INTEGRATING REENGINEERING AND TQM TO ACHIEVE OPERATIONAL EXCELLENCE IN STUDENT SERVICES

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ABSTRACT

Total Quality Management has been institutionalized in many universities to improve academic processes and student services. Such efforts typically involve process owners at a lower levels of organizations and focus on continuous improvement. What is sometimes missing is a systems focus that asks not only how well we are doing it, but also why are we doing it? This systems approach provides an opportunity to reengineer critical processes and achieve breakthroughs in performance. This paper develops an approach for integrating reengineering and TQM efforts that is applied at the University of Central Florida to achieve operational excellence in student services.

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1.0 INTRODUCTION

A focus on quality now pervades successful American businesses. The same concern for quality exists in higher education in the United States. Those responsible for the delivery and administration of higher education have adapted many quality tools developed for manufacturing and service industries to educational processes. Recognizing the essential role of education, business leaders have "demanded" that universities fully incorporate the principles of Total Quality Management (TQM) on campus [21].

Universities have responded to that challenge (some before the "demand" cited above) [19]. Most of the emphasis has been on applying quality concepts for classroom instruction [2] [14] [23]. Although most of the documented quality efforts in the literature appear to involve classroom instruction and delivery of quality educational content (a long standing objective of most universities), there have been many other quality efforts directed toward administrative processes and delivery of student services. For example, the University of Central Florida established the office of Quality Initiatives as an initial effort to help assess administrative processes and work with the "process owners" to improve their processes. The fundamental idea of "continuous improvement" has provided the foundation for these efforts. Since its founding, the office has worked with numerous groups, generally at the direct provider level, to develop methods for process improvement. Horine, Halley and Rubach [15] reported that about two-thirds of universities responded quality improvement efforts have been in administrative areas, as compared with half identifying teaching methods. Greene [8] provided a blueprint for transforming universities into quality based organizations that address both instructional and service components. IBM has provided significant partnership grants to several universities to integrate TQM concepts into undergraduate and graduate courses [15]. The focus on quality within universities has extended from applying quality concepts to educational processes and administrative areas to actively teaching quality concepts in the curriculum. The latter includes integration of quality courses in existing curricula to the development of new curricula focusing on quality (e.g., the University of Central Florida's graduate program in Product Assurance Engineering; see also [15]).

Despite these efforts toward continuous improvement of educational processes (both academic and student services) there is need for further improvement. The quality initiatives necessarily deal with the "process owner." That is the individual who is empowered to make the changes necessary to effect quality improvement. If the process owner is not involved, no amount of teamwork and quality circles is going to have any significant effects. Within universities, many processes cross various functional and administrative boundaries and it is often difficult to identify the process owner, the first and most important step for implementing quality initiatives. Often, processes seem to "just grow," created by well-meaning administrators responding to a current situation and restricted by the existing technology and facilities. Improvement in

these processes needs more than quality tools for continuous improvement. What is needed is a complete redesign of the process itself.

The emergence of business process reengineering (BPR) [13] has provided a new impetus for "starting over." This paper examines the relationship between TQM and BPR and proposes an integrated approach for applying those concepts to improving student services in a university. The model is demonstrated with an application to improving student services at the University of Central Florida.

2.0 OPERATIONAL EXCELLENCE, TOTAL QUALITY MANAGEMENT, AND REENGINEERING

The shift from a product-focused strategy to one that concerns the product plus value-added services has resulted in an increased emphasis on improvements in operations planning. The shift in market focus has created significant pressures to achieve operational excellence: minimizing the cost of creating and delivering products, attaining the fullest possible return on assets, and meeting stringent customer service requirements [3]. The emphasis on operational excellence extends to service organizations as well. Recently, the University of Central Florida identified "achieve operational excellence" as one of its four strategic directions [26, p. 5]. The "how" of such strategies is not always clear. The University of Central Florida subsequently identified "Foster operational excellence through the use of information technology to improve the accessibility and timeliness of services to students and employees" (p. 46), and to "Continue to emphasize improvement through the endorsement of TQM processes" (p. 55). This strategic plan also emphasizes the need to review and revise policies, procedures, and processes where needed. In order to be effective in achieving operational excellence, it is necessary to understand the relationships among these various improvement paradigms.

2.1 Operational Excellence

Operational excellence is characterized by improved customer service and lower operating costs. Chapman [3] indicated that better operations planning is a critical success factor for operations excellence. There are three characteristics to better operations planning: consistent rationality that analyzes operations from the ground up in order to address tradeoffs and consider "ripple" and "domino" effects; inherent flexibility reflected with a "plan to replan" in order to be able to frequently respond to change; and a high level of precision in planning. The ability to attend to the details on a comprehensive basis is enhanced by leading edge technology and decision support systems. Without such technology, critical employees will continue to fight ever more fires while being consumed in an increasingly complex environment.

Operational excellence requires a detailed understanding of the various processes that drive the delivery of an organization's products and services. It demands an increased role for technology in identifying and improving those processes. Process improvement has been and continues to be a fundamental aspect of Total Quality Management.

2.2 Total Quality Management

Despite the wide use of Total Quality Management (TQM), there is no generally agreed upon definition. In fact, it is not clear whether TQM is a system, a philosophy, or a business strategy. Ciampa [5] characterizes total quality in three different ways: the unifying principle, the outcomes, and the tools and techniques. The unifying principle is total dedication to customers so that their needs are met and their expectations are exceeded. The total quality outcomes include intensely loyal customers, minimized time so that costs decrease, a climate that supports teamwork and more meaningful work, and a general ethic of continuous improvement. The tools and techniques include quality control, quality assurance, reliability engineering, just-in-time production, organizational development, and leadership. Tenner and DeToro [25] identified three fundamental principles of total quality: customer focus, process improvement, and total involvement. The customer focus should include both internal and external customers in order to ensure that the needs and expectations of the external customer are ultimately met. Together, these three principles have the effect of ensuring continuous improvement in the product or service offered. Process improvement requires first that variability be minimized and that the process is stable. When achieved, if the results are unacceptable, the process must be redesigned. Finally, total involvement begins with active leadership by senior management and includes efforts that use all of the employees in the organization. Involved employees will work together to solve problems, improve processes, and satisfy customers. Tenner and DeToro also identified six supporting elements: leadership, education and training, supportive structure, communications, reward and recognition, and measurement.

Much of the research and focus on TQM has involved process issues, the how of TQM, and little on the content of TQM. Reed, Lemak and Montgomery [20] considered the firm's orientation (customer or operations) and evaluated the effectiveness of TQM implementations. Those with a customer orientation used TQM successfully and were better performers. Total quality developed from industry and does not have an underlying "theory" per se. Dean and Bowen [6] compared TQM with various management theories and identified areas where they are virtually identical, areas where TQM practice should be informed by management theory, and areas where new directions in management theory are suggested by TQM. In their analysis, Dean and Bowen characterize Total Quality as a philosophy or approach to management that can be characterized by its principles, practices, and techniques. The three mutually reinforcing principles are a customer focus, continuous improvement, and teamwork, all of which are based on meeting a customer's needs and expectations. Leadership is a key element in most prescriptions for TQM. Recently, Choi and Behling [4] found that top managers' underlying (often unspoken) orientations toward time, goals, and customers lead to different approaches to TQM, which in turn influence TQM's chance of success.

There is no single recipe for a successful implementation of a total quality or reengineering program. Sharman [22] reported that McKinsey and Company found that two-thirds of the quality management programs "stall" with respect to delivering tangible improvements in performance. Krishnan, Shani, Grant, and Baer [18] studied quality

management programs and identified three sets of problems in their formulation and implementation:

- confusion arising from the pursuit of multiple quality initiatives and lack of clarity and consistency of program goals;
- inability to translate broad quality goals into quantitative targets, organizational structure for implementing quality programs, communication difficulties, and managing the transition from individual to organizational learning; and
- problem of consistency between quality programs and other strategic initiatives, particularly when simultaneously pursuing quality management and restructuring.

2.3 Business Process Reengineering

Hammer [12] introduced the concept of reengineering that has been accepted and has been tried in many companies. Hammer and Champy [13] further popularized the concept Business Process Reengineering (BPR) with their best selling book. In it, they define reengineering as the "fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed" (p.32). They emphasize four key words: fundamental, radical, dramatic, and processes. They emphasize what reengineering is not. In particular, it is not the same as reorganizing or flattening an organization; it is not restructuring or downsizing; and it is not the same as quality improvement; TQM, or any other quality management program. Hammer and Champy note that reengineering and TQM have a number of common themes: both involve processes and both start with the needs of the customer. However, quality programs typically work with existing processes and seek to enhance them, whereas reengineering seeks breakthroughs, not by enhancing existing processes, but rather by discarding them. With respect to bureaucracies, Hammer and Champy indicate that they cannot be eliminated as an objective. Rather, by reengineering processes so that they are no longer fragmented, bureaucracy will no longer be needed. One distinguishing characteristic of reengineering is the role of information technology (IT). Hammer and Champy characterize IT as an "essential enabler" for reengineering efforts.

Recent surveys of executives have indicated frustration with BPR outcomes [10] [13] [24]. Hammer indicated that 50 to 70 percent of all reengineering initiatives fail in achieving their objectives [24]. Khalil [17] indicated that causes of BPR failure included mismanagement of change, lack of know-how, and misunderstanding of reengineering.

Hammer and Champy [13], while providing a good description of the concepts associated with reengineering, did not focus on explicit guidance on how reengineering should be conducted. Dixon, Arnold, Heineke, Kim, and Mulligan [7] reviewed the literature and developed content and process models for reengineering research. This structure will be useful for evaluating different aspects of reengineering, but does not provide any meaningful guidance for an organization attempting to conduct a reengineering effort. Hales and Savoie [11] described four phases for a BPR project: orientation; overall planning; detailed design; and implementation. They focus on the critical orientation phase because it provides the foundation for successful

reengineering efforts. Based on their experience, Hales and Savoie identified ten "lessons learned" with respect to the orientation phase that are related to BPR success. The lessons learned include: commit to implementation; establish the business context, project scope, and expectations; agree on duration and resources; assemble a team of the best people; limit the team size; clearly define roles and responsibilities; communicate; encourage creativity; provide effective education and team building opportunities; and provide the best facilities, methods, tools, and support.

Khalil [17] developed a life cycle perspective for BPR The first phase is to conduct a "readiness for change assessment." The findings of this assessment will help in identifying the scope of BPR projects and sensitize the culture and political environment to possible change. This is an important time to identify cultural issues that may affect employee insecurity and possible distancing from BPR efforts. With possible discarding of processes, the question of what are the positives for people naturally arises [16]. Khalil recommends that the next phase is to identify which processes are targets for redesign. Typically, these should be processes that are central to the execution of the business strategy and currently fall short of customer expectations, management aspirations, and competitor performance [10]. The third phase involves identification of potential BPR enablers, including information technology and human organizational enablers (e.g., autonomous teams, flattened organizations). The next phase is business analysis--to link the process vision and business strategy. This understanding provides a foundation for the next two phases: process analysis and process redesign. Process analysis requires that the existing process be understood and its performance measured before designing a new one. Traditional industrial engineering tools and information systems methodologies are useful here. Process design results in a prototype of the new process. Khalil emphasized that these solutions must be evaluated with respect to their relative benefits, costs, risks, and time frames. The final phase is process implementation, including a migration strategy to move from the current process to the new process. Finally, an essential element inherent in successful implementation of BPR projects is top management leadership and support [10] [11] [13].

3.0 INTEGRATED BPR/TQM PROCESS IMPROVEMENT MODEL

Allender [1] posed the question of whether BPR is compatible with TQM? Dixon *et al.* [7] noted that, superficially, reengineering and continuous improvement are opposites: one is top down and the other is bottom-up; one has discrete start and stop points and the other is continuous; one works on existing processes and the other eliminates it. Hammer and Champy [13] emphasized that BPR is not TQM and highlights some of the same differences. Yet, Dean and Bowen [6] in their extensive survey, identify "reengineering" as one of the continuous improvement practices in TQM. Allender concluded that nothing in the TQM philosophy dictates that continuous improvements must proceed in small steps and that improvements are welcomed in either small steps or gigantic leaps. Thus, the breakthroughs envisioned by BPR are indeed consistent with TQM.

There is no disagreement that both BPR and TQM are customer focused and both require strong top management leadership and commitment. The compatibility between redesign/reengineering and moderate continuous improvement seems to be

reasonable and the outcomes of BPR and TQM seem to be the same--improved processes that better serve the customer. One fundamental difference remains: BPR is top-down--reengineering projects tend to be system focused and are often conducted by a reengineering team that does not involve the process owners; TQM tends to be bottom-up and involves process improvement activities conducted by teams of persons responsible for the process. Obviously, this difference in the two improvement processes is a source of tension. TQM tends to involve workers who believe that their work will be easier and service to the customer will improve. BPR is often perceived as an imposed solution and may be threatening to the workers [16].

Any attempt to integrate these improvement approaches must recognize the areas of mutual support and the areas of tension. The advantages of an integrated approach may be particularly evident where processes involve several functional areas, and there is no evident single "process owner." In these situations, there is often a high information content that requires strong technological support. This circumstance frequently suggests a need for a redesign that incorporates information technology and requires a top-down perspective. At the same time, there is a need for the cross-functional process co-owners to be involved in the redesign. In facing this redesign, the organizational infrastructure must also be considered. Halal [9] identified an "internal market" structure (contrasted with a hierarchical structure or a matrix structure) as being the appropriate one for the information age. These elements are illustrated in Figure 1.

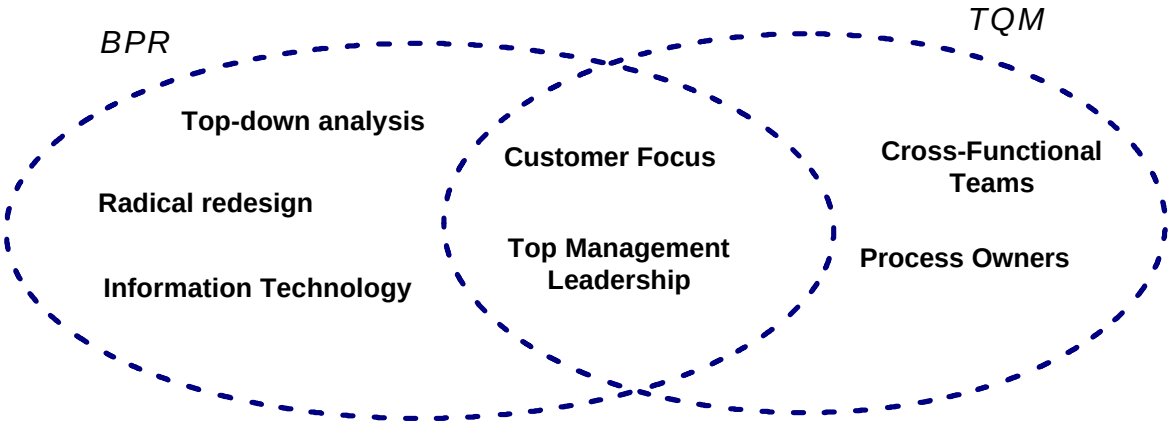

Figure 1. Integrated BPR/TQM Process Improvement Model

The Integrated BPR/TQM model is being used to review and address student services at the University of Central Florida. The scope of students services, the underlying problem, and the approach taken are described in the following sections.

4.0 EDUCATIONAL SERVICES AND STUDENT CUSTOMER FOCUS

The primary mission of most universities is to provide a quality education to students. In order to achieve operational excellence within a university, there must be a focus on the internal customer—namely the student, as well as the external customers (e.g., industries, professions, and service organizations) of the products that

universities produce (namely, educated students). In industry, one can shape products out of raw materials without viewing the raw materials as customers. Unlike industry, where the product is generally not viewed as a customer, the student must be viewed as the customer of the university's services. In education, the needs and requirements of the students who are the users of the "services" that are provided by the university must be assessed in order to provide excellent service. The raw materials in industry do not generally have the choice to remain in the production process or not, but students can make that choice.

It is easy for offices within the university to lose sight of their primary customer—the student. Individual offices are often evaluated based on process efficiency and costs to the organization, rather than on how well the processes and products serve the needs of the customer. It is difficult for an individual office to maintain a student customer focus, particularly when a university experiences rapid growth and the processes designed for smaller student body have not kept pace. Moreover, the resources available to serve the students frequently do not keep pace either. The University of Central Florida has grown from about 2,000 students when it was established in 1963 to over 28,000 students in 1997. The current growth rate is about 4%. The total student enrollment has increase by over 30% in the past five years while faculty have increased by less than 20%.

Growth in information technology resources also tends to lag the growth in the university. Legacy information systems are typically bound by an earlier systems design, are frequently fragmented, and do not provide the current information needed to serve students effectively. These information systems serve multiple functions for various administrative units. Their effective design requires a cross-functional perspective. At the University of Central Florida, the problem of year 2000 compliance provided an additional incentive for examining information systems.

5.0 INITIAL APPLICATION OF INTEGRATED BPR/TQM MODEL TO STUDENT SERVICES

At UCF, a number of initiatives have followed the integrated BPR/TQM approach. The primary focus involves three areas: information technology, identification of customer needs, and identification and improvement of critical processes that are not meeting customer needs. Because of the scope of these efforts, it was necessary to conduct them as separate, but loosely related projects. The new effort was undertaken against a background of an existing TQM effort that focused its work primarily at lower organizational levels, training and empowering quality groups to conduct process analyses in their areas of responsibility. Thus there is a culture of continuous improvement that was widely known throughout the university. The key element of success for any BPR/TQM effort—top management leadership—is actively present in all of these initiatives. The President and the Provost have been the initiators of these efforts, and it is well-known that they will strongly support implementation of the results.

The Integrated BPR/TQM effort takes a broad view of student services--those activities, products, and processes provided by or supported by the university (exclusive of classroom instruction) that enhance the student's educational experience

at UCF. These include both academic services (e.g., admissions, advising, class registration) and student life enhancing services (e.g., student government, financial aid, parking, clubs and organizations).

The BPR/TQM effort has evolved over the past year and currently involves three projects. The first project considers Information Technology and involves the development and implementation of a new information system. The second project that was initiated involves Student Services Improvement Teams that are focusing on particular "problem" areas. The third project is the student services Operational Excellence Initiative named UCF21 (University's Customer Focus for the 21st Century).

5.1 Information Technology

Information plays a key role in the provision of student services, both as an enabler for administrative personnel, as well as identifying the availability and access data for the students. Recognizing that the legacy databases were inefficient and not effective, a major effort was undertaken to identify the information needs of the internal administrative users. The results of this effort led to the selection of a new software system developed on a relational database that would meet these needs (identified in conjunction with existing processes). Simultaneously, it was recognized that students needed easier access to information. This occurred as the Internet and the world wide web were becoming commonplace. Consequently, efforts were begun to use the web as a key enabler for providing relevant information (both general and personal) to students.

Effective implementation of these information technologies is a difficult task. The Leading Edge Administration Project (LEAP) was established to provide the leadership and mechanism for the implementation. LEAP has a high level steering and advisory committee, standards teams, and technical teams that involve contractor personnel and a broad range of UCF personnel from all functional areas. Because a standard software package is being used, there is a need to "fit" existing processes to the system, at least in terms of information requirements. Cross-functional teams are used in these fit sessions to identify the essential information required for their respective processes. This activity provides a basis for reengineering the existing processes and takes advantage of the new information technology and determine how to best use that information technology to deliver the various student services. It is likely that many of the existing processes were determined, in part, by the limited capabilities of the legacy information systems. This project is being led by the Vice-President for Information Technology.

5.2 Student Services Improvement Teams

Customer (student) feedback indicated that satisfaction with "student services" was not as high as with academic offerings, suggesting a need for a fresh look at identified problems. Consequently, the Provost convened a Student Services Improvement Team, chaired by an Assistant Vice-President for Academic Affairs, during the Fall, 1996 semester charged with the task of looking at ways for improving, coordinating, and fostering cooperation in UCF's student services areas. The team, consisting of members from the major student services areas, identified seven areas

that should be addressed in order to improve services to students. These areas include:

- Academic Advising,
- Academic Advising Staffing,
- Non-Curricular Information,
- Orientation Improvement,
- Student Financial Assistance Staffing,
- Student Holds, and
- Student Services Staffing.

The SSIT recommended that several areas be selected from this list for the initial effort and teams be formed in each area to conduct the assessment. It was decided to proceed with teams for Non-Curricular Information, Orientation, Academic Advising, and Student Holds. These three areas cross different organizational functions. These teams are being led by key individuals in each of the areas and facilitated by the Quality Initiatives office.

5.3 UCF21 Operational Excellence Initiative

The Information Technology initiative and the Student Services Improvement Team initiative clearly involve cross-functional activities, but both initiatives are working within existing processes. To establish the broader systems view, the Provost established a research project titled "UCF21--University's Customer Focus for the 21st Century" as part of the President's Operational Excellence Initiative. The primary goals of the UCF21 project are to:

- develop a systems level view of student services and their interactions by documenting all critical student service processes and their interrelationships;
- identify systems level improvement opportunities, including reengineering;
- recommend changes and/or in-depth studies; and
- develop implementation plans for changes and /or in-depth studies.

The UCF21 Project is directed by a faculty member from the Industrial Engineering and Management Systems Department and consists of a team of 3 faculty, 6 graduate students, and 3 undergraduate students. The UCF21 team's focus is in three specific areas: (a) student perceptions, (b) student information, and (c) student services. The student perceptions area involves identifying the importance and satisfaction levels of students with respect to student services. Many offices across the university routinely conduct surveys and assessments of their processes. The UCF21 team is currently developing an inventory of all existing surveys, evaluating their content, and determining where additional information about student perceptions is needed. Where information is lacking, UCF21 will conduct additional surveys to fill the void. The main diagnostic result will be a compilation of student perceptions of importance and satisfaction with various student services, and will provide direction for identifying critical processes requiring reengineering.

The student information focus area involves determining the accuracy and timeliness of information provided to students and about students. Inventories of the existing electronic forms and non-electronic forms of information are being developed.

The relationships among the information systems and the impact of legacy systems on the accuracy and currency of information is being evaluated, as well as the non-electronic forms of information.

The University of Central Florida provides and supports over 100 different significant products, activities, and processes that enhance the students' educational experience. A major thrust of the UCF21 effort is to determine the activities, processes, and products that lead to a successful UCF experience, develop an inventory of the services that UCF currently provides, and determine what is missing. This will be followed by an examination of the interrelationships among the services and the role of information in providing those services, in order to develop recommendations on process improvements as well as reengineering.

The UCF21 project team is performing an integrative function among the major projects. The assessment of information needs and relationships by UCF21 is being used by LEAP in its fit analyses. In addition, the LEAP analyses are providing information to UCF21 regarding the relationships among the various information systems and requirements. The initial fit analyses require individuals to assess their current processes. This assessment provides a starting point for UCF21's evaluation of existing processes, and it provides some momentum among the process owners for instituting process redesigns. The several SSIT teams will include members from the UCF21 project who will function primarily as observers, but will also provide technical guidance for process examination. The two way communication among the projects and the frequent interaction with various administrative personnel provides an opportunity for user "buy-in" regarding process change. This approach combines the advantage of a top-down approach while heavily involving the user/process owner. It is expected that this will lead to greater ownership of the outcomes.

The efforts of the UCF21 team in the 1997-1998 academic year correspond to the first four phases in Khalil's' [17] BPR Life Cycle: readiness for change assessment; problematic process identification, change enablers identification (here, information technology), and business analysis. At the completion of this initial effort, critical processes will have been identified that will be modeled and analyzed. This will be followed by process redesign, where appropriate, and implementation of new processes.

6.0 SUMMARY

Both Business Process Engineering and Total Quality Management approaches have been widely used by business with varying results. Both approaches to business improvement (operational excellence) have the potential to yield significant results as evidenced by many success stories [13] [20]. An understanding of the strengths and limitations as well as critical success factors for BPR and TQM provides a basis for integrating the "best of both worlds" to develop an effective model for performance improvement. The model developed in this paper includes radical redesign of critical processes as a means of achieving breakthroughs in performance. These breakthroughs build on the moderate improvements that are frequently experienced with traditional continuous improvement efforts. The breakthroughs require more of a top-down view of the organization's activities. The key to successful integration is to

conduct top-down and bottom-up approaches simultaneously and to fully utilize key personnel to be involved and communicate at both levels. This understanding provides the basis for the Integrated BPR/TQM approach being pursued at UCF to achieve operational excellence in student services. The likelihood of success of this approach is greatly enhanced by the top management leadership, commitment to, and support of the efforts. Although in its early stages, this approach offers the possibility of achieving significant improvements in student satisfaction and identifying services not currently offered that will further enhance the student's educational experience at UCF.

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