Re-Operationalizing and Measuring "Impact" of a Leader Development Course

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This article re-operationalizes the term "impact" to evaluate success in the USAF Leader Development Course for Squadron Command (LDC). Literature is used to define impact in a three-part way: area of impact (what topics were most effective in instruction), level of impact (how topics will be applied in the future), and depth of impact (why the course was effective). Based on qualitative analysis of 379 surveys completed by students and their supervisors, findings revealed 10 top areas of impact. Seven topics were common between what students indicated had impacted them with what graduates reported actually applying post-graduation. Regarding level of impact, self, others, and unit were the top-rated categories of applying course content. The depth of impact was seen as being in an ecosystem of interconnectedness between the human microsystem (interactions with instructors, peers, and self) and six overlapping elements – the exosystem – that brought the student experience to life. The system of relationships is depicted in a new model called the "Student Experience Ecosystem" that may serve as a blueprint for designing similar courses. The study aids LDC revisions, informs development of similar programs in the academic community, and offers a holistic way to improve pedagogy in higher education.

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In 2018 the U.S. Air Force's (USAF) Air University initiated the Leader Development Course for Squadron Command (LDC) based on guidance from the Chief of Staff of the USAF and the results of an Air Force-wide study on morale and leadership culture, "Improving the Effectiveness of Air Force Squadron Commanders" (Ausink, Matthews, & Conley, 2018). The overall objective of the LDC is to develop future officers and civilians approaching positions of command/leadership with an emphasis on "human domain leadership skills" (USAF LDC Smart Card, 2019). The LDC is an eight-day intensive course consisting of lectures, seminars, and experiential events that builds human domain and leadership skills for students in Week One and then offers multiple methods to apply that knowledge in simulations, scenarios, and discussions during Week Two. The course culminates in an end-of-course immersive experience involving augmented reality scenarios, also called the Capstone Experience, and follow-on discussions on how to apply the knowledge and experiences to leading oneself and others in preparing for Squadron Command. There are no in-course assessments or grading/ranking structure. The incentive for student engagement with the content is strictly for students' own personal and professional growth.

All courses taught at Air University employ some kind of end-of-course assessment that is used to measure key areas for improvement, normally including learning objectives, student experience, content, delivery, and instructor effectiveness. The instructors of the LDC sought to go beyond the traditional assessments and develop a way to measure the impact of the course and to strengthen the student experience, which was seen as a key factor for course success. Hence, the real inquiry to be answered is, "What is the impact of the LDC?" How impact is measured is central to the primary research question. A follow-on inquiry is, "What needs to change, if anything, to strengthen the impact?" This study answers the two inquiries, or research questions, about impact and change.

Literature Review

Defining and measuring impact has become a mantra for evaluating contemporary leadership development programs (Ebrahim, 2013; Gugerty & Karlan, 2018; Keyte & Ridout, 2016; Martineau & Patterson, 2010). The challenge with measuring impact is two-fold. Foremost, defining what "impact" means is a somewhat controversial topic, as agreement must be made on what to measure and how to measure it (Diem & Nikola, 2005; Ebrahim, 2013; Gugerty & Karlan, 2018; Keyte & Ridout, 2016) and whether impact is even the right thing to measure (Ebrahim, 2013; Gugerty & Karlan, 2018). The second challenge involves designing the data collection process to answer the research questions with the right data collected (Collins & Holton, 2004; Keyte & Ridout, 2016) and deciding on which indicators to use from that data (Gugerty & Karlan, 2018; Robinson, Lloyd & Rowe, 2008).

Defining "Impact"

Impact is different from measuring output or outcome (Mills-Scofield, 2012; Stannard-Stockton, 2010; Walker, 2015). Whereas output is a count of what is done (often called activities), and outcomes are the measured effects or results of the outputs (the observed effects), impact is the link between the output and outcome, or "the degree to which outcomes are attributable to the activities" (Stannard-Stockton, 2010, p. 2). The linking of outcomes to activities must be identified and clearly explained (Mills-Scofield, 2012) or measuring impact is not feasible or not worth the effort expended (Gugerty & Karlan, 2018). The primary mission of the LDC is to teach students to thrive in command based on learning and applying specific leadership and human domain skills (LDC Smart Card, 2019). The eight course objectives are:

- Prepare for an inspired squadron command
- Build self-awareness and understand tendencies
- Develop a personal philosophy of command
- Understand the value of a peer network
- Align resources with strategy, mission, vision, and values
- Assess and improve command climate and organizational culture
- Value taking calculated risks and learning from mistakes
- Value critical thinking and values in decision making

So, the impact of the LDC could be best conceptualized as understanding the degree to which the course content resonated with students' most desired leadership and human domain skills and their intent on applying those skills in the future as related to command in a military unit. Additionally, ensuring an overall positive student experience is critical to all courses taught at Air University. Thus, in relation to the LDC, measuring impact would include three categories: the area of impact (what topics were most effective in instruction), the level of impact (how topics will be applied in the future), and the depth of impact (why the program was effective in terms of the student experience). These categories of impact are measured to uncover the link between the course output – students complete course content – and the outcomes, which are a 92.3% and 90.33% course approval rating by graduates and their supervisors, respectively, based off either a four or five star response to the question of how well the course met its stated mission "to equip and inspire Airmen to thrive in command". In order to understand these approval ratings – uniquely high for Air University courses – the intent of this study is to understand the initial links between course output *in toto* and the outcome of these approval ratings. This study does not attempt to link specific course activities to course learning objectives. The task of understanding why specific course content and activities impacted students will be a topic of future study.

Measuring "Impact"

Deciding how to measure impact is a fundamental step in any leadership development program (Martineau & Patterson, 2010) and, according to recent literature, is generally done in five to seven stages (Center for Creative Leadership, 2018; Gugerty & Karlan, 2018; Keyte & Ridout, 2016). The overlapping or agreed upon stages include narrowing the scope of what to measure and deciding the appropriate collection methods (Center for Creative Leadership, 2018; Gugerty & Karlan, 2018; Keyte & Ridout, 2016; Martineau & Patterson, 2010). The scope of what to measure includes how impact was defined earlier using three components: the area of impact (what topics were most effective in instruction), the level of impact (how topics will be applied in the future), and the depth of impact (why the program was effective in terms of the student experience).

Currently, the LDC course outcomes are assessed indirectly using participants' responses to end-of-course surveys coupled with additional data compiled from post-course follow-up surveys completed by course graduates and their supervisors. While Air University students generally expect to complete an end-of-course survey, they did not know ahead of receiving the post-course survey email that a second survey would be requested. A limitation to this study is that only the existing survey data could be used, and no additional data collection was allowed in order to prevent survey fatigue of students. While the data from the eleven 5-point Likert scaled questions provide various information and feedback on the course (e.g. course purpose, content, instruction, and most / least effective topics), three questions are most applicable in measuring impact. The answers to Question 7 ("What are the five most effective areas on instruction?") can be used to measure the area of impact, or what topics were most effective in instruction; the answers to Question 11 ("How do you plan on applying what you

learned in the course so far?") are best to measure the level of impact, or how topics will be applied in the future; and the answers to Question 9 ("What are the three things you liked most about the course and why?") can be used to measure the depth of impact, or why the program was effective in terms of the student experience. The new method of understanding impact as a measure of area, level, and depth is defined specific to the issue at hand: understanding impact in a leadership development course in the Air Force.

Methods

This study used a three-stage qualitative approach. The first stage of the methodology measured impact by coding responses to three questions in end-of-course critiques of five cohorts of students (N=288; Q7, n=279; Q9, n=278; Q11 n=269). Impact was measured using three components: the area of impact, the level of impact, and the depth of impact. The second stage of the methodology examined data collected from the post-course surveys sent to graduates (n=79) and their supervisors (n=31) of two courses after a three-month period. The third stage of the methodology compared the results in stage one and stage two to measure to what extent the learning outcomes were achieved.

Data Collection

Students electronically completed surveys via a link provided in a general email. The responses were aggregated for each question, allowing individual survey participants to be anonymous. Copies of the electronically-collected survey responses were provided to the researchers via email from the course director of the LDC. The researchers used only the responses to three questions from end-of-course surveys, specifically answers to question 7 (n=279 or 90.5% response rate), question 9 (n=278 or 90.2% response rate), and question 11 (n=269 or 87.3% response rate). Regarding the online post-course surveys, the researchers collected 79 responses (32.4% response rate) from three questions on the graduate survey and 31 responses (12.7% response rate) from two questions on the supervisor survey for analysis. The researchers speculate that the low post-course survey response rates are attributable to the course being new and relatively unknown, as well as to general organizational survey fatigue and a data collection cutoff decision that was made in order to proceed with the data analysis.

Data Analysis

For the first phase, analysis of the data collected was done using multiple coding cycles. The coding process was cumulative in nature, progressing from pre-coding to multiple coding cycles of exploring the data with codes and sub-codes and building categories and themes, followed by theoretical coding to help answer the research questions. For Question 7 ("What are the five most effective areas on instruction?"), 28 pre-codes were developed based on course subjects and learning themes. However, after the first coding cycle, 12 learning themes were dropped due to low significance (<5 occurrences in the data), and 10 additional codes were added due to separating course content into more specific topics, leaving 26 codes that were used for analysis. For Question 9 ("What are the three things you liked most about the course and why?"), eight pre-codes were increased to 14 because of six emergent codes. The final coding cycle combined several codes and reduced the number of codes to 11, which ultimately became themes to frame the concept of student experience. For Question 11 ("How do you plan on applying what you learned in the course so far?"), seven pre-codes were established which grew to 10 during the initial coding cycle; these were then re-organized into five primary codes with 11 sub-codes for the final coding cycle.

To address impartiality and positionality concerns, two qualified researchers collaboratively conducted the assessments using a simple coding structure based on course concepts and in-vivo coding that honored participants' own words and language choices (Merriam, 2009; Saldana, 2013) with emphasis placed on intercoder agreement and interpretive convergence (Bernard, Wutich, & Ryan, 2016; Saldana, 2013) in interpreting the data. Specific techniques for intercoder agreement and convergence were followed (Lombard, Snyder-Duch & Bracken, 2002) to ensure reliability in the coding process (Kolbe & Burnett, 1991; Lacy & Riffe, 1996; Neuendorf, 2002; Tinsley & Weiss, 1975). The intercoder agreement was 95% average for the three questions analyzed in the first methodological stage. Each of the two researchers separately coded all questions in one entire cohort (n=44) or 14% of all respondents, followed by shared coding of a second cohort (n=62) or 22% of all respondents. A second cohort of students was selected because of subsequent changes made in the course following the first cohort, making the second and subsequent cohorts more divergent with the first cohort than with each other. Each of the reliability coders – experienced researchers –

coded all three questions, which included multiple coding cycles. Two minor coding differences were found in applying sub-codes during the first coding cycle and one minor difference in interpretation of combining codes in the second coding cycle (pattern coding). The approximate amount of coding to reach a 95% agreement rate took roughly five hours. Disagreements were resolved through discussing and agreeing on the meaning of codes and re-checked during the second round of coding together. When turning categories into themes in the third coding cycle, the minor discrepancies were not a factor in the overall coding process.

For the second stage, the data from the online post course surveys were aggregated to protect respondent confidentiality. Responses and percentages were pulled directly from the aggregated answers. For graduates, responses to three of the nine questions on the survey were used. Question #4 was a scaling question asking graduates to provide their level of confidence in applying each learning outcome. Question #5 asked graduates to select the subject areas they had practiced/applied the most since returning home. Question #8 asked graduates to rate the LDC from one to five stars on how well the course met the mission to "equip and inspire Airmen to thrive in command". For supervisors, responses to two of the eight questions on the survey were used. Question #4 was a scaling question asking each supervisor to assess their graduate's abilities and attitudes relating to each of the eight learning outcomes. Question #7 asked supervisors to rate the LDC from one to five stars on how well the course met the mission to "equip and inspire Airmen to thrive in command."

Table 1
Area of Impact: Students Responses on Course Topics that were Most Effective

Course Concept/Topic	Frequency	Ranking
Know Yourself and Best Fit (personality types)	115	1
Clarity of Purpose	114	2
Know Your Team (personality & communication)	110	3
Capstone Experience	84	4
Cognitive Diversity	82	5
Creating a Culture of Trust & Empowerment	70	6
Air Force Culture and Climate	58	7
Leading a Squadron in Crisis	48	8
Values-Personal, Organizational and USAF	47	9
Coaching	43	10
Ethics, Legal, Justice, and Discipline	41	11
Commander Communication	34	12
Deliberate Development	33	13
Enlisted Force Distribution Panel	29	14

Negotiations for the Engaged Leader	28	15
Leadership Application	26	16
Energy Management and Human Performance	24	17
Leadership Staff Ride (Tuskegee or Rosa Parks)	18	18
Leading Through Failure	16	19
Squadron Commander's Perspective	15	20
Senior Officer/Wing Command Team Lesson	14	21
Squadron Leadership Case Study/Practicum	13	22
Decision Making	11	23
Human Performance and the Commander	9	24
Budget/Fiscal Readiness	7	25
Valor Workout/Road March	5	26

For the third stage involving comparing data, the analysis was framed by looking for overall trends, convergence, and divergence between what was collected at the end of the course with what was collected three months after the course. Results in stage one and stage two were examined in order to measure which course topics were actually utilized based on what topics students thought were most effective, the extent to which the course learning outcomes were achieved, and the number of stars assigned to how well the course met the mission to "equip and inspire Airmen to thrive in command."

Findings

The results or findings from the analysis are presented based on measuring impact using three questions from the end-of-course surveys, understanding impact using three questions from the graduate post-course surveys and two questions from the supervisor post-course surveys, and then comparing the data. The findings are then directly applied to the two research questions in the following discussion section.

Measuring Impact from the End-of-Course Surveys

In the end-of-course survey students were asked which topics they believed were the most effective in instruction, which the researchers understood as area of impact (see Table 1). Of the 279 of 308 respondents (90.5% response rate), the top ten areas of impact were: Know Yourself and Best Fit, Clarity of Purpose, Know Your Team, Capstone Experience, Cognitive Diversity, Creating a Culture of Trust & Empowerment, Air Force Culture and Climate, Leading a Squadron in Crisis, Values-Personal, Organizational and USAF, and

Coaching. The least reported areas of impact included Human Performance and the Commander, Budget/Fiscal Readiness, and Valor Workout/Road March.

Table 2 aggregates student responses to how they planned on applying what they learned in the course, which was understood as the level of impact. Of the 269 of 308 respondents (87.3% response rate), students reported that they planned on applying what was learned in the course in five categorical ways. The highest reported application was for self, specifically to better know oneself, for their own leadership, for future command, for self-reflection, and for developing a command philosophy

Table 2
Level of Impact: Students Responses on How Students Plan on Applying What They Learned

Category and Sub-Categories	Frequency	Ranking	Internal Ranking
For Self	151	1	
Knowing self	50		1
Own leadership	49		2
For future command	32		3
Self-reflection	24		4
Develop command philosophy	16		5
For/With Others	114	2	
Professional development of others	50		1
Generally, for others	36		2
Knowing others better	15		3
Peers	13		4
For Military Unit	72	3	
Squadron type organization	62		1
Unit other than squadron	10		2
Multiple Use	39	4	
At Home or Life in General	14	5	

Table 3
Depth of Impact: Students Responses on What They Liked Most About the Course

Reasons Why Students Liked the Course	Frequency	Ranking
Learning Environment/Atmosphere	118	1
Relevant Content/Subject Matter	97	2
Quality Faculty/Instructors	70	3
Learning from Peers	69	4
Delivery of Content/Quality of Instruction	43	5
Learning from Graduated Squadron Commanders	31	6
Allowed Time/Space for Self, Reflection, Introspection	30	7
Practicing/Applying what was Learned	25	8
Senior Leader/Wing Command Team Lesson	19	9
Networking	15	10
Teambuilding with Others in the Course	7	11

specifically. The second highest reported application of course content was for others, specifically to professionally develop others, for others in general, for understanding others better, and for peers. Application of course content for a military unit was the third reported category, with the squadron type unit as the primary focus as an organizational unit. Across the five categories and 11 sub-categories, the highest three areas of applying course content included a squadron type organization (62), knowing self (50), to professionally develop others (50), and for personal leadership.

Students were also asked in general terms what they liked most about the course, which was understood as depth of impact in terms of the student experience (see Table 3). Of the 278 of 308 respondents (90.2% response rate), the most liked aspects of the course were the learning environment/atmosphere, relevant content, quality instructors, learning from peers, and delivery of

content. During the final coding process of coding for themes and relationship of data, what emerged was a system of relationships between the 11 areas or reasons why students liked the course. The dynamics of the interconnectedness of the areas are explained in greater detail in the discussion section on answering research question one.

Understanding Impact from the Post-Course Surveys

In a follow-on survey 2–3 months after the course students were asked to rate their level of confidence in

Table 4

Level of Confidence in Ability to Do Each of the Eight Course Learning Objectives

	Completely Confident	Very Confident	Confident	Not Very Confident	Not at All Confident	Total
Thrive in Command	23.08%	57.69%	19.23%	0.00%	0.00%	78
	18	45	15	0	0	
Build Self-Awareness and	34.62%	56.41%	8.97%	0.00%	0.00%	78
Understand Tendencies	27	44	7	0	0	
Develop a Personal Philosophy of	42.31%	47.44%	8.97%	1.28%	0.00%	78
Command	33	37	7	1	0	
Utilize Your Peer Network	47.44%	43.59%	7.69%	1.28%	0.00%	78
	37	34	6	1	0	
Align Resources with Strategy,	32.47%	48.05%	19.48%	2.60%	0.00%	77
Mission, Vision, and Values	25	37	15	2	0	
Assess and Improve Command	29.87%	48.05%	19.48%	2.60%	0.00%	77
Climate and Organizational Culture	23	37	15	2	0	
Take Calculated Risks and Learn	37.66%	54.55%	7.79%	0.00%	0.00%	77
From Mistakes	29	42	6	0	0	
Think Critically and Consider Values	48.72%	47.44%	2.56%	1.28%	0.00%	78
in Your Decision Making	38	37	2	1	0	

their ability to do each of the eight course learning objectives (see Table 4). Across all eight learning objectives, graduates reported extremely high confidence levels – ranging between 97.40% to 98.72% – that combined very confident and completely confident. The objectives with the highest combined percentages of completely confident and very confident were thinking critically (96.06%), taking calculated risks and learning from mistakes (92.61%), building self-awareness (91.03%), utilizing peer network (91.03%), and developing a personal philosophy of command (89.75%). The lowest levels of confidence were reported for the objective of assessing and improving command climate and organizational culture. This data set serves as one of the course outcomes,

specifically that students generally have strong confidence in their abilities to execute the course learning objectives. Seven students rated themselves as "Not Very Confident," however it is unclear whether this is attributable to the course making those students aware of new blind spots, to the course neglecting to elevate students' confidence where they previously felt unconfident, or to some other reason. It is unclear to what degree students' self-assessments of their confidence in these eight areas is attributable to course content; for this reason, the researchers have modified this question set for future surveys.

The survey asked graduates to indicate which course topics and/or skills they had actually practiced since graduating from the course as a data set to drive deeper

analysis of area of impact (see Table 5). Of the 79 of 244 respondents (32.4% response rate), the top ten course subjects that graduates practiced since graduating from the course were: Know Yourself and Best Fit, Clarity of Purpose, Decision Making, Culture and Climate, Know Your Team, Deliberate Development, Creating a Culture of Trust & Empowerment, Accountability, Cognitive Diversity, and Values-Personal, Organizational and USAF. Graduates were then asked to rate the level to which they felt the course met the mission "to equip and inspire Airmen to thrive in command" on a scale of 1–5 stars. Of the 78 graduates that responded to the question, 72 (92.30%) rated the course with four stars or more with 41 (52.56%) rating the course as five stars. This data set also serves as one of our course outcomes, specifically that students have very high confidence that the course met its overall mission. This question is asked after all Air University professional development courses and does not typically return such high remarks, suggesting that the high approval is authentic and is not based on any desire to please the authority figures (instructors). Yet, we cannot totally discount the potential for highly positive response rates due to the positive relationships between instructors and students.

Follow-on surveys were also sent to graduates' supervisors 2–3 months after course completion which asked them to rate changes in their confidence in their graduates' ability to do each of the eight course learning objectives (see Table 7). Across all eight learning objectives, supervisors reported being more positive to much more positive (ranging from 64.51% to 90.32%) of the graduates' abilities relating to the eight learning objectives than they were before they took the course. The objectives with the highest level of positivity were inspired to thrive in greater leadership role or command (90.32%), ability to think critically (87.10%), ability to develop their own personal philosophy of command (80.65%), and being self-aware and *understanding interpersonal communication tendencies (80.64%).*

The survey then asked supervisors to rate how they felt the course met the mission "to equip and inspire Airmen to thrive in command" on a scale of 1–5 stars. Of the 31 supervisors that responded to the question, 28 (90.33%) rated the course with four stars or more with 13 (41.94%) rating the course as five stars. This data set serves as another one of the course outcomes, specifically that students' supervisors have very high confidence that the course met its overall mission.

Table 5
Course Concepts/Skills Practiced by Graduates

Course Concept/Skill	Frequency	Ranking
Know Yourself and Best Fit	48	1
Clarity of Purpose	46	2
Decision Making	45	3
Culture and Climate	42	4
Know Your Team	42	5
Deliberate Development	39	6
Creating a Culture of Trust & Empowerment	37	7
Accountability	35	8
Cognitive Diversity	34	9
Values-Personal, Organizational and USAF	33	10
Negotiations for the Engaged Leader	30	11
Commander Communication	28	12
Leading Through Failure	25	13
Energy Management and Human Performance	25	13
Ethics, Legal, Justice, and Discipline	23	14
Fitness Activities	23	14
Innovation	23	14
Coaching	17	15
Human Performance and the Commander	17	15
Senior Leader Perspective	16	16

Budget/Fiscal Readiness	13	17
Capstone Experience	10	18
Senior Noncommissioned Officer Perspective	10	18
Leading a Squadron in Crisis	4	19
Leadership Staff Ride (Tuskegee or Rosa Parks)	1	20

Table 6
Graduates' Star Rating of How Well the Course Met the Stated Mission

Star Rating	Respondents	Percentage
5 Stars	41	52.56%
4 Stars	31	39.74%
3 Stars	3	3.85%
2 Stars	0	0
1 Star	3	3.85%

Table 7
Supervisors' Rating of Graduates Abilities/Attitudes to Do Course Learning Objectives

	Much More Positive	More Positive	Neither More Nor Less Positive	Less Positive	Much Less Positive	N/A; Not Observed	Total
Inspired to Thrive in Greater Leadership Role or Command	16.13% 5	74.19% 23	9.69% 3	0.00% 0	0.00% 0	0.00% 0	31
Self-awareness and Understanding interpersonal Communication Tendencies	19.35% 6	61.29% 19	19.35% 6	0.00% 0	0.00% 0	0.00% 0	31
Ability to Develop their Own Personal Philosophy of Command	25.81% 8	54.84% 17	16.13% 5	0.00% 0	0.00% 0	3.23% 1	31
Value their Peer Network	19.35% 6	45.16% 14	29.03% 9	3.23% 1	0.00% 0	3.23% 1	31
Ability to Align Resources with Strategy, Mission, Vision, and Values	16.13% 5	54.84% 17	25.81% 8	0.00% 0	0.00% 0	3.23% 1	31
Ability to Assess and Improve Team/Command Climate and Organizational Culture	32.26% 10	41.94% 13	25.81% 8	0.00% 0	0.00% 0	0.00% 0	31

Attitude Toward Taking Calculated Risks and Learning from Mistakes	16.13% 5	54.84% 17	29.03% 9	0.00% 0	0.00% 0	0.00% 0	31
Ability to Think Critically and Consider Values in their Decision Making	25.81% 8	61.29% 19	12.90% 4	0.00% 0	0.00% 0	0.00% 0	31

Comparing Data

Data was compared in three different ways. The first comparison used student responses in the end-of-course survey and graduate responses in the post-course surveys. The second and third comparisons viewed how graduates and supervisors assessed outcomes and how they rated the course using stars in the end-of-course survey. Table 9 compares the topics students found most effective in the end-of-course surveys with the topics they actually reported practicing in the post-course surveys. This comparison is made to draw data to help determine whether the topics that students report being impacted by immediately after the course are, in fact, being utilized once they return to their organization, thus meeting the LDC mission "to equip and inspire Airmen to thrive in command" as well as the eight course learning objectives.

Seven topics were common between what students indicated had impacted them with what graduates reported actually applying once they returned: Know Yourself, Clarity of Purpose, Know Your Team, Cognitive Diversity, Creating a Culture of Trust & Empowerment, Culture and Climate, and Values. The common categories between the two groups are highlighted in the table below. Three topics that joined the list of course topics actually practiced included Decision Making, Deliberate Development, and Accountability. Decision Making rose from a ranking of #24 on the most effective list to #3 on the actually practiced list. The topic that fell the farthest in the rankings from most effective to actually practiced, from #4 to #18, was the Capstone Experience, which was more of an experiential activity that allowed students to utilize numerous course concepts and was less of a topic and more of an event. The topic that fell the second most in ranking, from #8 to #18, was Leading a Squadron in a Crisis, perhaps because the respondents had not actually experienced a crisis. Coaching fell from #10 to #15, most likely because students may not have yet had an opportunity to practice the coaching concepts learned in the course.

Table 10 shows to what extent the course learning objectives were achieved or assessed by graduates and supervisors in the post-course survey. Graduates reported a higher confidence of their ability to achieve the eight course learning objectives than the supervisors reported. For graduates, the objectives with the higher percentages were thinking critically (1st), taking calculated risks and learning from mistakes (2nd), and tied for 3rd were building self-awareness and utilizing the peer network. For supervisors, the objectives with the higher percentages were inspired to thrive in greater leadership role or command (1st), thinking critically (2nd), and developing a personal philosophy of command (3rd).

Table 11 compares the number of stars assigned by graduates and supervisors for how well the course met the mission to "equip and inspire Airmen to thrive in command". A higher percentage of graduates gave five stars to the course, where a greater percentage of supervisors gave four stars. Collectively, 91.31% of graduates and supervisors gave four or five stars.

Discussion

The discussion of the results is presented in two parts. Part one answers the first research question, "What is the impact of the LDC?," using the responses to three questions on end-of-course surveys and the answers to post-course surveys by graduates and their supervisors. Part two addresses the second research question, "What needs to change, if anything, to strengthen the impact?" based on analysis of the responses in relation to course content and course objectives.

Answering Research Question #1: What is the impact of the LDC?

The top ten areas of impact from the end-of-course surveys were: Know Yourself and Best Fit, Clarity of Purpose, Know Your Team, Capstone Experience, Cognitive Diversity, Creating a Culture of Trust & Empowerment, Air Force Culture and Climate, Leading a Squadron in Crisis, Values-Personal, Organizational and USAF, and Coaching. Seven of these topics were consistent with results from the post-course surveys.

The seven topics that were common between what students felt was most effective and what graduates reported that they actually applied: Know Yourself, Clarity of Purpose, Know Your Team, Cognitive Diversity, Creating a Culture of Trust & Empowerment, Culture and Climate, and Values.

Table 8
Supervisors' Star Rating of How Well the Course Met the Stated Mission

Star Rating	Respondents	Percentage
5 Stars	13	41.94%
4 Stars	15	48.39%
3 Stars	3	9.68%
2 Stars	0	0
1 Star	0	0

Table 9
Comparing the Topics Students Found Most Effective and What They Actually Practiced

End-of-Course Topics	Ranking	Post-Course Topics	Ranking
Know Yourself and Best Fit	1	Know Yourself and Best Fit	1
Clarity of Purpose	2	Clarity of Purpose	2
Know Your Team	3	Decision Making	3
Capstone Experience	4	Culture and Climate	4
Cognitive Diversity	5	Know Your Team	5
Creating a Culture of Trust & Empowerment	6	Deliberate Development	6
Air Force Culture and Climate	7	Creating a Culture of Trust & Empowerment	7
Leading a Squadron in Crisis	8	Accountability	8
Values-Personal, Org and USAF	9	Cognitive Diversity	9
Individual Coaching one-on-one	10	Values-Personal, Org and USAF	10
Deliberate Development	13	Individual Coaching	15
Accountability	18	Capstone Experience	18
Decision Making	24	Leading a Squadron in Crisis	19

Table 10
Comparison of Objective Assessments by Graduates and Supervisors

Course Learning Objective	Graduates		Supervisors	
	Completely Confident and Very Confident		Much More Positive and More Positive	
Inspired to thrive in greater leadership role or command	80.77%	5th	90.32%	1st
Build self-awareness and understanding of personal tendencies	91.03%	3rd	80.64%	4th
Develop a personal/individual philosophy of command	89.75%	4th	80.65%	3rd
Utilize own peer network or value peer network	91.03%	3rd	64.51%	8th
Align resources with strategy, mission, vision, and values	80.52%	6th	70.97%	7th

Assess and improve organizational climate and culture	77.92%	7th	74.20%	5th
Take calculated risks and learn from mistakes	92.61%	2nd	70.97%	6th
Think critically and consider values in decision making	96.06%	1st	87.10%	2nd

Table 11
Comparison of Star Ratings of the Course by Graduates and Supervisors

	Graduates		Supervisors	
Star Rating	Respondents	Percentages	Respondents	Percentage
5 Stars	41	52.56%	13	41.94%
4 Stars	31	39.74%	15	48.39%
3 Stars	3	3.85%	3	9.68%
2 Stars	0	0	0	0
1 Star	3	3.85%	0	0

Regarding level of impact, self, others, and unit were the top-rated categories of applying course content. Of the 11 sub-categories of applying course content, the levels with the highest ranking included applying what was learned to a squadron-type organization (62), knowing self (50), to professionally develop others (50), and for personal leadership (49). These levels of impact are consistent with the learning objectives and the mission of the LDC, although students taking course content back to their organizations and using it to deliberately develop others was not a stated course objective but not an undesired development either. To the contrary, their interest in teaching course content to others is yet another indication that students find the course content relevant and important.

Depth of impact was the most intriguing and interesting area in the study. The five most liked aspects of the course were the learning environment/atmosphere, relevant content, quality instructors, learning from peers, and delivery of content. In reading the qualitative remarks from students in the end-of-course surveys, a positive "student experience" was a concept that was continuously used to describe students' strong liking, support, and praise for the course. Moreover, the responses indicated that the student experience was a large reason why they opened themselves up and invested personally into the course and therefore got more out of it. While the student was at the center of the "student experience', it seemed that the learning environment contained all of the other layers that added depth to the students' experience of the course.

Students positively experienced aspects of the course through others (humans) that contained the greater human domain of elements. Students positively experienced the delivery of relevant course content, immediate application of course content, and networking through the instructors and senior leaders. Especially prominent in students' qualitative comments on surveys was the teaming of military instructors who were successful squadron commanders with civilian instructors who were experts due to senior leadership experiences, some including graduated commanders and leaders from the corporate arena, or because their educational background included doctoral work in leadership, education, mental health, and history. The collaborative approach to teaching proved significant in student assessments and is supported in key literature that discusses frameworks for collaborative teaching (Friend, 2017; Friend & Cook, 2007; Mason & James-Burga, 2019). Students positively experienced learning from others, teambuilding, and networking through their peers in the course, especially in their small groups or seminars. Students positively experienced personal growth, self- reflection and introspection, learning from others, and learning content through a self or personal lens.

In aggregating the reported elements of positive experience that provided depth of impact for students, the data points to a complex web of interconnected elements consisting of interactions with both humans and the learning environment more broadly. Urie Bronfenbrenner's Bioecological Model of Human Development provides a useful theoretical framework

for organizing the various elements that comprised what students reported as the "student experience" (Bronfenbrenner, 1979; 2005). Bronfenbrenner's model links the various levels and layers of interactions and influences that comprise the environment of human development, beginning with the microsystem (immediate interactions with the individual) and progressing outward through the mesosystem (interactions between elements of microsystem), exosystem (elements that affect structures within the microsystem), macrosystem (dominant beliefs and ideologies affecting the environment), and chronosystem (how the individual and environment change over time). Bronfenbrenner's model therefore provides a model to aid in understanding and visualizing the student experience.

See Figure 1 for the diagram depicting the Student Experience Ecosystem, or how the depth of impact relates to the greater system of interconnectedness between the human micro interactions (instructors, peers, and self) and the exosystem of six overlapping elements that brought the student experience to life (delivery of relevant course content, immediate application of course content, networking, teambuilding, learning from others, and self-reflection/introspection). Learning and delivery of relevant course content along with the benefits of the course were experienced through the interactions with quality instructors/senior leaders, peers, and self. By aggregating the students' own words and feedback we can construct the ecosystem that defined their collective interaction with the course content and learning experience. This ecosystem comprises the link between course outputs (content) and outcomes (positive student growth and development), enabling the greater study of measuring impact.

Figure 1
The Student Experience Ecosystem
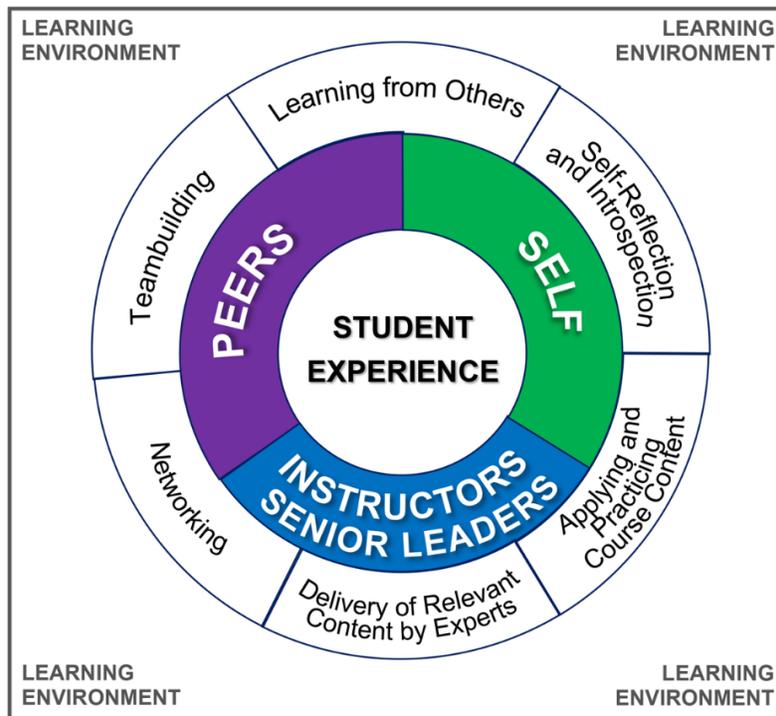
Answering RQ #2: What needs to change, if anything, to strengthen the impact?

Based on analysis of the findings, ten recommendations are presented to strengthen the overall impact of the course. Recommendations 1–5 focus on strengthening the *area of impact*; 6–8 focus on strengthening the level of impact; and recommendations 9–11 are aimed at strengthening the depth of impact.

1) Increase emphasis on topics that the graduates are using more after the course like decision making and deliberate development.

2) Revise coaching to having students practice coaching techniques more than just receiving coaching from an instructor.

3) Conduct additional analysis comparing content delivery methods and instructional activities for the areas of higher impact (i.e., find what is working well) and revamp areas of lower impact to incorporate those best practices.

4) If revamping produces no significant increase in impact, consider replacing lower-rated topics with more time to practice and apply new information.

5) Consider discussing course objectives with students in ways that are more meaningful – partially because the findings showed differences of assessments between graduates and supervisors, utilizing peer network and taking risks.

6) Consider ways to deepen the level of self-learning, especially regarding leadership and personality.

7) Consider increasing additional time and activities for self-reflection.

8) Consider increasing emphasis on professional development of others.

9) Continue with the current program format and make minor course corrections based on end-of-course surveys and instructor feedback that strengthen the student experience.

10) Consider emphasizing to students what supervisors believe to be positive about graduates and the course.

11) Ensure the same high caliber of instructors for the long-term future, especially the graduated Squadron Commanders and civilian faculty.

Limitations and Concerns

The limitations to the study are few, and steps to mitigate them must be addressed. The first limitation involves only using the data provided by the course critiques with no follow-up interviews conducted to further understand the data. No personal identifying information of participants was provided to the researchers, so only the data collected via surveys was available. The second limitation is the use of two coders and the inter-rater reliability in the coding process, but training and inter-rater agreement were conducted before and during the data interpretation stage. The positionality of the researchers is present as both are civilian faculty hired by the U.S. Air Force and instructors of the course under study, but in recognizing the potential influence of positionality, the concern and potential limitation were addressed in a deliberate way. The final concern involves the process of redefining the concept of impact, largely due to entering into new conceptual ground, but this limitation was accepted as there was no current definition in relation to the program being evaluated. The very nature of the inductive, qualitative approach required re-operationalizing impact as a key stage in the three-part methodology.

Implications and Further Research

The impact of this study provides a framework for re-operationalizing the concept of "impact" in leadership development programs, as well as informing future changes to the overall course design, data collection process, faculty development program, and specific change recommendations to course content and structure. Future study can implement this framework for measuring impact in other professional development courses inside and outside the armed forces to help streamline course content with achieving course objectives. Moreover, the Student Experience Ecosystem provides a way to organize and understand the positive student experience that can be used to inform and consult other professional development courses to enhance the student experience and impact of their content on students. Future study will expand the ecosystem model with analysis of additional course aspects that contribute to the overall student experience (logistics, food/snacks, support staff, travel days, etc.). Continued study is warranted as the USAF continues to invest in, and improve, leadership development of its future leaders and commanders.

Conclusion

Using students' end-of-course surveys and post-course surveys completed by graduates and their

supervisors, this study re-operationalized the concept of "impact" as having three main components. Measuring the area of impact (what topics were most effective in instruction) resulted in six highest rated areas that included Know Yourself, Clarity of Purpose, Know Your Team, Capstone Experience, Cognitive Diversity, and Creating a Culture of Trust and Empowerment. Measuring the level of impact (how topics will be applied in the future) resulted in three primary levels of impact that included application of course content for self, for others, and for the respondents' military unit. Measuring the depth of impact (why the program was effective in terms of the student experience) resulted in identifying a new conceptual model, the *Student Experience Ecosystem*, that depicted the student experience as the interconnected relationships of delivery of relevant content, application of course content, networking, teambuilding, learning from others, self-reflection, and introspection as seen thru the lenses of learning from quality faculty, learning from peers, and self-learning. This unique multi-layered depth of the student experience remained strong after course completion as both graduates and their supervisors reported high levels of effectiveness of course content along with high positive growth in the leadership of graduates. Overall, the results from the study contributed to recommendations for program improvements, for greater impact on strengthening the student experience, and for aiding the USAF in the future Quality Enhancement Plan (QEP) for the LDC.

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