# The AIR Professional File

**Spring 2020 Volume**

Supporting quality data and decisions for higher education.

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# LETTER FROM THE EDITOR

This volume of AIR Professional File includes two very different types of investigations—one using large scale national data and the other an in-depth case study.

The first article, *National Trends in Federal Student Loan Borrowing by Income Group and First-Generation Status*, is the result of research conducted as part of the 2018 NCES Data Institute. The Institute provides intensive training on the use of NCES datasets and research methodologies. Monnica Chan and her colleagues analyzed data from the National Postsecondary Student Aid Study over a 16-year span to explore student loan debt burdens across family income groups and parental education level. Their findings, some of them surprising, contribute to the ongoing dialogue about college affordability.

In the second article, *Community College Business Intelligence*, Leezet Llorance describes the process, implementation, and impact of a comprehensive business intelligence system at a community college in Texas. The project was notable for its innovative blending of appreciative inquiry with BI tools and processes. Llorance details how the transformational impact of this effort enhanced decision-making at the college and helped deliver on its commitments to stakeholders.

Before you go, take a moment to consider what you want to do with that paper or project you planned to present at the 2020 AIR Forum. Within the in-person Forum falling victim to the pandemic, you have the opportunity to reach an even larger audience for your work by publishing it in the AIR Professional File. Why not get off the couch and send it?

To your good health,
**Sharron Ronco**



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# Community College Business Intelligence

## A Case Study at Lone Star College–Tomball Campus on a Business Intelligence Approach to Community College Challenge

Leezet Llorance

### About the Author

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### Abstract

The purpose of this research study was to explore the process, implementation, and impact of a business intelligence (BI) strategic system at Lone Star College–Tomball Campus (LSC-T), Texas, to determine the effectiveness of BI on community college decision-making.[1] This research study (a) explored the process of implementing a new BI strategic system model at LSC-T, (b) evaluated the value of that system, and (c) gauged the impact of the new model on the college faculty and staff. The significance of this research study is the evaluation of the effect of BI on LSC-T's decision-making processes.

The design of this research is an intrinsic case study. Three instruments were used to gather data for this study: (a) interviews, (b) review and analysis of secondary or existing data, and (c) observational fieldwork. A significant outcome of the LSC-T effort was a 10.02% growth in contact hours over five consecutive semesters. A surprise in this exploration was the blending of David Cooperrider's appreciative inquiry process with the inquiry framework defined by Priyadarshini Chaplot, Kathy Booth, and Rob Johnstone to establish an appreciative inquiry framework.

A recommendation for further research on a BI strategic implementation would be the effect of using the blended appreciative inquiry framework with a commitment to a project planning methodology.

**Keywords:** community college, business intelligence, appreciative inquiry framework, business intelligence strategic system, Lonestar College-Tomball

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1. A previous version of this article was published in EDUCAUSE Review on April 8, 2019.

# INTRODUCTION

Business intelligence (BI) uses methods and technologies that collect, store, report, and analyze business data to help organizations make better business decisions (EDUCAUSE, n.d.). Like universities, community colleges face many challenges, and perhaps they too could make better decisions by applying BI (Chakraborty, 2013). Chakraborty (2013) has written, "BI and analytics help optimise the entire education sector from the perspective of every stakeholderthe [sic] student, the institution, the faculty, the government and the industry." Some community colleges have implemented a BI strategic system to improve accountability that is linked to one of its most important challenges: funding. Other challenges beyond funding are changing learner preferences; changing learner demographics; increased competition; new educational alternatives; and an insufficient supply of qualified employees, compliance, rules, regulations, and guidelines (Komp & Nielson, 2016). In addition to these challenges, Chen (2017) published a paper in the Community College Review that identified seven problems community colleges face: low completion rates, large numbers of unprepared students, a wide workforce–skills gap, an undefined mission to meet the needs of students in the 21st century, minimal collaboration among schools, lack of community support, and lackluster results (Chen, 2017). These seven problems and challenges can be grouped into three categories: (a) accountability and performance, (b) strategy, and (c) organization.

Many companies within the corporate world have implemented a BI strategic system to achieve success and increase accountability to their stakeholders and to improve performance. So then why has this phenomenon not been accepted within higher education, and in particular within community colleges? The ideation of BI strategic systems by community colleges has begun to help them become more accountable to their stakeholders: students, taxpayers, and local communities. For example, Houston Community College in Texas has simplified its accreditation process using BI (Houston Community College, n.d.). Houston Community College implemented an academic dashboard in 2016. The benefits of implementing the dashboard were improved program review and enrollment management, replacement of individual spreadsheets, and the reduction of manual effort for data extraction. These benefits caused a positive impact on Houston Community College's accreditation and bottom line (HCC Academic Dashboard, 2017). As a result, the dashboard earned Houston Community College the 2017 Best of Texas Award for the best data analytics/business intelligence project.

In 2011, Cuyahoga Community College, in Cleveland, Ohio, implemented an enterprise data warehouse for historical data and an operational data store for current data. Cuyahoga Community College's reporting capabilities were expanded as a result (Cuyahoga Community College, n.d.). Later, in 2013, Cuyahoga Community College implemented an all-college dashboard with student-success metrics displaying current data (Cuyahoga Community College, n.d.). Additionally, St. Petersburg College, in St. Petersburg, Florida, used BI to improve baccalaureate-student success (Community College Baccalaureate Association, 2015). Between the fall of 2011 and the spring of 2014, St. Petersburg College implemented more than 20 dashboard elements that displayed student information.

These dashboards allowed quick access to information that the provosts and deans need to make decisions (Community College Baccalaureate Association, 2015). Although community colleges are implementing BI components, as businesses have been doing since BI's resurgence in 1956 (Heinze, 2014), a full BI strategic system consisting of multiple BI components based on real-time data to support decision-making is new to academia, unlike in business.

## Statement of the Problem

Very limited research has been conducted on the value of a comprehensive BI strategic system to address challenges in community colleges. Therefore, the problem addressed in this study is the need for real-time decision-making to support one particular challenge of community colleges—namely, the new accountability requirement of community colleges to their stakeholders. Whereas the research literature has provided evidence that BI components are being implemented at some community colleges, comprehensive BI strategic implementation by a community college is rare. A comprehensive BI strategic implementation for accountability and performance involves the organization (people, processes), technology, and of course the data (Kuster & Rouse, 2009). Kuster and Rouse (2009) remarked, "Few institutions have experience in BI implementations and can articulate their deliverables, expected timeframes and projected costs. With the goal of providing 'take-action analytics' for the institution's urgent and emerging issues, a typical deliverable may need to integrate student, employee, financial, and external data." Some community colleges in Texas have implemented BI strategic systems as their new business model. This research study will examine one Texas college's implementation of a BI strategic system to enhance decision-making and to deliver on commitments.

## Purpose of the Study

BI can enable institutions to know their student (and faculty) customers; maximize student retention; capitalize on alumni loyalty; quickly respond to enrollment changes; manage curricula to market demand; improve admission, registration, and other process efficiencies; seek additional grants via better measurable objectives; and minimize time and effort involved in compliance reporting (Kuster & Rouse, 2009). The purpose of this research study was to explore the process, implementation, and impact of a BI strategic system at LSC-T in order to determine the effectiveness of BI on community college decision-making. The focus of this study was on the innovative approach by a community college to implement a business solution for an academic problem. The goal was to understand this process and its impact on the college.

## Design of the Study

Three instruments were used to gather data for this case study: interviews, review and analysis of secondary or existing data, and observational fieldwork. Interviews were with the leader of the Office of Analytics & Institutional Reporting of the Lone Star College–System Office (LSC-SO), and the president and vice president of instruction of LSC-T who participated in the BI strategic implementation. For this study, constructed data consist of diagrams, charts, tables, and summaries to form a model created from secondary or existing

data on this institution's process. In addition, a third source of data collection came from observational fieldwork, which allowed for the observation of events and activities at LSC-T. The data collected from interviews, BI strategic system implementation documentation, and observation were segmented into implementation process, BI value, and college impact. The strategy used to promote qualitative research validity was triangulation.

In conclusion, a single community college in Texas was studied to understand its innovative process to implement a BI strategic system. Although the reasons for deciding to implement a BI strategic system was part of the research discovery, the focus was on the process to address the issues identified, and not on the issues themselves. BI is potentially critical to the success of a community college's decision-making process: "Attempts to analyze data without BI are clumsy" (Drake, 2017). Community colleges can potentially move to advanced analysis with BI.

# CASE STUDY

## The Issue

The new president of LSC-T, Lee Ann Nutt, inherited a budget in 2015 that had been reduced significantly—by 55% from 2014—due to declining contact hours. To create a sense of urgency, the president held a college-wide town-hall meeting to appeal to the hearts and minds of administration, faculty, and staff. Presentations reminded the college of events of the past year for their students and the community of LSC-T. All these joyful experiences would be lost if the economic evidence of a 55% decreased budget were not addressed now. The president followed the pride-filled emotional response of the college to its past experiences with an address concerning the urgency to increase contact hours (Kotter, 2008). Data were presented with an explanation of the calculation of contact hours. The president explained that the calculations indicated declining contact hours and a declining budget over the four years prior to her administration.

## Stakeholders

An external partnership was established between LSC-T and the Office of Analytics & Institutional Reporting. The external partnership allowed for a new strategic initiative methodology to be defined and unfolded within a culture of appreciative inquiry. The Office of Analytics & Institutional Reporting added value by offering a methodology of principles, tools, and practices to drive processes within guidelines.

Internally at LSC-T, four strategy groups were organized consisting of faculty and administration (Nutt, 2016, p. 5). Internal partnerships among the four strategy groups were needed to identify initiatives by examining their college's status quo in relation to strategic objectives, to solicit input from stakeholders from various departments/divisions, and to define risk management for the success of their initiatives. From an academic leadership standpoint, a means to engage faculty and staff at a community college in the institution's change process is advantageous. An aid to the exploration of the impact on behavioral change at a community college due to the implementation of its BI strategic system comes from David Cooperrider and Diana

Whitney's book *Appreciative Inquiry: A Positive Revolution in Change*. They define appreciative inquiry as a narrative-based process of positive change. They illustrate it as a cycle of activity that starts by engaging all members of an organization or community in a broad set of interviews and deep dialogue about strengths, resources, and capabilities (Cooperrider & Whitney, 2005, p. 15).

## Data

As stated earlier, to address the issue of declining contact hours at LSC-T, the president offered an explanation of the calculation of contact hours in her town-hall meeting. The contact hours of the previous year (March–March) were the basis for funding the upcoming academic year (August–August). There are 10 categories of contact hours to be considered. Each of the following five categories consists of both fundable and nonfundable contact hours, for a total of 10 categories: (a) academic (credit), (b) workforce (credit, noncredit), (c) corporate, (d) community education, and (e) corporate college. Academic credit fundable is the largest category, followed by workforce credit fundable, making those the primary categories for contact hours. Since state funding is based on contact hours and accounts for 23% of the college's budget, an increase in academic and workforce credit fundable courses (enrollments, course offerings) should cause an increase in contact hours and thus an increase in state funding. The president of LSC-T set a goal of 104,154 contact hours over 5 academic years (Nutt, 2015, p. 51). How was this numeric goal calculated?

To reach the 5-year goal of an additional 104,154 contact hours, as mentioned previously, the president of LSC-T defined four growth strategies to guide initiative planning: (a) scholarships (to generate more, award more, and use more), (b) offerings (to offer more, schedule smart, and publicize more), (c) awards (to provide more certificates and degree opportunities), and (d) students (to enroll more and retain more) (Nutt, 2015, p. 63).

The analytics team of the Office of Analytics & Institutional Reporting was tasked with the implementation of the initiatives (defined by the four strategy groups) as scorecards with the following data elements:

- Initiative name (character data type)
- Initiative start date (numeric data type)
- Initiative end date (numeric data type)
- Key performance indicator (KPI) target value (numeric calculated value)
- KPI actual value (numeric calculated value)
- KPI metric (formula to evaluate input factors to determine success/failure results)

The institutional reporting team of the Office of Analytics & Reporting was tasked with KPI analysis as a narrative/report to be displayed on the scorecard.

For the KPI analysis report, comparison of the previous year's data with the current year's data was vital in the trend analysis for predictive analytics. In addition, prescriptive analysis could be used to determine which areas to focus on.

To monitor the implementation of initiatives, the four strategy teams at LSC-T were initially responsible for implementation project plans for each initiative using the Franklin Covey project management essentials methodology (FranklinCovey, 2013).

## Resolution

### THE RESOLUTION: PART A: WHAT DO WE NEED TO WORK ON? WHAT IS OUR AFFIRMATIVE TOPIC? SWOT ANALYSIS.

The new LSC president tasked the analytics team at LSC-SO to facilitate the alignment of administration and faculty with the four growth strategies by defining an operational roadmap (LSC-SO, 2015a, p. 2). To determine the current perspective of faculty and administration on their institution, the analytics team chose qualitative analysis using surveys and focus groups with the intention of mapping the answers to a SWOT (Strengths, Weaknesses, Opportunities, and Threats) diagram (Chaney, personal interview, 2017; Nutt, personal interview, 2017).

The answers to the 23 questions were placed into 21 categories and labeled according to the SWOT diagram. Each of the following is according to administration and faculty:

- LSC-T's strengths are (1) resonant leadership, (2) academic programs (veterinary technology, pharmacy technician, registered nursing, surgical technology, and drama), (3) community support, and (4) grit and growth mindset.
- LSC-T's weaknesses are (1) bounded rationality, (2) marketing strategy, (3) strategic partnerships, (4) student retention, (5) singular focus on the LSC-T community, (6) linguistic barriers, and (7) skewed fixed versus variable costs ratio.
- LSC-T's opportunities are (1) rebranding, (2) vet tech high school program on weekends, (3) campus facility optimization, (4) targeted demographic marketing, (5) online programs (international market), and (6) optimal scheduling.
- LSC-T's threats are (1) budget challenges, (2) nostalgia for sovereignty, (3) legacy/insular culture, and (4) few traditional growth options.

These SWOT results were reviewed by the president for prioritization and assignment to the four strategy growth groups. The groups were then assigned members to form cross-functional teams of administration and faculty. To assist the strategy groups, the analytics team delivered an operational roadmap document that included scope, approach, major activities, dependencies, assumptions, timelines, and the key business and financial benefits (LSC-SO, 2015a). This roadmap was used by the lead of each strategy focus group to define initiatives to increase contact hours, taking into consideration the identified strengths, weaknesses, opportunities, and threats assigned to them (Nutt, personal interview, 2017). Administration and faculty worked together to vet their initiatives to determine which were viable tactically within 1 year and strategically over a span of 5 years by identifying inhibitors to the initiatives and solutions to these inhibitors using an initiative feasibility rubric defined by the analytics team (Chaney, personal interview, 2017; Nutt, personal interview, 2017).

Action plans for the implementation of the vetted initiatives were expected to be defined by the teams. Project plans with timelines, resources, and deliverables were to be developed and maintained by each team lead for execution, monitoring, and accountability of the initiatives. The team leads met with the president on a regular standing schedule for status and feedback. These efforts were supported by a culture of inquiry.

Once planning began, it became clear a process was needed within the framework of the culture of inquiry; therefore, the process of appreciative inquiry was adopted and then applied to form a culture of appreciative inquiry for this effort. The process starts by engaging all members of an organization in dialogue about their positive core (strengths, resources, capabilities). It then moves them through a series of activities focused on envisioning bold possibilities. From there, it asks them to discuss and craft propositions that will guide their future together. Finally, it evolves into the formation of teams to carry out the new dream and designs for their future (Cooperrider & Whitney, 2005).

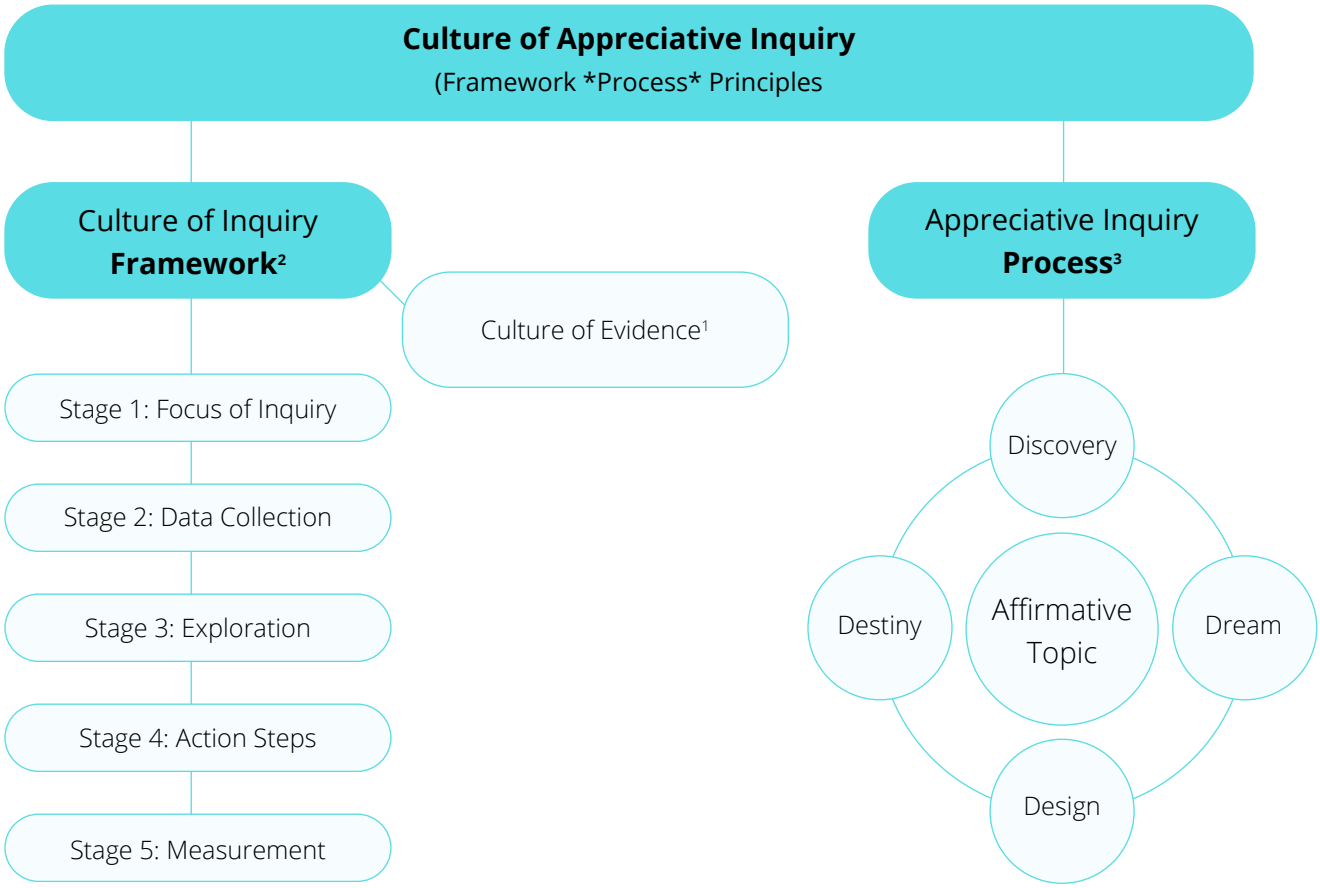
### THE RESOLUTION: PART B: HOW DO WE DO THIS? THE CULTURE OF APPRECIATIVE INQUIRY WITH THE BOSTON CONSULTING GROUP (BCG) MATRIX.

To answer the question, "How do we keep up the communication momentum between faculty and administration on this long journey from identifying and vetting initiatives and their action steps to executing and monitoring them?," the president of LSC-T embraced appreciative inquiry. This mindset enabled a climate of no fear at the college, which freed everyone to offer ideas, to explore, and to discover (Nutt, personal interview, 2017): "She sold the vision, followed it up, did not micromanage, and gave people freedom," according to Quentin Wright, vice president of instruction of LSC-T (Wright, personal interview, 2017).

To support administrative decisions, community colleges routinely use their institutional databases and metrics to assess institutional effectiveness in terms of accreditation standards, graduation and transfer rates, and course schedules. Because of these efforts, some community colleges have successfully established a culture of evidence (Dowd, 2005). The next step is to analyze the data collected. That is, colleges cannot simply report on the data, but also need to understand and apply the data to increase student success and strengthen the institution, thereby making data actionable. The application of data insights can be achieved by defining action steps at each level of the institution. A culture of appreciative inquiry is the next step (Chaplot, Booth, & Johnstone, 2020). Routinely collecting data on student performance and institutional effectiveness (culture of evidence), combined with the institution-wide inclusion of practitioners to engage with these data and to define, implement, and monitor action plans, provides the building blocks of a culture of appreciative inquiry when focusing not on the negatives of an institution, but on its positives. This positive focus is the central point in the appreciative inquiry process to help an institution to grow by identifying and nourishing what it does right. It does not replace a culture of evidence; rather, it adds people, action, and data insight to it. This is what was needed at LSC-T under the leadership of its new president (Nutt, personal interview, 2017): "Her leadership to bring appreciative inquiry about cannot be underestimated" (Wright, personal interview, 2017). The institution needed to grow from a culture of evidence into a culture of appreciative inquiry (Chaney, personal interview, 2017) in order to work together from all four strategy growth groups to execute and monitor the vetted initiatives and their action steps.

There are five stages to build a framework (Chaplot et al., 2020) to support a culture of appreciative inquiry: a definition of the focus of inquiry (Stage 1) that shapes the data collection (or culture of evidence) and presentation (Stage 2) that is the basis of exploration (Stage 3) that is used to define action steps (Stage 4). The final stage (Stage 5) is the measurement of the action steps. Within this framework, a circular process of discovery of the institution's positive core was followed by envisioning bold possibilities (dream) and coconstructing propositions to guide the institution's future (design) to a destiny that is sustained. "The real power of combining these things is in developing processes **in the context** of a methodology and applying methodologies in the context of a framework and most importantly, when you utilize all of those things **in the context of YOUR business"** (emphasis in original; Scottellis, 2008). Figure 1 is the appeciative inquiry framework that evolved from this project. It is a blending of David Cooperrider's appreciative inquiry process with the inquiry framework defined by Priyadarshini Chaplot, Kathy Booth, and Rob Johnstone (2020).

**Figure 1. LSC-T's Culture of Appreciative Inquiry (Process within a Framework)**




*Source:* Adapted from Chaplot et al. (n.d.); Cooperrider & Whitney (2005).

The current culture of the LSC-SO rests on six core cultural beliefs:

- **Students Matter:** I engage and support each student to achieve their goals.
- **Inspire Excellence:** I celebrate successes and value contributions of all employees.
- **Act Intentionally:** I create goals and make decisions based on meaningful data.
- **Better Together:** I share knowledge and encourage collaboration to reach common goals.
- **No Fear!:** I am empowered to effect positive change.
- **Trust!:** I practice transparent communication, encourage dialogue, and cultivate trust. (Lone Star College [LSC], 2015, p. 10)

The current LSC-SO culture was the starting point for applying two criteria of the culture of appreciative inquiry to LSC-T: leadership support, and investment for an institution-wide strategy, i.e., large-scale change and support (Chaplot et al., 2020).

## INQUIRY FRAMEWORK STAGE 1: FOCUS OF INQUIRY

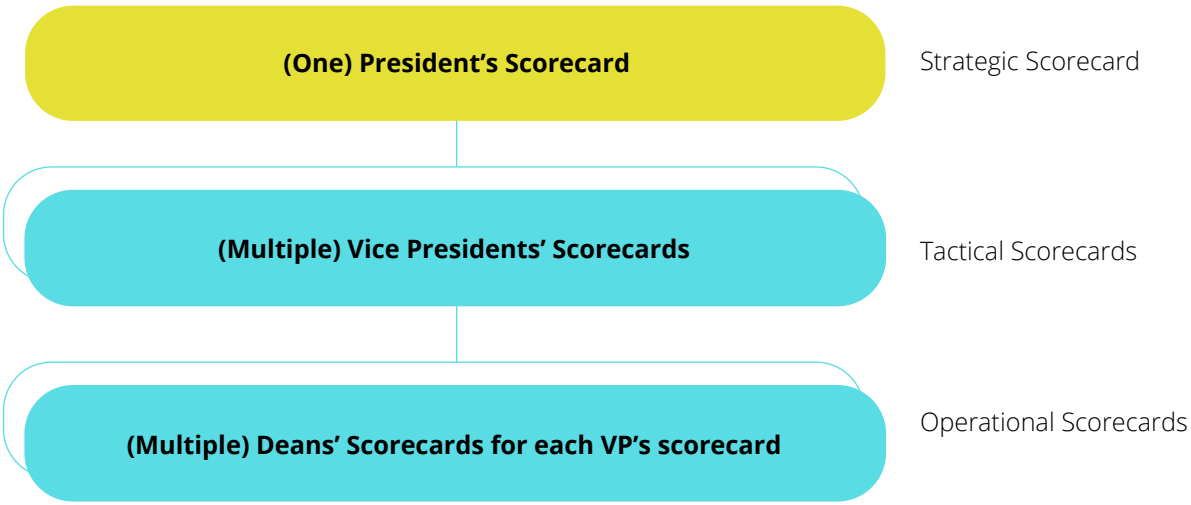
The focus of inquiry was increased enrollment, without which there cannot be student success. The president of LSC-T adopted the chancellor's strategic goals listed above. As a result, her vice presidents, deans, department chairs, faculty, staff, and students were affected at her college. Appreciative inquiry shifted the mindset from problem analysis to positive core analysis based on the discovery of the strengths and opportunities (affirmative topics) identified in the SWOT analysis.

## INQUIRY FRAMEWORK STAGE 2: DATA COLLECTION AND PRESENTATION

Promotion of student success by beginning with increased enrollment (defined in the president's town-hall meeting by increasing contact hours) shaped the data collection and presentation efforts that were led by the analytics team working with the president of LSC-T and her cabinet and faculty.

To support a culture of evidence, data from the student information system was stored independently on a server as the transaction system. To reduce traffic on this server due to report requests and data queries, a copy of it was made and used as a reporting system. This infrastructure supports a culture of evidence. With a culture of inquiry, a warehouse is also needed for archived and aggregated data to support visualization implemented as dashboards and scorecards (a type of dashboard). The use of scorecards allows the analytics team to implement not only a performance measurement framework, but also a strategic planning and management system for each level of the institution. The president's strategic plan could then evolve from a document to a strategic system. In the future, if the other areas of the president's strategic plan, particularly financials, are added to the scorecard, it will become a balanced (comprehensive) scorecard (Balanced Scorecard Basics, n.d.). The BI infrastructure team of the Office of Analytics & Institutional Reporting was responsible for the scorecard infrastructure planning using the concepts of Robert Kaplan and David Norton (Balanced Scorecard Basics, n.d.). Figure 2 was the proposed hierarchical structure of scorecards (to track contact hours in real time) offered to the president of LSC-T.

**Figure 2. Hierarchical Structure of Scorecards Proposed by the Office of Analytics & Institutional Reporting**




*Source:* Adapted from LSC-SO (2015c).

## INQUIRY FRAMEWORK STAGE 3

### Exploration (Initiatives)

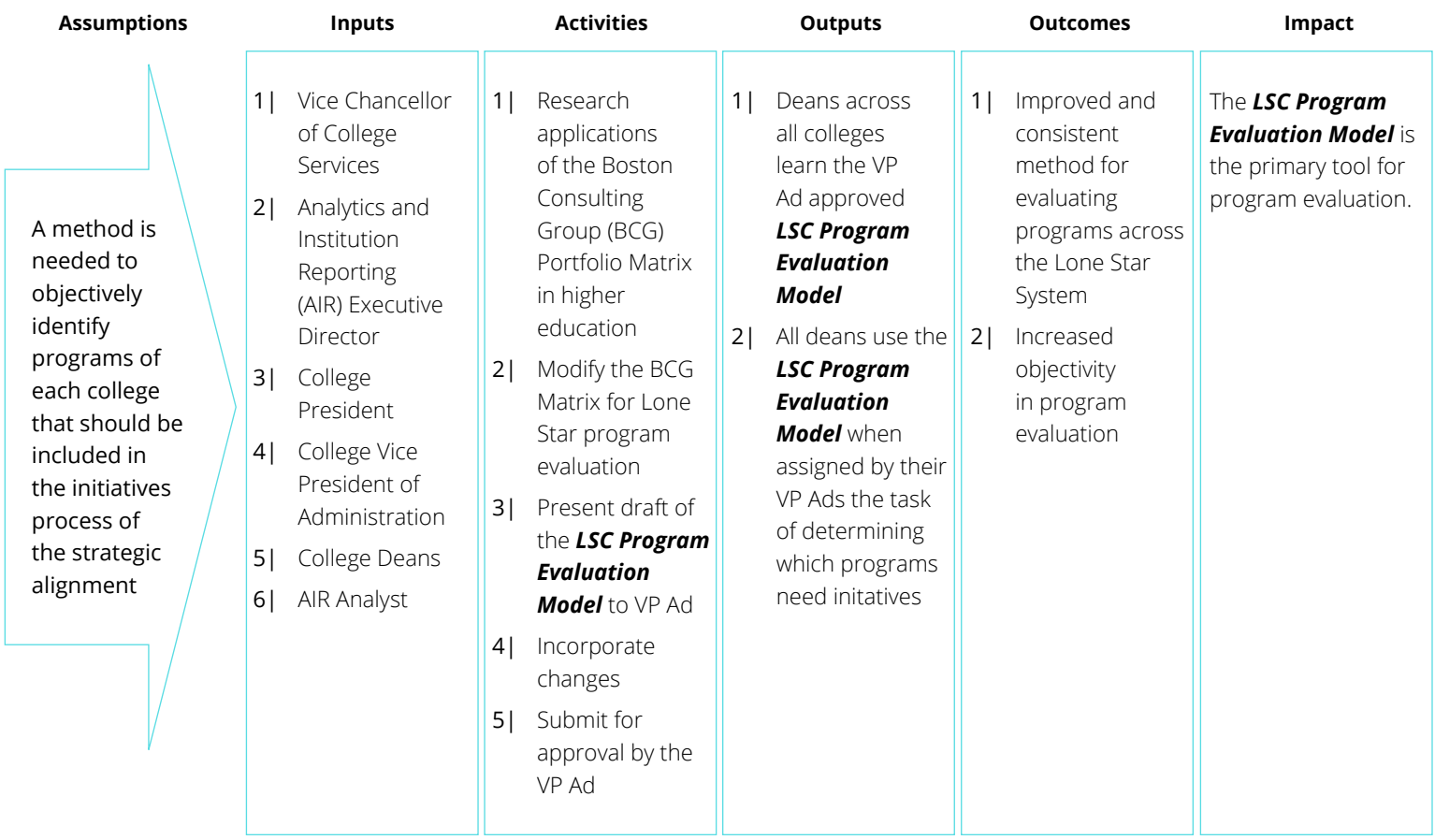
Data exploration at LSC-T consisted of multiple brainstorming sessions/workshops to identify initiatives to address enrollment increase and its role as the first step to student success. Participants at discussions included all levels of the institution (Nutt, personal interview, 2017). The appreciative inquiry process allowed participants to dream bold possibilities for LSC-T as they envisioned results of high numbers of contact hours and a sustainable budget.

LSC-T initiatives were vetted using the initiative feasibility rubric defined by the analytics team. Vetting activities consisted of identifying inhibitors and solutions to the inhibitors and calculating feasibility scores for initiatives based on the feasibility score of all inhibitor/solution combinations for each initiative (Chaney, personal interview, 2017; Nutt, personal interview, 2017).

### Exploration: BCG Matrix → LSC Program Evaluation Model

When all programs requiring initiatives cannot be easily and quickly identified, a method is needed to objectively identify programs to be included in the initiatives process. The logic model in Figure 3, based on Paul McCawley's process (McCawley, 2001), shows how the analytics team defined an LSC program evaluation model based on the BCG portfolio matrix.

**Figure 3. Proposed Logic Model for LSC Program Evaluation Model**

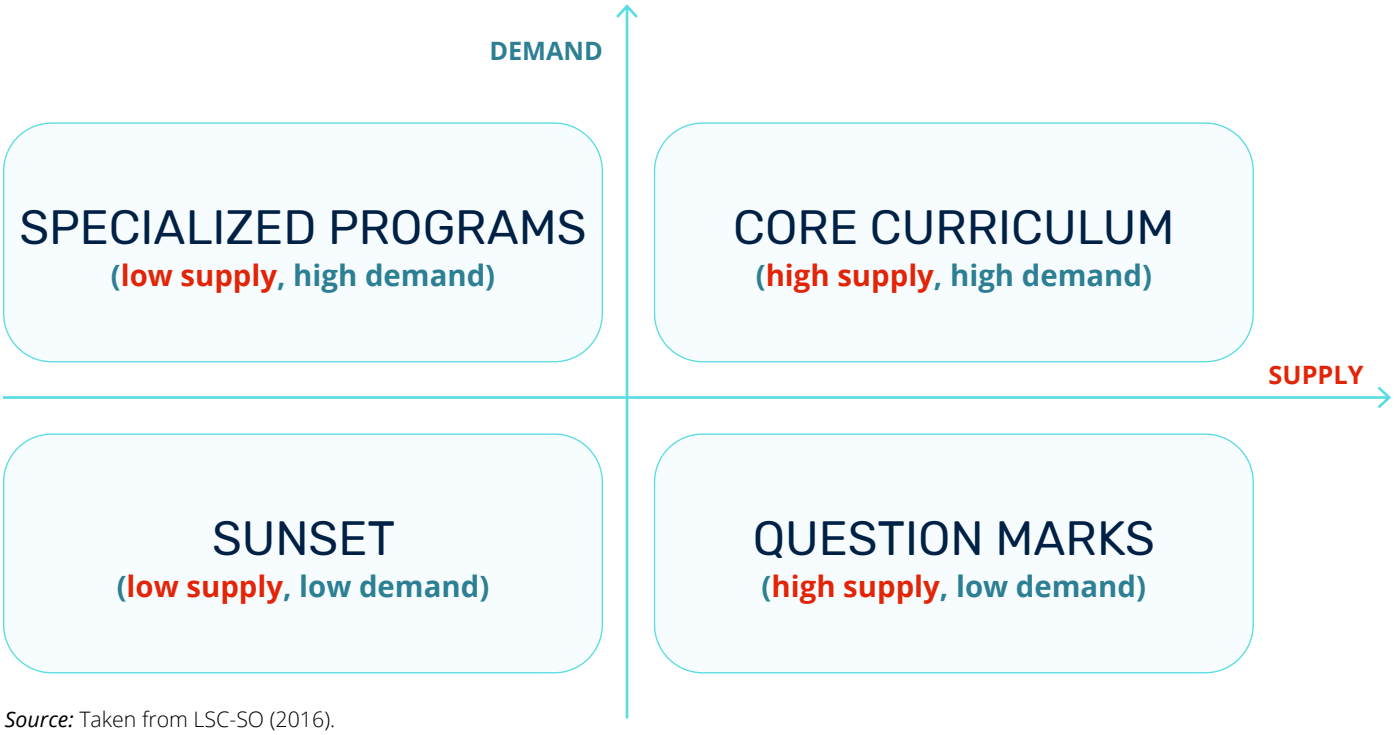



*Source:* Adapted from LSC-SO (2016).

The BCG portfolio matrix model, although used primarily by corporations, has been considered in academia for evaluation of faculty allocation at Carroll University (Debrecht & Levis, 2014), curriculum planning at Sam Houston State University (Sam Houston State University, n.d.), analysis of existing programs to be considered for investment at DePaul University (Mohr, 2011), and school product and services by the National College for Teaching & Leadership. Newbould was the first to discuss customization of the BCG portfolio matrix model for the evaluation of academic programs offered at universities (Wells & Wells, 2015). The goal of the Office of Analytics & Institutional Reporting was to customize the model for community colleges for the strategic evaluation of academic and workforce programs (resource allocation and growth) for an increase in enrollment. First, the office took the time to learn the BCG portfolio matrix model.

After learning the BCG portfolio matrix model, they customized it for LSC's environment and community college program evaluation. Figure 4 is the customized version for LSC.

**Figure 4. LSC Program Evaluation Model: Initial**




*Source:* Taken from LSC-SO (2016).

The following steps were offered to explain how to use LSC's new model for program evaluation (Jurevicius, 2013):

1| Select the academic/workforce program.

2| What are the contact hours for the program?

3| What are the contact hours for all college programs?

4| Plot the information on the grid to determine the strategy/recommendation (QuickMBA Strategic Management, 2015).

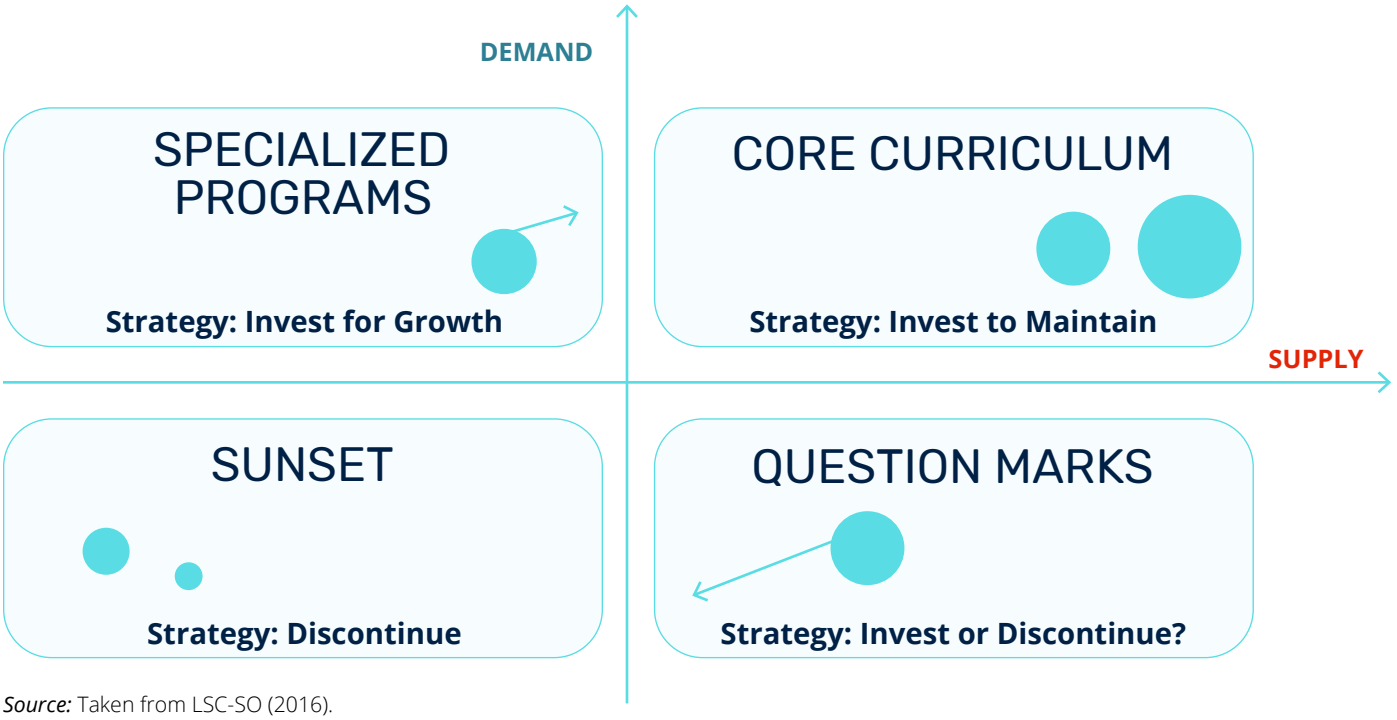
4.1. Program contact hours are represented by the size of a circle in relation to a circle representing the total college contact hours.

$$\frac{\text{\# of Program Contact Hours}}{\text{Total College Contact Hours}} =$$

4.2. An arrow indicates the expected future position of the program.

4.3. Figure 5 is a plotted example.

**Figure 5. LSC Program Evaluation Model: Final**




*Source:* Taken from LSC-SO (2016).

The BI infrastructure team was responsible for mapping the initiatives in the scorecard implementation (Chaney, personal interview, 2017; Nutt, personal interview, 2017). Once initiatives were vetted and a final set had been approved by the president of LSC-T, the next task in this newly defined process for LSC-T was to define action steps for execution and monitoring of vetted initiatives.

## INQUIRY FRAMEWORK STAGE 4: ACTION STEPS: PROJECT MANAGEMENT METHODOLOGY

Stage 4 involves detailed analysis of the student success and enrollment initiatives to define action steps. Essentially, the goal is to answer the question, "How are we going to implement XYZ initiative?" Office of Analytics & Institutional Reporting leadership was responsible for defining a project management methodology tailored to higher education. They adopted the Franklin Covey project management essentials methodology and applied it to this academic effort. The next step was the rollout of project planning workshops for LSC-T. These workshops explained that the previously defined action steps (of each group's initiatives) were to become the work breakdown structure of their project plans. Since start and end dates were mandatory for initiatives, it was explained in the workshops that those dates would become the start and end dates of the associated project plans. Post workshop, it was agreed that each strategy

group not only would define project plans for their initiatives but also would determine the frequency of status meetings and progress reports on their project plans. Since all levels of the institution were involved, there would be multiple project plans that would be connected and roll up into a master institution project plan. Project plans could then become the means to monitor the execution of vetted initiatives campus-wide. But monitoring was not enough: It was also necessary to have accountability.

## INQUIRY FRAMEWORK STAGE 5: MEASUREMENT: KEY PERFORMANCE INDICATORS

Stage 5 addresses accountability through the implementation and monitoring of KPIs, which consist of a metric, a target value, and an actual value. The goal is for the actual value to equal the target value over a specified time as well as to make apparent any gaps between the two. KPIs are useful in determining the institution's effectiveness and operational efficiency. KPIs offer an objective way of determining if the strategic initiatives for student success and enrollment are working by offering verifiable measurements of accomplishments, not just the work performed (Balanced Scorecard Basics, n.d.). The monitoring of initiative execution (from Stage 4) combined with accountability ensures the sustainability of the college's efforts to increase enrollment and student success, which becomes the completion of the appreciative inquiry cycle; the realization of the Destiny phase.

The core metrics for enrollment (contact hours) and student success for LSC-T's BI strategic system are (a) headcount, (b) first-time-in-college persistence fall to spring, (c) first-time-in-college persistence fall to fall, (d) student completion of developmental math requirements within a year, (e) student completion of developmental reading requirements within a year, (f) student completion of developmental writing requirements within a year, (g) number of students transferred to 4-year institution, and (h) number of degrees and certificates awarded overall by campus (LSC-SO, 2015b, p. 8). The analytics team and the BI infrastructure team were responsible for linking KPIs to initiatives in a scorecard implementation that would be LSC-T's BI strategic system (Chaney, personal interview, 2017; Nutt, personal interview, 2017).

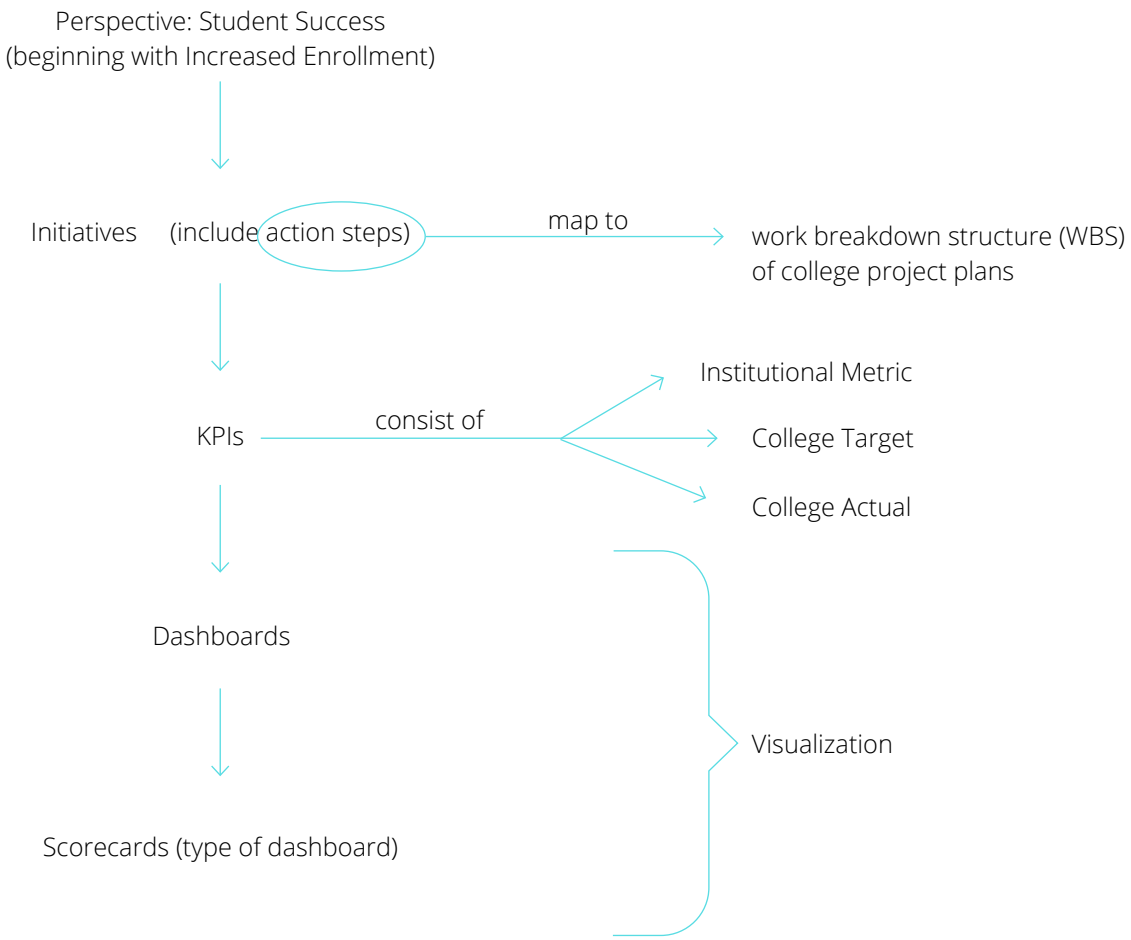
A major feature of the BI strategic system is inquiry and analysis (Nutt, personal interview, 2017). An analyst from the institutional reporting team was assigned to work directly with the president of LSC-T, her cabinet, and her council. The institutional reporting analyst assisted with data analysis to answer such questions as, What happened?, Why did it happen?, Why will it happen?, and How can we make it happen? (Kellen, Recktenwald, & Burr, 2020) when monitoring the progress of initiatives and their associated KPIs. These focus questions align with the different types of analytics: descriptive, diagnostic, predictive, and prescriptive (Norris & Baer, 2013) and help to direct the flow of analysis to decision-making. The institutional reporting team and the analytics team worked together on reporting and data analytics to support decision making at LSC-T. The looping flow of inquiry and analytics is depicted in Figure 6, which was developed by the researcher.

**Figure 6. Inquiry and Analysis Flow**


*Source:* Adapted from Norris (2013).

Figure 7 depicts the connections of initiatives and KPIs for the proposed scorecard implementation of the overall perspective on student success and enrollment. Notice that the action steps of initiatives map outside the implementation to administration through the work break down structure of college project plans.

**Figure 7. Hierarchy of Implementation of Accountability**




*Source:* Adapted from personal interviews with M. Chaney (2017, September 29) and L. A. Nutt (2017, September 26), L. M. Llorance, interviewer.

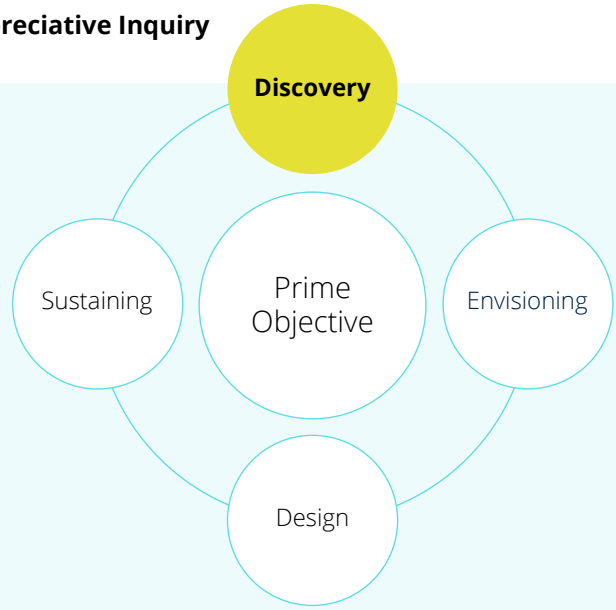
# SUMMARY

A surprise in this exploration of a BI implementation at LSC-T was the unfolding of an appreciative inquiry framework that supports LSC-T's efforts: "LSC-Tomball used an Appreciative Inquiry framework that emphasized open and creative communication (inquiry) with a positive mindset (appreciation)" (Chaney, personal interview, 2017). What is unique at LSC-T is the blending of David Cooperrider's appreciative inquiry process with the inquiry framework defined by Priyadarshini Chaplot, Kathy Booth, and Rob Johnstone (2020) to establish an appreciative inquiry framework.

Another unique point is that inquiry was campus-wide. According to LSC-T's president, Lee Ann Nutt, "This was and still is a campus-wide effort supported by no fear of inquiry. It is dependent on participation by everyone" (Nutt, personal interview, 2017).

Figure 8 depicts this new appreciative inquiry framework integrated with the BI tools used by LSC-T at each of the five stages of the framework.

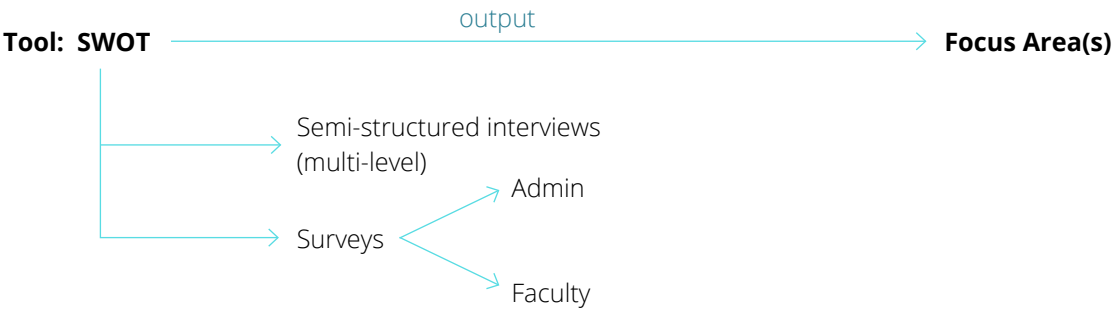
**Figure 8. The Evolved Version of the Culture of Appreciative Inquiry**




## STAGE 1

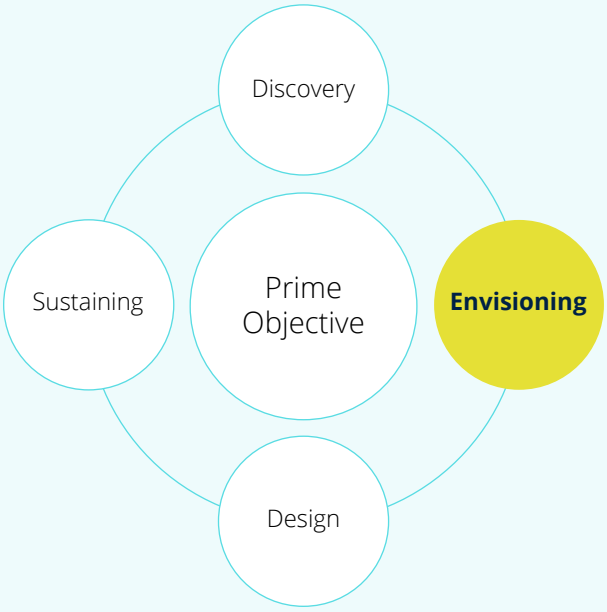
### Focus of Inquiry

**WHAT DO WE NEED TO WORK ON?**

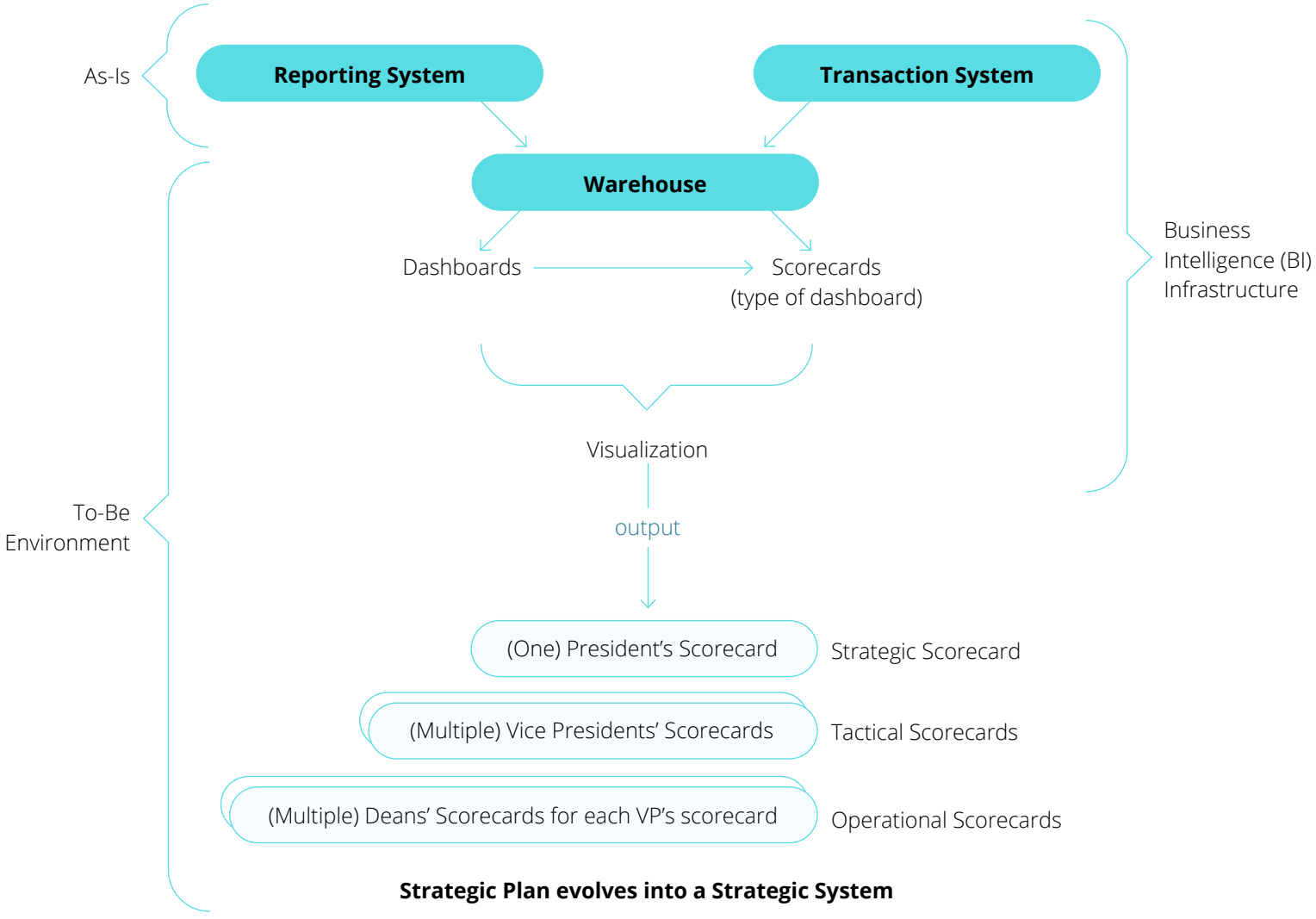


# STAGE 2

## Data Collection and Presentation

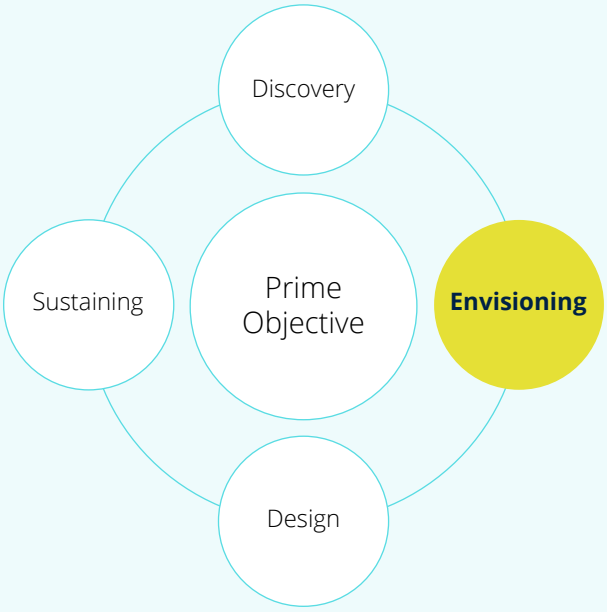



## Visualization




**Strategic Plan evolves into a Strategic System**

# STAGE 3
## Exploration

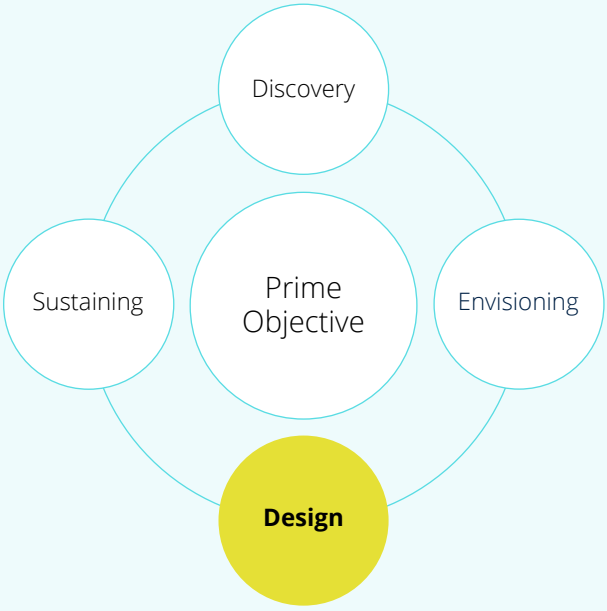



**IDENTIFY INITIATIVE(S) FOR FOCUS AREA(S)**

**Tool: Workshops (internal, external)**

Initiative Feasibility Rubric → output → Vetted Initiatives → Implementation Plans (narrative, functional)

# STAGE 4
## Action Steps




**HOW ARE WE GOING TO IMPLEMENT XYZ VETTED INITIATIVE?**

**Tool: Workshops on Covey's Project**

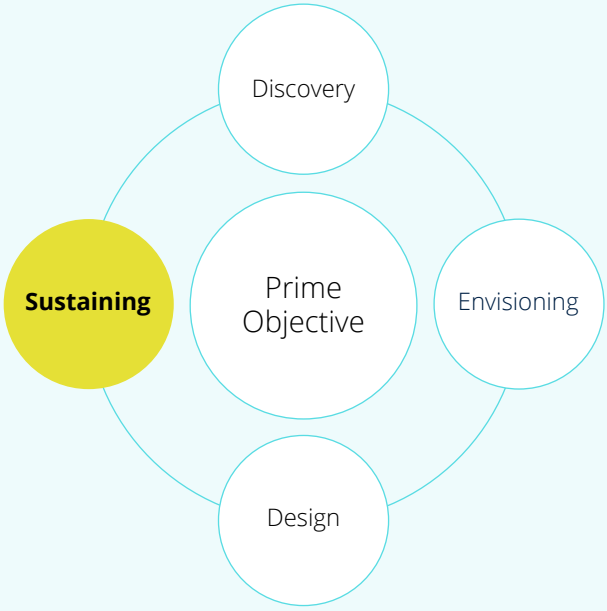
output

- Project Plan
  - Work Breakdown Structure (tasks, start dates, end dates)
  - Risks (blockers and solutions, from Stage 3)
- Status Meetings
- Progress Reports

**COVEY'S PRINCIPLES**

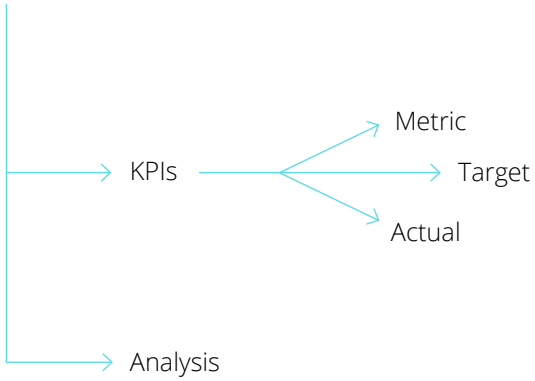
- **Discipline 1: Focus**
- **Discipline 2: Leverage**
- **Discipline 3: Engagement**
- **Discipline 4: Accountability**

# STAGE 5
## Measurement




**HOW ARE WE GOING TO MONITOR THE ACCOUNTABILITY OF THE IMPLEMENTATION OF THE XYZ VETTED INITIATIVE?**

**Tool: Workshops on Scorecards (from Stage 2)**




**What happened?**

**Why did it happen?**

**Why will it happen and how can we make it happen?**

Analytics were used by the focus groups to determine what was happening with enrollment numbers and to prescribe a change to increase the enrollment numbers. Before claiming that a prescribed change had occurred, the groups and executive leadership tracked enrollment numbers through meetings and Analytics & Institutional Reporting reports. As a result, LSC-T has experienced five consecutive semesters of growth. During that period (Spring 2015 to Spring 2017), LSC-T had a 10.02% growth (Wright, personal interview, 2017). Fiscal year 2018 is LSC-T's best-funded fiscal year in many years (Nutt, personal interview, 2017).

In addition, of the $1 million available to all six LSC colleges to be allocated based on performance, LSC-T received more than $500,000. The second-ranking college was allocated approximately $300,000. Thus, the smallest of the six colleges received the highest allocation for performance (Nutt, personal interview, 2017). Another area examined for decisions based on data was the vet tech program. There was a 60% growth in this program after decisions were made based on program data evaluation (Nutt, personal interview, 2017). Based on these results, it appears that BI has enhanced decision-making with increased enrollment numbers that led to additional funding allocation to LSC-T.

A recommendation for further research would be the effect of using the blended appreciative inquiry framework for a BI strategic implementation with a commitment to the project planning methodology for the entire project. The goal would be to determine advantages of timeliness delivery and enhanced college-wide communication among and between strategy focus groups. Another recommendation for further research would be the effect of using a warehouse instead of a reporting system as the backend for dashboards and scorecards. In this case study, the completion of the development and deployment of the warehouse was still active. Due to its incompletion, the backend was a reporting system of transactional data. The goal of further research would be to explore the implementation of the warehouse of aggregated data, its challenges, and its effectiveness when deployed.

The implementation of the visuals of the hierarchical structure of scorecards was not complete at the time of this case study. Another recommendation for further research would be the effect of a complete hierarchical structure of scorecards including visuals. The goal would be to explore the implementation and learn how challenges are overcome. In addition, research could seek to determine if transparency and accountability are enhanced and, if so, the results on performance due to increased transparency and accountability.

Full BI strategic implementations by community colleges are rare but might not be for long. Ongoing research of additional implementations could help the entire community college system in America. Valuable considerations based on this research are the selection and customization of BI tools in alignment with the culture of the college. In addition, applying the tools within an inquiry framework that supports an appreciative inquiry process can and has produced a college-wide transformational impact.

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# APPENDIX: DATA COLLECTION

Data for this research study were collected from interviews, BI strategic system implementation documentation, and observation. The program documentation collected includes the following (details in references):

## Program Documentation

1| LSC. Lone Star College strategic plan 2015–2020.

2| LSC. Lone Star College system district policy board manual (4th ed.).

3| LSC. Organization chart.

4| LSC-SO. Scorecard and KPI watch lists.

5| LSC-SO. Tomball tactical initiatives workshop.

6| LSC-SO. LSC program evaluation model.

7| LSC-T. 2012–2015 strategic plan Lone Star College–Tomball.

8| Nutt. State of the college address.

9| Nutt. Tomball 2020 report strategy group findings.

## Field Observations

The fieldwork for this exploration consisted of the following qualitative observations of events and activities at LSC-T:

1| KPI/dashboard/scorecard presentation @ LSC-T, facilitated by the Office of Analytics & Institutional Reporting on August 10, 2015, 10:00 a.m.–12:00 p.m.

2| Initiatives workshop @ LSC-T, facilitated by the Office of Analytics & Institutional Reporting on September 2, 2015, 2:00 p.m.–4:00 p.m.

3| LSC program evaluation model @ LSC-SO, facilitated by the Office of Analytics & Institutional Report, presented to vice presidents of administration on December 15, 2015, 10:00 a.m.–11:00 a.m.

4| Project management methodology presented to LSC-T president and vice president of instruction on June 14, 2016, 9:00 a.m.–10:30 a.m.

5| Project management methodology presented to LSC-T College Leadership Council on July 11, 2016, 10:00 a.m.–11:00 a.m.

6| LSC-T GRIT planning workshop @ LSC-T, facilitated by A&IR to LSC-T Strategy Groups on July 13, 2016, 9:00 a.m.–12:00 p.m.

## Interviews

Face-to-face interviews of approximately an hour each were conducted with the leader of the Office of Analytics & Institutional Reporting, the president of LSC-T, and the vice president of instruction of LSC-T (currently the special assistant to the chancellor). The interviews were not recorded, but interviewers used their notes to write field reports. A report on each conversation was submitted to each interviewee within a week for feedback and approval of the accuracy of summarized content of the interviews. The interviews conducted are the following:

1| Chaney, M. (2017, September 29). Interview with Associate Vice Chancellor Marian Chaney, Office of Analytics & Institutional Reporting. (L. M. Llorance, Interviewer)

2| Nutt, L. A. (2017, September 26). Interview with President Lee Ann Nutt, LSC-T. (L. M. Llorance, Interviewer)

3| Wright, Q. (2017, October 16). Interview with Special Assistant to the Chancellor Quentin Wright. (L. M. Llorance, Interviewer)

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