create a vision that is a connection between the past, present, and future
- Create a directional compass to provide direction for the team
- Create a strategic compass to bring process to the vision
- Create a visionary compass to challenge your team to reach its potential
- Do not get lost. Keep everyone aligned to the vision to maintain purpose
- Align with a vision and keep your team focused, energized, and confident

Here are some readings that will help you find more ways to Inspire a Shared Vision:

Blanchard, K. (1998). *Gung ho! Turn on the people in any organization.* New York: William and Morrow Co.

Blanchard, K. (2002). *Zap the Gaps*. New York: Harper Collins Publisher.

Hiam, A. (2002). *Making Horses Drink.* Canada: Entrepreneur Press.

Kotter, J.P. (2002). *The Heart of Change.* Boston: Harvard Business School Press.

Maxwell, J.C. (1999). *The 21 Indispensable Qualities of a leader.* Nashville: Thomas Nelson Publishers.

Maxwell, J.C. (2001). *The 17 Indisputable laws of teamwork.* Nashville: Thomas Nelson Publishers.

CHALLENGE THE PROCESS

Leaders who **Challenge the Process** encourage their people to search for opportunities to change the status quo, experiment, take risks, and then learn from mistakes. These leaders **Seek Innovation** by searching for and encouraging others to search for opportunities to improve the efficiency and effectiveness of the organization. Additionally, they **Take Risks and Learn From Mistakes** by creating opportunities for team members to experiment with new ideas in order to gain critical knowledge about the best ways to add value for the customer.

The following are a few ways to Challenge the Process:

- Ask "what if" questions all the time
- Keep a persistent, open mind
- Set up a suggestion system
- Have an idea of the month
- Respect ideas to make improvement contagious
- Establish a "creative corner"
- Understand and manage creative roles
- Acknowledge the value of stepping stone ideas
- Innovate in pairs to maximize communication
- Seek ways to improve or replace everything
- Ask dumb questions to get people thinking
- Keep a public record of creative suggestions
- Give strange ideas serious consideration
- Change for changes sake
- Change your mindset

Here are some readings that will help you find more ways to Challenge the Process:

Blanchard, K. (1998). *Gung ho! Turn on the people in any organization.* New York: William and Morrow Co.

Blanchard, K. (2002). *Zap the Gaps! Target higher performance and achieve it!* New York: Harper Collins Publisher.

Hiam, A. (2002). *Making Horses Drink.* Canada: Entrepreneur Press.

Kotter, J.P. (2002). *The Heart of Change.* Boston: Harvard Business School Press.

Maxwell, J.C. (1999). *The 21 Indispensable Qualities of a leader.* Nashville: Thomas Nelson Publishers.

Yukl, G. (2002). *Leadership in* Organizations. New Jersey: Prentice Hall.

ENABLE OTHERS TO ACT

Leaders who **Enable Others to Act** foster teamwork among the organization's members, create an environment of mutual respect and trust, and provide members with the necessary support to perform at their best. They **Promote Cooperation** by encouraging the open exchange of information and ideas among work group members. Likewise, they **Empower** organization members by providing them with the necessary knowledge, information, and authority to take control of their jobs.

The following are a few ways to Enable Others to Act:

- Treat organization members as invaluable members of the team
- If you believe it, they will believe it and will act in that manner
- Assign critical tasks to others
- Give support as needed to help them be successful
- Establish a forum for free and open exchange of ideas
- Listen to the ideas
- Assign tasks to individuals who normally do not perform them
- Make it known that training is important and critical to the organization's success
- Share information about important issues going on in the organization
- Give people substantial authority to make decisions on their own
- Give organization members the opportunity to be in charge
- Include coworkers outside your organization in planning meetings and fun events too
- Encourage team member self-improvement efforts—on duty and off duty
- Teach your people how to do your job
- Let team members implement improvement ideas themselves

Here are some readings that will help you find more ways to Enable Others to Act:

Pfeffer, J. (1994). *Competitive Advantage through people: Unleashing the power of the work force*. Boston: Harvard Business School Press.

Lawler, E.E., III. (1992). *The ultimate advantage: Creating the high-involvement organization*. San Francisco: Jossey-Bass.

Maxwell, J.C. (1999). *The 21 indispensable qualities of a leader: Becoming the person others will want to follow*. Nashville: Thomas Nelson, Inc.

Axelrod, A. (1999). *Patton on leadership: Strategic Lessons for corporate warfare*. Paramus, NJ: Prentice Hall.

Hudson, F.M. (1999). *The handbook of coaching: A comprehensive resource guide for managers, executives, consultants, and human resource professionals*. New York: Jossey-Bass.

ENCOURAGE THE HEART

Leaders who **Encourage the Heart** set high expectations, recognize individuals for their progress and contributions, provide rewards for exceptional performance, and celebrate the accomplishments of the work group. They **Recognize Individual Contributions** by rewarding individual progress and contributions that meet high standards of performance. They also **Celebrate Team Accomplishments**, personally highlighting and recognizing the work group's attainment of key objectives and goals.

The following are a few ways to Encourage the Heart:

- Set high expectations and reward people when they meet or exceed those expectations
- Tailor rewards to recognize specific accomplishments and contributions of the individual
- Make rewards meaningful
- Recognize progress, not just results
- Recognize success, no matter how small the accomplishment
- Say thank you often
- Provide frequent feedback and recognition
- Get out from behind the desk and find people doing good things
- Let people know their unique characteristics and how important those are to the unit
- Make people tell you about their progress and accomplishments
- Make individual and unit recognition a public event
- Celebrate events that are important to the unit
- Schedule events to show appreciation for the unit's hard work
- Highlight the person's or unit's strengths when they face challenges or difficulties
- Let your people know you care

Here are some readings that will help you find more ways to Encourage the Heart:

Blanchard, K.H. & Bowles, S. (1997). *Gung Ho! Turn on the people in any organization*. New York: William-Morrow & Co.

Blanchard, K., Lacinak, T., Tompkins, C., Ballard, J., & Blanchard, K. (2002). *Whale Done! The power of positive relationships*. Free Press.

Hiam, A. (2002). Chapter 8. Encouragement. *Making Horses Drink*. Canada: Entrepreneur Press.

Kouzes, J.M. & Posner, B.Z. (1998). *Encouraging the Heart: A leader's guide to rewarding and recognizing others*. San Francisco: Jossey-Bass.

Nelson, B. (1994). *1001 Ways to Reward Employees*. New York: Workman Publishing.

ENJOY THE WORKPLACE

Leaders who **Enjoy the Workplace** create a playfully productive atmosphere at work by encouraging humor and promoting fun activities. These leaders **Allow Humor to Reduce Stress and Boredom** by encouraging humor to break tension and create an enjoyable workplace. Likewise, they **Promote Fun Activities to Relax and Unwind** and encourage creative and fun activities to increase morale and job satisfaction.

The following are a few ways to Enjoy the Workplace:

- Be willing to laugh and have fun with others
- Be the catalyst for fun and humor
- Take work seriously, but don't take yourself too seriously
- Don't be afraid to laugh at yourself
- Start a "joke-of-the-day" tradition (keep 'em clean)
- Encourage a friendly work environment
- Find time for fun events during busy times (i.e., off-sites)
- Take part in unit social activities
- Choose informal or relaxing settings to hold stressful meetings
- Break the ice during tense moments
- Use lulls in the schedule as an excuse to have a unit picnic or party
- The way to a person's heart goes through their stomach (take 'em to lunch)
- Create a spirit award
- Use quick, simple, and fun activities to lift spirits at work
- And finally, don't forget to smile!

Here are some readings that will help you find more ways to Enjoy the Workplace:

Freiburg, K.L. & Freiburg, J.A. (1996). Nuts! Southwest Airlines' crazy recipe for business and personal success. New York: Broadway Books.

Hemsath, D., Yerkes, L., & McQuillen, D. (1997). *301 ways to have fun at work.* Williston, VT: Berrett-Koehler.

Lundin, S.C., Paul H., & Christensen J. (2000). *Fish! A remarkable way to boost morale and improve results*. New York: Hyperion.

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Yerkes, L. (2001). *Fun Works: Creating places where people love to work.* Williston, VT: Berrett-Koehler.

Appendix S: Sample Action Plan

TAKING ACTION

My Strengths

1. Set the example (Model)
2. Promote cooperation (Enable)
3. Seek innovation (Challenge)

My Weaknesses

1. Recognize individual contributions (Encourage)
2. Create a vision (Inspire)
3. Allow humor (Enjoy)

My Action Plan

Model

Completed	Due date
❑ Set up a suggestion system	22 Nov
❑ Seek improvement opp.	ongoing

Enable

Completed	Due date
❑ Give next big project to Jane	ASAP
❑ Discuss training with sections	31 Oct

Inspire

Completed	Due date
❑ Unit vision statement	27 Sep
❑ Post approved vision	4 Oct
❑ Develop unit milestones	1 Nov

Encourage

Completed	Due date
❑ Create monthly award program	Christmas
❑ Celebrate unit 10-yr anniv.	18 Sep
❑ Check project status and recognize progress	This week

Challenge

Completed	Due date
❑ Talk core values at meeting	next week
❑ Write down personal goals	end of week

Enjoy

Completed	Due date
❑ Start "joke of the day"	Monday
❑ Take action team to lunch	2 weeks
❑ Schedule unit picnic	end of mth

Appendix T: Action Plan Template

TAKING ACTION

My Strengths	My Weaknesses
1.	1.
2.	2.
3.	3.
4.	4.

My Action Plan

Model

Completed	Due date
❑	
❑	
❑	

Enable

Completed	Due date
❑	
❑	
❑	

Inspire

Completed	Due date
❑	
❑	
❑	

Encourage

Completed	Due date
❑	
❑	
❑	

Challenge

Completed	Due date
❑	
❑	
❑	

Enjoy

Completed	Due date
❑	
❑	

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Vita

Captain Matthew A. Douglas graduated from Hargrave High School in Huffman, Texas. He entered undergraduate studies at Angelo State University in San Angelo, Texas, where he graduated with a Bachelor of Science degree in Mathematics in May 1996. He was commissioned through the Detachment 847 AFROTC at Angelo State University.

His first assignment was to the 58th Airlift Squadron, Altus Air Force Base, Oklahoma, as a C-17 aircraft maintenance officer. In January 1999, he was assigned to the 715th Air Mobility Squadron, Travis Air Force Base, California, where he served as maintenance flight commander and tanker/airlift control element commander. While stationed at Travis, he deployed overseas in support of a contingency and numerous exercises. In August 2001, he entered the Graduate School of Engineering and Management, Air Force Institute of Technology. Upon graduation, he will be assigned to Headquarters, 15th Air Force, Travis Air Force Base, California.

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14. ABSTRACT

Developmental feedback programs provide an opportunity to improve leadership practices by giving leaders feedback about their performance from a number of sources. This thesis expanded on Capt Doug Patton's pilot study (2002) that developed and validated an upward feedback instrument (UFI) for Aeronautical Systems Center (ASC) and Air Force Security Assistance Center (AFSAC) supervisors. Specifically, the purpose of this thesis was to develop a web-based developmental feedback collection, reporting, and analysis tool-set. The collection and reporting instrument was based on Patton's instrument (2002) and updated under an on-going study by Capt Abby White (2003). The analysis tools were loosely based on the exercises contained in the Leadership Challenge Workbook (Kouzes and Posner, 2001) as well as recommendations from other leadership scholars (e.g., Yukl, 2002).

A structured approach to the information systems life cycle was used to design the web-based developmental feedback system. The result of the life cycle was a system that performed three distinctive functions: 1) on-line collection instruments for self and observer assessments, 2) automatic feedback data entry and reports for each leader and across leaders for the researcher, and 3) on-line workbook to aid leader self-analysis and development of action plans. The perceived utility of the feedback provided by the program and usability of the system were assessed. Results from the assessments were used to recommend improvements to the program.

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