

Training Undergraduates to Assume Leadership Positions

Mary Jo Parker

University of Houston-Downtown

Numerous programs are associated with leadership development. These systems of leadership induction/transfer occur primarily once individuals enter their career space. The University of Houston-Downtown (UHD) Scholars Academy offers a leadership training program for undergraduates as a year-long program involving first an off-site retreat of a full weekend, challenge course elements focused on team-building and individual low/high challenges, upon return to the university campus monthly meetings, and active learning experiences with mentees. Also, an on-site, face-to-face and virtual Peer Led Team Learning (PLTL) training session lasting 15 weeks or one semester. In the last two years the PLTL training has become foundational to scaling up the leadership training across the Scholars Academy program and UHD in a general sense.

Keywords: Mentoring, leadership development, minority leadership, workforce leadership

Introduction

Leadership training for undergraduates within the context of a university setting generally consists of a seminar course where weekly meetings target communication skills, group activities, and topical discussions of leadership styles, vision, micro-messaging, biases, conflict resolution, and negotiation skills. These currently running programs are offered as a single course, a degree program, or a graduate program (Johns Hopkins University, 2021; Stanford LEAD Graduate Program, 2021; UT Austin-Cockrell School of Engineering, 2021).

Why is leadership development necessary in the arena of science, technology, engineering, and mathematics (STEM)? Is intellectual capacity deemed necessary as an element of leadership? In some cases intellectual capacity enhances leadership (Dalakoura, 2010). Developing STEM leadership capacity has become a mandate from business and industry as well as civic engagement groups requesting increased volunteerism from the university ranks in general and STEM more specifically (Pearce & Conger, 2003). There is sufficient research indicating undergraduates do increase their own leadership capacity by simply going to college and engaging in the various college processes (Blanchard, 2021; Blanchard & Hershey, 1969; Petri, 2014). Gains in self-efficacy, community engagement, and increased character development seemingly take place as a result of doing the activities college offers, such as joining social or academic organizations, moving into officership of organizations, mobilizing study groups for a

particularly difficult course or examination, and participating in leadership opportunities presenting themselves. All these activities seem to raise the academic performance level of the undergraduate as a result of ownership of the issue/problem and investment in the outcome of the group or exam or community service, thereby supporting growth in leader and leadership skills (Dalakoura, 2010; Ferman & Van Linden, 1998; Omvies et al., 2005). Social and emotional growth of the college student can be evidenced in the development of character, responsibility and integrity, or trusting what is said and what will happen. A recent study found that minorities and women or at-risk individuals appear more open to change in terms of leadership and of change in general, suggesting greater adaptability perhaps due to their life circumstances (Dugan & Komives, 2006). This is important when equitable leadership development is considered as part of the college student's development. Commitment, competence, and character have been identified as key components of good leaders and likewise leadership competencies (Crossan et al., 2012; Gandz, & Seijts, 2012). Further, group facilitation and group socialization demand strong facilitation skills to transform problems into chances to increase cooperation, respect on the part of the group, and on the part of the facilitator, leadership. Leadership is about facilitating the process of change in a bi-directional, interactive event between leaders and followers (Northouse, 2012). Peer led team learning, a type of small group learning, focuses on facilitation by those being trained both verbally and non-verbally as well as in a type of Socratic questioning by the facilitators to invoke problem-solving strategies

rather than answering the questions by the trainee (Quitadamo et al., 2009 Brahler, & Crouch, 2009).

High impact practices often suggest effective connections to student retention and student engagement as well as character development as it connects to leadership development (Kuh, 2008; Kuh & Umbach, 2004). Many four-year colleges and universities encourage a common practice of mentored undergraduate research as a student support mechanism and as a career development opportunity, especially within the sciences (Lopatto, 2007). Several studies offer well-documented findings associated with undergraduates involved research experiences in under the guidance of laboratory principal investigators or in the classroom setting using a student-centered, problem-based approach. Likewise, studies on the effectiveness of mentored research experiences indicate several important findings, such as: 1) enhancing the entire undergraduate experience and 2) increasing the substantive interest in entering a career in science through advanced graduate work (Mogk, 1993). Gains in self-confidence and pathways to science careers, especially among first generation, minority, and female undergraduates were documented in several studies by Lopatto (2004, 2007, & 2009) and Hathaway et al, (2002). Character development has frequently been connected as an underpinning to leadership development (Crossan, Gandz, & Seijts, 2012). In the University of Houston-Downtown (UHD)

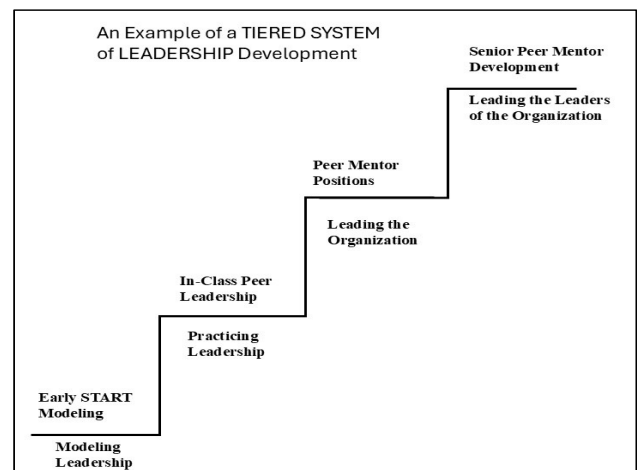
Scholars academy mentoring, community engagement, and ambassadorship have been used as positions to provide developmental leadership activities, thus creating opportunities for change to occur. In most cases undergraduate leaders act as employees whose pay is based on grant funding. This tiered system of leadership demonstrates that leadership activities and roles lead to increased responsibilities, thus allowing upper division undergraduates to emerge with greater levels of leadership skills which arise from responsibilities and a program of guidance. The tiered levels of change opportunities, and activities describe the changes, which can evolve, in an individual, as the individual begins to sense themselves as leaders. This is especially true as they begin to see themselves as a leader capable of influencing processes between individuals and/or a shared interdependence among individuals, groups, and organizations, and their relationship surrounding the organizational climate and customs (Day & Harrison, 2007). Such a system of organized activities for change and growth has arisen as a result of federal and state grant support to UHD Scholars Academy and as an intentional review of activities common to the SA organization, which has produced leaders as a consequence of having been in the program (Micari, Gould, & Lainez, 2010).

THE TIERED SYSTEM

Early Start Modeling as a Peer Leader (Modeling Leadership)

The Scholars Academy (SA) uses a system of tiered leadership from which upper division undergraduates are selected for positions where they must guide other peers in a facilitative manner. By tiered system, the term tiered is meant to describe the step-wise advancement into leadership positions, but also that the increased levels of appointed leadership responsibility increases with each step. The levels to be discussed include: 1) Early Start Modeling; 2) In-class Peer Leadership; 3) Peer Mentoring; and 4) Senior Peer mentor (See Figure 1.). The initial opportunity to participate in mentoring arises for a program entitled START, a week-long daily program is offered to incoming freshman and transfers. The program has several pre-determined objectives including building a feeling of cohort (community connections), strategically defining, for all the standards, opportunities, and guidelines for SA membership, and contextualizing these within the scope of the science, technology, engineering, and mathematics (STEM) disciplines/majors. For the START program generally undergraduates who have participated in the START program previously as freshman or transfers create the pool of candidates from which peer leaders emerge. Daily debriefings with the START program coordinator occur during the entirety of the START week of activities. Throughout the debriefings, peer leaders work with SA administrative leadership and during the START program the peer leaders facilitate the groups, thus influencing peers while also influencing the organization (Day & Harrison, 2007).

Figure 1. Example of a tiered system of leadership development.



In-Class Peer Leadership (Practicing Leadership)

Undergraduates have additional opportunities in activities to facilitate and influence peers within the classroom setting as peer leaders. Leaders selected for in-course peer leadership continue in this facilitative role in the fall/spring semester within a seminar course. Each is paid a modest stipend. Generally, those attending the START program submit applications following their first year of university. In terms of the upper division undergraduate leaders, tremendous growth, is captured from their acting as facilitative leaders within the START program. Evidence of leaders' ability to adapt, to consult (with program coordinator), to begin to ask good questions that move their team (followers) to new levels of understanding, increasing their consideration of leadership relationships within the organization (Day & Harrison, 2007).

Peer Mentoring Positions of Leadership (Leading the Organization)

Another tier level of enhanced responsibility and leadership within the organization occurs in the form of selection as a peer mentor for a discipline group. These leaders are upper division undergraduates, so more mature and capable of guiding others, thus bring greater experience either from leading or from having been led and experiencing from the leadership skills of their own peer mentor. Peer mentors are selected based on nominations from faculty, staff, or self-nomination and once selected must sign a contract indicating their commitment to the position. The peer mentor position is a year-long position with responsibilities ranging two full academic terms and commitment to meeting once a month with their discipline-based group and PhD faculty mentor. Beyond commitment levels, peer mentors must be willing to meet with organizational leadership for in-house training once a month. Prior to selection, those nominated must have demonstrated noticeable nurturance of others (relationship building), character to lead others (integrity and trust), remain facilitative in their responsibilities and actions with their mentees, and demonstrate high commitment to the Scholars Academy organization (organizational climate and culture) as well as to the STEM discipline. These students generally are considered experts in their disciplines. Active grant awards fund the peer mentors' year-long mentoring positions. Finally, all peer mentors participate in an off-campus retreat training for three days and two nights in a camping situation prior to the start of each fall semester. These students will be challenged as groups and individually through participation in a challenge course low elements and high elements. Organization leaders use this time to place all peer mentors, generally urbanites, in a rural environment to create the opportunity for growth and leadership resulting within the new environment. Even at this level of

mentorship undergraduates maintain constant communication with the organization leadership to gain advice for situations they may never have experienced, thereby enabling their own growth as a leader. Because the challenge course looks like fun, the challenges presented offer each individual a mental and physical obstacle that may only be overcome through individual efforts and discipline or through combinatorial effort as part of a team.

Senior Peer Mentor Development (Leading the Leaders of the Organization)

The position of senior peer mentor was established early on in the SA organization's interest to empower STEM leaders in leadership associated with organization. Because peer led team learning is a standard training method for almost all undergraduate tutors, the senior peer mentor has generally been trained in this technique, thus seen more as a coach to the other discipline-based peer mentors. The senior peer mentor works directly with the SA administrative personnel in deciding how and what to present as topics for each monthly meeting. The senior peer mentor facilitates the peer mentors and models high performing leadership qualities. In this way the senior peer mentor influences the future leadership of the organization. Some refer to this process as leadership development in process (Dalakoura, 2010).

Leadership Development Opportunities**Research Leaders Associated with Research Programs (Leading the Organization)**

Undergraduates are matched with on-campus UHD PhD research scientists within a variety of STEM lab settings. Leadership develops through this framework, as the PhD comes to understand the qualities/competencies and commitment the undergraduates bring to gaining deep learning of not only discipline content and skills, but also of what research is and what it can become for each of the mentees in the pursuit of individual careers. Early mentored research students are guided by and learn from an upper division undergraduate who has worked with the PhD for some time. As the early career research students develop expertise and competency in the lab and trust on the part of the PhD researcher, they move up within the lab setting and as a leader. Thus, leaders are trained and leadership is developed through this systematic mentorship in research. This particular leadership development tier truly has long-term impact on post-baccalaureate graduate/ professional programs, individual ambitions, and confidence to enter STEM careers (Lopatto, 2004; 2007; Mogk, 1993). Funding support provides those engaged in mentored research, thus bringing a workforce element to this type of leadership development and hopefully, transferability of the skills into the post-baccalaureate workplace.

Community Engagement (Leading the Organization and the Community)

Another opportunity for leader and leadership development occurs through participation in community engagement activities through discipline-based groups. Leadership occurs through our undergraduates providing assistance to others more needy than themselves (even while they are predominantly underrepresented and low socioeconomically disadvantages). Through post-testing surveys, lessons learned are gathered and analyzed. While the SA membership may indicate they initially did not want to participate in community service, post-test results indicate strong, uniform understanding of how they are seen as leaders within the community where engagement occurs. Community engagement does not include any type of funding support (Dugan & Komives, 2006). However, in terms of providing opportunity for enhancing intrinsic reward and character development of participating undergraduates, community engagement provides a perfect training ground, one which is low cost and high yield. This is essential as giving back provides an intrinsic reward, character development for each member. Many undergraduates continue to provide community engagement outside of the discipline-based groups, accruing many service hours (approximately 750 per semester or over 1600 per year from discipline-based groups involved in community service. As indicated in some of the post-semester surveys, undergraduates claim the community service makes them: 1) well-rounded; 2) gain friendships and soft skills; and 3) experience networking activities. Many speak reflectively of their experiences in these community-based leadership activities such as: 1) pride in self for inspiring children by sharing their story; 2) facing daily struggles together and understanding that together any problem can be fought off; 3) honored to represent their university in such a prestigious light; and 4) actually helping someone.

Outreach Ambassadors (Leading the Organization and its Cultural Climate)

A relatively new opportunity to grow leaders and leadership arose with a Department of Education MSEIP three-year grant valued at \$750,000. Outreach ambassadors were established as another arm of the UHD SA program with goals to recruit for STEM majors primarily and be the face of the SA at external events. The premise of ambassadorship lies in the competence and commitment of the selected undergraduate to the university and the SA program. Ambassadors provide outreach and marketing externally of the university. They become the face and voice of the SA program, thus this is a preeminent position that can be tremendously assistive to recruitment of future

undergraduates and strongly communicate the vision, goals, advantages and benefits of the SA program. The ambassadorship requires leadership styles that are telling, selling, and participating as they engage individuals or groups or other organizations in the benefits of the university and the SA program. As is evident, ambassadors are highly competent, highly committed, and highly influential to peers and across the organization. Often, ambassadors may be peer mentors and may have been peer leaders. Active grants support ambassadors, thereby connecting to the organization. Leadership development occurs on a monthly basis and contractual agreements are required of each undergraduate participant. Each must know and be able to communicate the story of the SA program, the opportunities it presents, the requirements, and the historical outcomes that separate this academic unit from others. They must be willing and able to share their own "stories" or accounts of how and why they entered SA, remained with it, and elected to move into a position of leadership by becoming an ambassador.

The Role of Peer Led Team Learning within the Tiered System

Peer Led Team Learning Workshop Method

The PLTL workshop project began as a coalition of faculty, students and learning specialists organized around the peer-led team-learning model of teaching mathematics and science course. This coalition began in 1995 led by David Gosser from City College of New York, Verma-Nelson, from St. Xavier University, and Jack Kampmeier from University of Rochester (Gosser et al., 2001, Bartow, D., West, E.G., Strozak, V., Varma-Nelson, P., Kampmeier, J., 2001). A vital part of the PLTL workshop method is the leader training course. This 11-15 week course is offered by the PLTL trained faculty member and a selected PLTL student trainer, who has completed the course prior to offering it as a student leader. The workshop model offers training composed of icebreakers, learning styles, equity issues related to race, gender, and ethnicity, group dynamics and cooperative learning, pedagogical tools such as concept mapping, problem solving using pairs, construction of models, round robins, developmental theories introduction, use of role playing for skill and leadership development, and assessment of students' learning. PLTL training develops students with potential in leadership in the skills of facilitation. Of course the skills of facilitation focus on support of particular pedagogy as PLTL arose for the specific purpose of student content success.

Our university noticed that each undergraduate completing the PLTL training course emerged out of the course with more confidence, capacity to speak to people, an air of leadership it appeared as they began to apply for leadership positions within the Scholars Academy as well as UHD university-wide leadership positions. From these observations we searched for an assessment instrument

Training Undergraduates to Assume Leadership Positions

in order to begin compiling information to accompany our observations. The North (2010) self-assessment instrument was found and began to be used on all students completing the PLTL training workshop.

During the challenge offered by the COVID pandemic over a two-year time period, UHD adjusted its PLTL training model to be able to train via zoom or virtually. The workshop materials were emailed to trainees by the student trainer and all aspects of the training were taken online. The breakout rooms within a Zoom environment were used for paired sharing etc. The training process was slightly revised to ensure students received the practice time needed to grow. We did note that those undergraduate trainees emerging from the virtual training, while conversant, did not display levels of leadership characteristics observed once the training was back to a face-to-face mode. However, UHD had not instituted the North self-assessment tool during this time period either. What we did learn and gain from this period of online PLTL was that this type of training can be used quite readily and with impact.

Early History at UHD

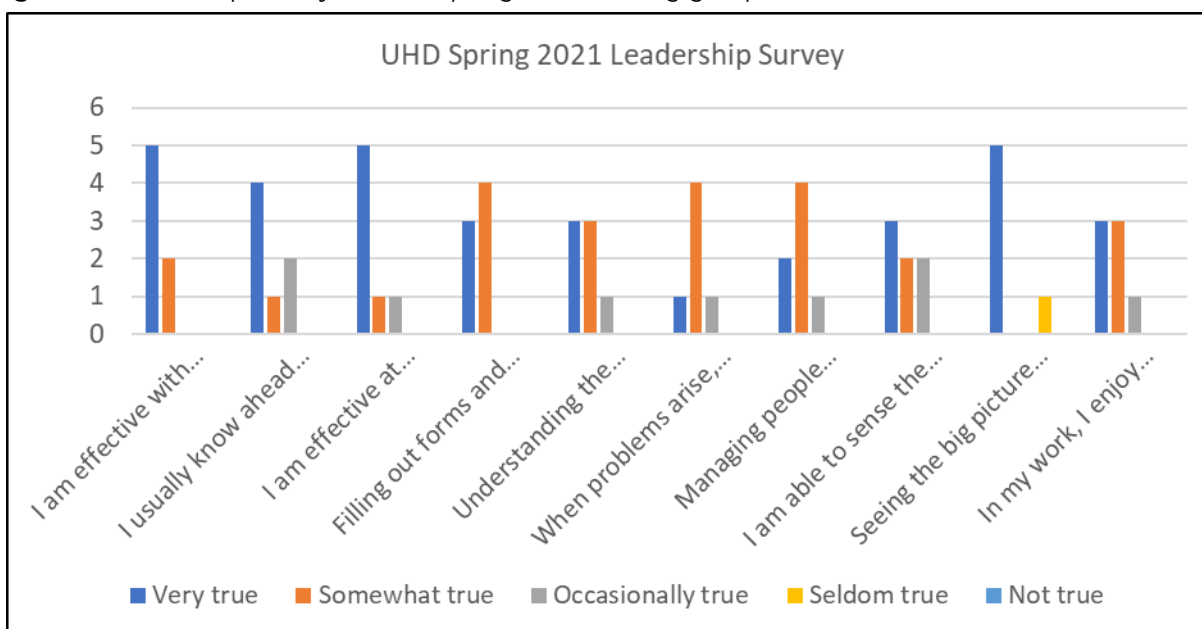
A Department of Education grant in 2013 followed by one in 2019 dedicated funding of the PLTL training sessions during academic semesters (2013) then added summers to its offerings (2019) with the explicit purpose to scale up the opportunities for any Scholars Academy member to be training in small group facilitating and gain leadership skill sets. In order to gauge leadership levels annually leadership questions are included in a post-semester survey which has been administered over the last 12 years. Additionally, as the PLTL training sessions have been supported through a grant program,

a leadership scale, developed by Northouse (2010), was made available for electronic use through Qualtrics in a post-survey manner to all who completed the PLTL training workshops. Converting the leadership survey in part or in whole allows multiple uses across activities associated with leadership development. While results must be utilized with caution, as the PLTL training model limits to any single training session the number to 8-10, results review three broad areas comprising leadership: 1) administrative; 2) interpersonal; and 3) conceptual. The Northouse survey is comprised of 18 questions categorized into the three broad areas previously outlined. There is a scale as well for users to determine individual strengths and weaknesses arising from the survey. Differences across each component of leadership determine strengths and weaknesses for the individual under training. Leadership example statements include effectiveness dealing with aspects of work, anticipating how people will respond to new ideas/proposals, effectiveness at problem-solving, and understanding the social fabric of the organization (See Figure 2 below).

Trainees reported self-perceived high levels of effectiveness with detailed aspects of their work (as leaders); knowing ahead of time how people will respond to their ideas; being an effective problem-solver; and seeing the big picture comes easily for them.

From fall 2020 to summer 2021 over 25 undergraduate STEM majors have been trained. 40% of these undergraduates represent minorities and 64% represent females. Given this rate of participation over the course of the grant funding the training almost 50% of the annual SA membership will be trained in PLTL thereby formalizing a leadership development process at UHD.

Figure 2. Leadership survey of 2021 Spring PLTL training group.



Other Methods of Assessing Leadership

As previously referenced, this paper used the self-report inventory developed by North (2010) suggesting development growth when participants accounted for their own behaviors in a pre and post fashion (See Figure 1.). An executive summary of an eight-year Kellogg Foundation funded project led by Zimmerman-Oster and Burkhard (2000) investigated leadership programs across colleges and universities suggesting in their findings that there were common practices and assessments used across many of the successful programs when methods and activities were reviewed. Some for example involved self-assessment reflections (some likert scales, some journal keeping). Some other activities included problem-solving and service learning such that experiences created provided self-direction, and engagement with a community agency with the collegian as the lead from the institution. The Leadership Practices Inventory (Kouzes & Posner, 2004) relies on self-report utilizing a likert scale model. Most importantly, this tool connects how one sees themselves as a leader according to the actions/behaviors taken. Leadership practices were seen as fitting into five models of exemplary practices/behaviors/actions. More specifically, 30 leadership behaviors comprise the areas of self-reflection then these fit into the areas of modeling the way, inspiring through shared vision, challenges the process, enabling others to action, and encouraging one's heart.

UHD, SA, and Leadership Development

Based on current demographics that Hispanics are likely to become the major ethnic group in Texas by 2030 there is a need for Texas to close the science education gap, recruiting more Hispanic students and other minorities into university STEM degree programs. A clear need exists for more minority undergraduate students across a broad natural sciences, computer and mathematical sciences, and engineering technology degree emphasis to enroll in and complete STEM degrees, thus lessening an educational attainment gap evidenced among minorities (Dugan & Komives, 2006). At UHD this includes all degree plans within the College of Sciences and Technology. The ultimate goal of increasing the pipeline of minority students, entering and completing the baccalaureate degree, is related to the need for 1) familiarity of the college experience, 2) pre-college academic support, 3) academic monitoring, 4) mentoring by STEM faculty and undergraduates already successful in the STEM arena, 5) broadened exposure to graduate and industry experts and opportunities, 6) research and career exposure, and 7) leadership development across STEM arenas through PLTL training (DOED MSEIP

awards #P120A130040; P120A190069, and #P120A230070). The importance of including PLTL workshop training into the awarded grants is vital to supporting the students in their quest for gains in leadership. Each student receives a stipend for training in PLTL once in their career at UHD. Trainees receive \$180 for the 11-15 weeks of training (whether face-to-face or virtual). The student PLTL trainer received \$240 per semester the training is offered. And the faculty expert in PLTL receives .5 summer month for running the training sessions. Does money have to be involved? Initially when UHD began offering the PLTL workshop trainings there were no grants with PLTL included as part of the objectives of the awards. As leadership assessment became involved with the PLTL workshop method, the value was began to be documented. Thus, a small stipend became attached to the training course. Of course, as grant awards go by the wayside, PLTL workshop still offers a purpose to the curriculum it supports and the students in training.

Because UHD is an urban MSI/HSI university located in the 4th largest metropolitan city in the U.S., the tiered leadership development provides an intentional, purposeful vehicle aimed to 1) support minority students seeking university degrees through this large university, 2) examine those leader/leadership tiers influencing STEM undergraduates college to career readiness enhancements, impact, and degree completion (baccalaureate and post-baccalaureate), and 3) create process and product knowledge for other universities, both minority-serving and other, to utilize in the support of education and leadership development positively influencing the changing demographic constituencies and leadership capacity of Houston, Texas, and the U.S.

Significance and the Future (Leadership in Employment)

The university experience is not just about acquisition of tremendous levels of content knowledge and in the case of STEM undergraduates, laboratory skill development. Collegians are expected to enter the workforce with communication skills, people soft skills, and teamwork skills to effectively and quickly transition into the workforce. Paying close attention to leadership development skillsets can enhance not only job acquisition, but longevity in the workplace as a valued member of the organizational team. Indeed Career Guide 2025 (retrieved from <https://www.indeed.com/career-advice/career-development/leadership-in-the-workplace>) discusses the top qualities of an effective leader within the workplace. Within the workplace leadership deals with the management or supervision of fellow employees. However, leadership also refers to the influence a worker/supervisor has on others in terms

of job performance. Effective leadership has the potential to impact decisions, actions, and workplace attitude in a positive manner. Positive morale more often equates to a positive working environment and a company ready for success. The qualities often connected to leadership in the workplace include communication, empathy, positivity, confidence, vision, responsibility, transparency, motivation, and humility.

References

- Blanchard, K. (2021). *A situational leadership approach to effective leadership*. The Ken Blanchard Companies. <https://resources.kenblanchard.com/blanchard-leaderchat/a-situational-approach-to-effective-leadership>.
- Blanchard & Hersey. (1969). *Hersey-Blanchard Situational Leadership Theory*. *Leadership-central.com: Where leaders expand and share their knowledge*. <http://www.leadership-central.com/situational-leadership-theory.html#axzz5l9Y8YMWw>.
- Burg, N. (2012). Reflections on leader training: peer-led team learning: Leader training. Online at <http://www.pltlis.org>. Originally published in *Progressions: The Peer-Led Team Learning Project Newsletter*, 1,(1), Fall 1999.
- Crossan, M., Gandz, J., & Seijts, G. (2012). Developing leadership character. *Ivey Business Journal*. <https://iveybusinessjournal.com>.
- Dalakoura, A. (2010). Examining the effects of leadership development on firm performance. *Journal of Leadership Studies, Direct*.
- Day, D. V. & Harrison, M. M. (2007). A multilevel, identity-based approach to leadership development. *Human Resource Management Review*, 17. 360-373 in ScienceDirect.
- Dugan, J. & Komives, S. (2006). Developing leadership capacity in college students: Findings from a National Study. ResearchGate. <http://www.researchgate.net>.
- Ferman, C. I. & Van Linden, J. A. (1998). *Youth leadership: A guide to understanding leadership development in adolescents*. Jossey-Bass.
- Gosser, D., Bartow, D., West, E. G., Strozak, V., Varma-Nelson, P., & Kampmeier, J. (2012). *The Peer-Led Team Learning Model: The six critical components*. Online at <http://www.pltlis.org>.
- Hathaway, R., Nagda, B., & Greggerman, S. (2002) The relationship of undergraduate research participation to graduate and professional education pursuit: An empirical study. *Journal of College Student Development*, 43(5).
- Johns Hopkins University. (2021). Student leadership development. <https://studentaffairs.jhu.edu/sli/student-leadership-development/>.
- Komives, S. R., Longerbeam, S. D., Owen, J. E., Mainella, F. C. & Osteen, L. (2006). Project Muse: A leadership identity development model: Applications from a grounded theory. *Journal of College Student Development*, 47(4), 401-418.
- Kouzes, J. M. & Posner, B. Z. (2004). *Leadership Practices Inventory - Self Report*. The Leadership Challenge, Wiley Brand. <http://www.leadershipchallenge.com>.
- Kuh, G. (2008). High-impact educational practices. <https://www.aacu.org/node4084>.
- Lopatto, D. (2004). What undergraduate research can tell us about research on learning. <http://www.web.grinnel.edu/science/ROLE/>.
- Lopatto, D. (2007). Undergraduate research experiences support science career decisions and active learning. *CBE Life Science Educ.* 6(4), 297-306.
- Lopatto, D. (2009). Science in solution: The impact of undergraduate research on student learning. *Research Corporation for Science Advancement*. *Science_in_solution_lopatto.pdf* (grinnell.edu).
- Micari, M., Gould, A., Knife, A., & Laninez, L. (2010). Becoming a leaders along the way: Embedding leadership training into a large-scale peer-learning program in the STEM disciplines. *Journal of College Student Development*, 51 (2), p218-230.
- Mogk, D. W. (1993). Undergraduate research experiences as preparation for graduate study in Geology. *NAGT*, 41, p126.
- Northouse, P. G. (2012). *Leadership: Theory and practice*. Sage Publications.
- Pearce, C. L., & Conger, J. A. (2003). *Shared leadership: Reframing the hows and whys of leadership*. Sage.
- Petri, N. (2014). Future trends in leadership development. Greensboro, NC: Center for Creative Leadership. Scientific Research: An Academic Publisher.
- Peer-led team learning. (2021). Peer-Led Team Learning. <https://pltlis.org/history>.
- Quitadamo, I. J., Braher, C. J., & Gregory, C. J. (2009). Peer-Led Team Learning: A prospective method for increasing critical thinking in undergraduate science courses. *Physical Therapy Faculty Publications*. 45. https://ecommons.udayton.edu/dpt_fac_pub/45
- Stanford LEAD Graduate Program (2021). Stanford LEAD Program. <https://online.stanford.edu/programs/stanford-lead-program>.

- UT Austin-Cockrell School of Engineering. (2021). Leadership development. <https://cockrell.utexas.edu/student-life/leadership-development>.
- Van Linden, J. A., & Fertman, C. I. (1998). *Youth leadership: A guide to understanding leadership development in adolescents*. Jossey-Bass.
- Zimmerman-Oster, K. & Burkhart, T. (2000). Leadership in the making: Impact and Insights from leadership development programs in U.S. Colleges and Universities. Executive Summary Kellogg Foundation. Eric Number: ED 446 577.

About the Author

Dr. Mary Jo Parker is currently a faculty member in the Natural Sciences department at University of Houston-Downtown. She also is Executive Director of the Scholars Academy, an academic unit in the College of Sciences & Technology supporting STEM majors through scholarships, a mentoring network system, broadening experiences, and professional assimilation experiences. She brings deep experience in proposal writing and grant awards implementation over a 16-year period in the area of STEM undergraduate education, student success and student matriculation into post-baccalaureate education. Further, she brings skill sets in nonprofit organization, educational technology, outreach experiences, strong understanding of underrepresented STEM, closing learning gaps, building career readiness, service-learning community engagement, and online learning.