GOING VIRTUAL

Evolution of the Student Experience Ecosystem (SEE) Model to the SEE Model 2.0 and the Virtual (vSEE) Model

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About the Authors

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Abstract

This paper examines how a faculty team reimagined and redesigned an in-person leader development course to a virtual version, updated the existing Student Experience Ecosystem (SEE) Model to the SEE Model 2.0, and created the virtual, or vSEE, Model. Using the Design Thinking Framework for Innovation (DTFI) and action research methods, a new virtual course was imagined, designed, tested, and improved over a six-cycle-process. Using a multiphased, qualitative study, data was collected via multiple sources from 121 participants (19 faculty/staff and 102 students) and analyzed using manual coding and NVivo software. Results are organized into 22 categories under four themes (general course design, student experience, instructor experience and faculty development, and technology experience), showing a progressive refinement with key lessons learned that led to the final creation of the new virtual course and development of the SEE Model 2.0 and vSEE Model. The application of the DTFI using action research methods produced results and lessons learned in the design process that contribute to the theory and practice on teaching in a virtual learning environment. The study fills a gap in the scholarly field and informs other institutions on the process, failures, and successes of course redesign to a virtual version.

Keywords: design thinking process for innovation, student experience ecosystem, virtual learning environment, United States Air Force, leader development

Introduction

From 2018 to 2020, the US Air Force Leadership Development Course (LDC) was delivered in a classroom environment using a range of pedagogy/andragogy. The eight-day course of lectures, seminars, and experiential events builds skills associated with leading others in a military context (e.g., knowing self, establishing climate and culture, values-based decision making, negotiation skills, building effective teams, dealing with conflict, administering discipline and justice, physical fitness events, and coaching). The overall course objective is to "improve leader development of officers and civilians approaching command selection in order to sharpen and focus leadership skills to achieve mission success through high-performing teams."[1] LDC received exceptionally high marks by students in end-of-course critiques and in post-course surveys sent to graduates/supervisors.[2]

Due to Covid-19, LDC was halted for two months while USAF developed guidance and procedures to safely teach in person, and when higher leadership ultimately suspended nonessential travel for the foreseeable future, LDC faculty, like so many other educators in 2020, faced the task of going virtual. The problem was how to transition an in-residence course to a virtual LDC (vLDC) that would capture a similar experience in an interactive, experiential, and relational learning environment under pandemic realities while continuing to achieve course outcomes and learning objectives in the cognitive, affective, and behavioral domains. This research blends lessons learned from recent literature and expands on the previously developed Student Experience Ecosystem (SEE) Model.[3] An updated model, or the SEE Model 2.0, and a virtual version of the model, the vSEE Model, were developed based on the results of the study. Three research questions guided this study:

RQ 1: To what extent can the SEE Model for in-resident learning environments be updated based on student and instructor input?

RQ 2: How does the SEE Model apply to teaching a vLDC?

RQ 3: What lessons learned and recommendations can be taken from this study to inform other programs and educators going virtual?

Literature Review

Few studies examine revised models that integrate both learning (student-oriented) and teaching (instructor-focused) to deliver an experience that

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1. Leadership Development Course, *LDC Smart Card*; and Ausink, Matthews, Conley, and Lim, *Improving Effectiveness of Air Force Squadron Commanders*.
2. Hinck and Davis, "Re-Operationalizing and Measuring 'Impact' of a Leader Development Course."
3. Hinck and Davis.

deeply connects the cognitive and affective domains in an online or virtual environment in a way that builds and sustains relationships for improved learning.[4] In addition to a focus on student learning, instructor experiences in the classroom are an important tool to understand and leverage the larger framework of the learning environment.

There is not enough attention devoted to the affective zone of learning that connects the head with the heart for students.[5] When instructors are more authentic, competent, and positive, they connect more effectively with students, which improves student learning and positive learning experiences.[6] With the forced transition to virtual learning due to COVID-19, many instructors had to move beyond traditional methods of instruction to recreate positive learning environments in the virtual world. Moving from a traditional in-person course to a virtual version can be done, but it must be structured. As advocated for in research fields, the Design Thinking Process for Innovation (DTPI) and action research methods provided such a framework.[7] Action research has shown positive correlation with helping practitioners reflect in action that provides positive emotions in their work.[8]

Toward that aim of providing positive online learning experiences, instructors should humanize the course and make opportunities for interactions between students and co-learning opportunities, create choice options, and increase interactive communications, such as phone, texts, chats.[9] Two studies provided ways for instructors to create a learning experience for students that connects the heart and head: being oneself, scaffolding learning activities, modeling the behavior expected of students, giving examples connected to content, and making the class an inviting, pleasant place to be create a more accepting environment;[10] compassionately understanding students' electronic practicalities that limit learning aids in creating an experience that goes beyond the cognitive zone.[11] Technology equity may be a factor, and

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4. Roeser, "Educating the Head, the Heart, and the Hand"; Gazibara, "'Head, Heart and Hands Learning"; Lisciandrello, "The 3 Styles of Effective Teaching"; and BELE Network, "Remote Learning with the Head and the Heart."

5. Brown, "Developing Stronger Teacher-Student Connections."

6. Meyer, "Three Powerful Teaching Strategies."

7. Beckman and Barry, "Innovation as a Learning Process"; Dunn, "Implementing Design Thinking in Organizations"; Liedtka, "Innovative Ways Companies Are Using Design Thinking"; Tschimmel, "Design Thinking as an Effective Toolkit"; Inoue, *Mirrors of the Mind*; Inoue, *Psychology of Action Research*, 20; Stringer, *Action Research*; and Torbert, Fisher, and Rooke, *Action Inquiry*.
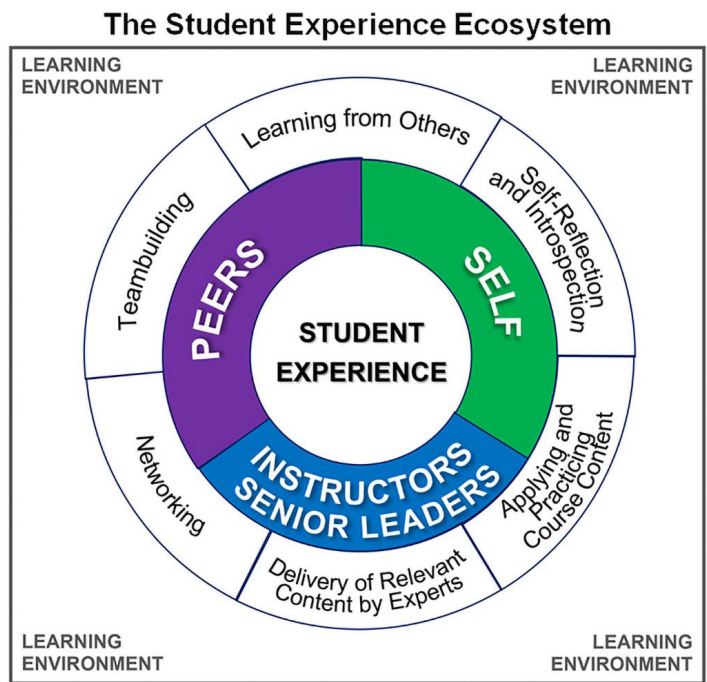
8. Amble, "Reflection in Action."

9. Bouchrika, "10 Top LMS Trends"; Movchan, "Why Do We Need Data"; and Willis, "How Virtual Teaching Changed."

10. Darby, "How to Be a Better Online Teacher."

11. Kamenetz, "'Panic-gogy': Teaching Online Classes."

connecting with students becomes even more challenging due to potential lack of presence and interruptions in the home learning environment.[12]

Source: Hinck and Davis, *"Re-Operationalizing and Measuring 'Impact of a Leader Development Course."*

Figure 1. The Student Experience Ecosystem

In the transition to a virtual course offering, LDC staff held the SEE Model at the center of focus in thinking about how to design a course with the best possible student experience (see figure 1). The SEE Model was developed based on a year-long research effort with 379 participants in LDC to understand why the course consistently received exceptionally high student feedback, with comments like "this is the best training I have received in my 16 years as an officer" and "this isn't a course; it is an experience." In this model, the student experience—or how students interact with, engage, and learn from and within the learning environment—depends upon coupled factors described as a "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

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12. Heubeck, "Virtual Teaching."

from others, and self-reflection/introspection)."[13] The varied microinteractions and exosystem outlined in the SEE Model created a learning environment that encouraged interpersonal connection and vulnerability for exploration of self and others and provided students with a variety of methods, opportunities, and modes to ensure every student had ample ways to explore and apply course content in ways that were meaningful to them. This was determined through several iterations of coding and categorizing student feedback in the end-of-course surveys from five cohorts of academic year 2018 students (N=288) and is explained in more detail in the methods section.[14]

LDC is a leadership course focused on squadron-level human-domain competency conducted over eight days (67 contact hours) in a seminar-based, in-residence course taught at Maxwell Air Force Base in Montgomery, Alabama. The instructor cadre are graduated squadron commanders (rank of lieutenant colonel), graduated superintendents (rank of senior master sergeant or chief master sergeant), and civilian academic experts, further augmented by volunteers from the Judge Advocate School, First Sergeant Academy, Chief's Leadership Academy, and Air Force Chaplain Corps College instructors. Retired general officers and current wing command teams provide advice and mentoring for half of the programmed contact hours. The student population represents part of the larger Air Force personnel and includes officers with 9–16 years commissioned service, GS-13–equivalent civilians, E–7 to E–9 senior enlisted leaders, and lead volunteer spouses—all selected by their unit's leadership chain based on quotas allocated to senior leadership levels. Before COVID-19 restrictions, LDC's annual throughput was 15 classes totaling 980 students per year. Like many educational courses, LDC revamped the course to the virtual environment, and this study captures some of the lessons learned.

Before and during COVID-19, several studies recommended teaching strategies that aid in online teaching to enable teachers to connect with students for optimum content and delivery.[15] From those sources, the top 20 recommendations regarding student connection and content delivery are provided below:

Recommendations to connect with students:

    1. Be authentic/yourself.

13. Hinck and Davis, "Re-Operationalizing and Measuring 'Impact' of a Leader
14. Hinck and Davis, 429–31.
15. Brown, "Developing Stronger Teacher-Student Connections"; Heubeck, "Virtual Teaching"; Hinck and Davis, "Re-Operationalizing and Measuring 'Impact' of a Leader Development Course"; Kamenetz, "'Panic-gogy': Teaching Online Classes"; Knowles, *The Modern Practice of Adult Education*; Meyer, "Three Powerful Teaching Strategies"; and Movchan, "Why Do We Need Data."

2. Be confident.

3. Be a champion.

4. Be graceful about their challenges/put yourself in their shoes.

5. Be clear in expectations (pre-work, presence, items 1–4, etc.).

6. Practice collective accountability.

7. Make the class/seminar a pleasant place to be where people WANT to come.

8. Humanize. Reach out and connect in different ways that engage all learning styles and preferences, ensure introductions are given priority, and explain new technology.

9. Embrace a strengths-based approach: get to know students and their strengths and interests.

10. Make emotional deposits: these can take on many forms, from compliments, smiles, and high fives to attending students' extracurricular activities, writing personal notes, or simply making time for meaningful conversations.

Recommendations for optimum content/delivery:

1. Do less, but with greater quality and meaning.

2. Organize course content intuitively.

3. Add visual appeal/make content visually appealing.

4. Build learning activities based on a standard structure.

5. Ensure experiential AND engage all learning modes/styles and domains of learning.

6. Teach holistically.

7. Have fun! Laugh! Show emotions!

8. Have choice options to empower students to take ownership of their own learning.

9. Create cooperative learning and enable interactive communication.

10. Choose the LMS (learning management system) or online platform that will fit or accentuate your learning objectives with/for students.

These studies and guidance, along with the SEE Model, is what guided the researchers in designing and framing the study.

Methods

The research design was a three-phased mixed-methods study with 1,103 total participants from 20 iterations of the Leader Development Course. Participants, data collection, and data analysis varied in each of the phases.

Participants

Phase 1 spanned nine in-person LDC iterations (May 2019–February 2020) and examined descriptive data and qualitative remarks from students' end-of-course surveys (n=521) and answers from instructors (n=8) during three focus groups.
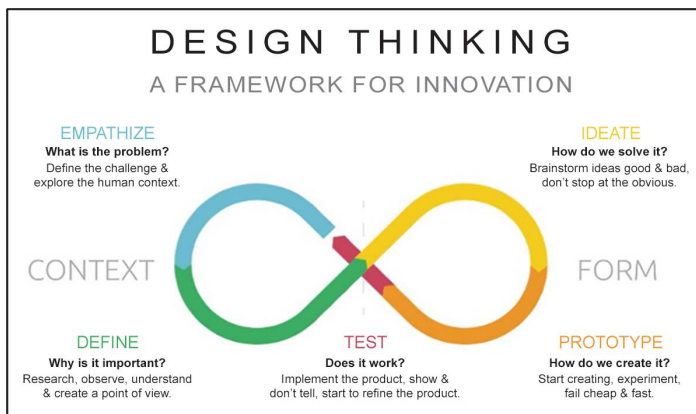
Source: Adapted from *Ashish Goel ("Notes on Christopher Alexander's Notes on the Synthesis of Form and Design Thinking,"* Medium.com, 17 July 2014, https://medium.com/@ashpodel/.)

Figure 2. Design Thinking Framework for Innovation

Phase 2 employed six cycles of action research that occurred over a three-month period and included two virtually delivered LDC courses (April 2020–June 2020). Each cycle completed all five stages (empathize-define-ideate-prototype-test) of the DTFI framework (see figure 2). Participants included 19 faculty/staff and 102 students involved in the entire design process.

Phase 3 spanned nine virtual LDC iterations (August 2020–March 2021) and examined descriptive data and qualitative remarks from students' endof-

course surveys (n=443) and answers from instructors (n=10) during two focus groups. This phase involved cross analysis of findings.

Data Collection

For Phases 1 and 3, descriptive data was collected from students' responses on end-of-course surveys. Qualitative data was collected from students' answers to open-ended questions in the end-of-course surveys and via informal focus groups with the same cohort of LDC instructors. A transcript of each focus group was generated via a transcription service and validated by participants for accuracy. For Phase 2 only, data collection included Zoom chats, emails, and notes captured during the team meetings, student end-of-course critiques, and select informal interviews.

Data Analysis

In Phases 1 and 3, data analysis involved reducing the large amounts of raw data by identifying patters and themes via three cycles of manual coding by a team of two.[16] The search for patterns, or data that occurred twice or more, helped to summarize ideas, concepts, and responses.[17] The first cycle of coding involved establishing pre-codes based on the literature review, survey questions, and interview questions. The second cycle of coding involved descriptive and in vivo coding that increased the primary and secondary codes. The last cycle of coding used pattern coding and frequency counts that reduced the larger volume of codes to establish themes. For the data collected from the focus groups, the experience of the instructors was understood by analyzing the transcripts using parts of Moustakas's method for analyzing transcripts as a modification of the van Kaam method of phenomenological data analysis:

1. List and make a preliminary grouping;

2. Reduce and eliminate;

3. Determine invariant constituents;

4. Cluster and thematize the invariant constituents;

5. Perform a final identification of the invariant constituents and themes by application;

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16. Patton, *Qualitative Research & Evaluation Methods*.
17. Saldaña, *Coding Manual for Qualitative Researchers*.

6. Use the relevant, validated invariant elements and themes, construct for each focus group a textual description of the experience;

7. Construct for each focus group a structural description of the experience based on the textual description and imaginative variation;

8. Construct for each focus group a textual-structural description of the meanings and essences of the experience, incorporating the invariant constituents and themes; and

9. Develop a composite description of the meanings and essences of the experience, representing each focus group, from the textual-structural descriptions.[18]

In Phase 2, data analysis involved similar coding procedures as described above and employed NVivo software with the focus on thematic analysis. Two researchers coded the data and reached 96 percent intercoder reliability. The only minor discrepancies were in the sub-code structure and moving from codes to categories, which were resolved during discussions on coding and interpretation of data.

Findings

Phase 1 Findings

For Phase 1, evaluating data from the in-resident courses, seven themes emerged:

1. The original concepts expressed in the 2020 SEE Model are validated.

2. The learning environment is composed of internal and external components.

3. The internal learning environment is largely the physical environment or what supports student learning and includes the support and tech/IT team, attending to human nutritional needs (i.e., snacks), and establishing an overall positive climate and physical meeting space.

4. The external environment includes the students' career field, the larger USAF culture, and commonly agreed-upon military values, which, together, impact the immediate student learning and instructor teaching.

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18. Moustakas, *Phenomenological Research Methods*; and Saldaña, *Coding Manual for Qualitative Researchers*.

5. The concept of time consists of two elements of chronological or quantity of time and more felt sensation of being in the moment with others, called Kairos.

6. Chronos is the aspect of chronology time and contains the deliberate schedule, the immersion over eight course days, and relevance in relation to what is simultaneously occurring in the students' life.

7. Kairos is the depth, or experience in the moment, of time and comprises the feeling of how content comes "alive"; it is the relational immersion in the course content with others and participants' experiences in the moment of learning.

Phase 2 Findings

For Phase 2, a total of 121 participants were involved with over 22,000 work hours over the six cycles. Using the DTFI, the results of the of the six cycles of action–reflection–change are shown in table 1 and organized into duration to move from empathize-define-ideate-prototype, test phase, and overall time expressed in people hours.

The time spent on the first four stages decreased with each successive cycle (1 through 4). Time spent on the last stage of testing increased with each cycle (5 and 6) to get to a successful version of the new virtual course.

The coding process (pre-codes, in vivo and descriptive coding, categorical coding, and thematic coding) produced multiple codes and categories of refining and reimagining LDC for a virtual environment.

Table 1. Organization of the Six Cycles of Action–Reflection–Change

Cycle	Empathize, Define, Ideate, Prototype	Test	Time
1	7.5 days	Zoom.gov discussion / 2 hours *Conceptual*	17K+ hours
2	4 days	Alpha test / 3 hours *Technology platforms*	17K+ hours
3	3 days	Beta test / 2.5 days *Days 0, 1, select content*	17K+ hours
4	2 days	Faculty development / 6 days *Teaching Teams & Lesson Plans*	17K+ hours
5	1.5 days	vLDC #20M / 8 days *Days 0 thru 9—IOC*	1.5K+ hours
6	1 day	vLDC #20N / 8 days *Days 0 thru 9—FOC*	1.5K+ hours

Key
#20M, #20N: course numbers
FOC: full operational capability
IOC: initial operational capability

The 21 categories are organized under the four themes that emerged during the coding process:

1. General Course Design:

- Be clear on the desired outcomes and available resources.

- Have a process to go from concept to test.

- Widen the learning continuum for before, during, and after student contact time.

- Design the course with deepening the student experience in mind.

- Identify conditions for success amid the pandemic.

- Use technology and schedule structure to aid in creating interpersonal connection.

- Update the SEE Model for the virtual environment, including new terms and definitions.

2. Student Experience:

- Students want opportunities for pre-work and deepening understanding of concepts.

- Breakaways are needed to facilitate discussion and smooth transitions from the main room, for example, Zoom.gov breakout rooms, use of telephone to chat, social media platforms, and self-reflection/journaling.

- Pacing the type and duration of breakaways in seminar; type, number, and duration of breakouts must be done with intent and focus on the student experience.

- Students want more time to connect and have an experience with each other; they prefer to avoid rapid breakouts of pairs for a few minutes to being able to have longer conversations in small groups or with the entire seminar.

3. Instructor Experience and Faculty Development:

- More instructors and support staff are needed to run vLDC as the learning environment requires more integral orchestration between actual and virtual environments.

- Optimum staffing for seminar is three instructors with two instructors physically in the same room and the third instructor from a remote location on a different computer network in case of internet outage. There is a heavy reliance of collaboration in the moment to ensure learning envi-

ronment is optimized and is adjusted/adapted to meet students' needs in achieving the learning objectives.

- Cover content delivery methods in the mornings; afternoons are instructor driven for "productive white space" to personalize content and practice with teaching team.

- Incorporate multiple reps using Zoom and "check-ride" to verify fluency of methods and tools and to increase instructor confidence.

4. Technology Experience:

- Expose students to all Zoom functions in week one and give them cohost and host responsibilities over course duration.

- Standardize screen names for *instructors/LDC team, students, and guests on Day 0; recommend starting screen names during check-in and reinforcing on Day 1 (asterisks are used with instructor names to readily distinguish them from students or guests).

- Find ways to use and save student chat responses, pictures, drawings/annotations, and so forth *and* create a memory or moment (e.g. build a PowerPoint collage of students, words, pictures, and drawings as evidence of learning).

Phase 3 Findings

Nine themes emerged from Phase 3:
- Reduction of student contact hours to 46 (from 67).

- Introduction of "Leader Prep" that prepares students for the synchronous experiences and offsets reduction of contact hours.

- Reduction of delivery time, content application, and practice.

- Introduction of "Leader Deepening" opportunities after each course day.

- Selection of Zoom as the primary technology delivery platform augmented with Canvas as the LMS for content.

- An increase in student self-reflection and self-study.

- New definitions of the internal and external learning environments.

- The use of multiple learning modalities to enhance the student experience and instructor experience.

- The need for a more comprehensive instructor development experience that mirrored LDC student experience, building relationships before learning content, delivery methods, and technology particulars.

Discussion

The discussion section is divided into three parts. Part 1 addresses RQ 1 by discussing findings from Phase 1 that led to the evolution of the SEE Model to the SEE Model 2.0. Part 2 addresses RQ 2 by discussing findings from Phases 2 and 3 that led to the development of the virtual SEE Model. Part 3 addresses RQ 3 by discussing findings from Phases 2 and 3 that led to LDC's lessons learned and recommendations for going virtual.
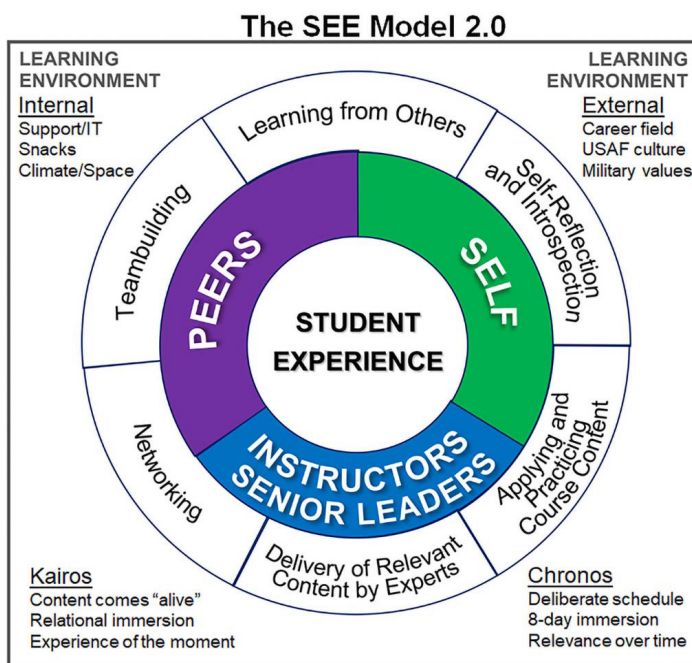
Source: Hinck and Davis, *"Re-Operationalizing and Measuring 'Impact' of a Leader Development Course."*

Figure 3. The SEE Model 2.0

Answering RQ 1: Evolution of the SEE Model to the SEE Model 2.0

The findings of the latest data on the in-residence course reaffirmed the original SEE Model with the emphasis in student feedback on the positive and

inviting environment that helped them buy into the content and enhanced their overall learning. The analysis uncovered additional clarification of how students defined "learning environment," which enabled updating the original model into the SEE Model 2.0 (see figure 3). The results split that environment into internal to LDC and external to the larger Air Force system. The internal aspects of the environment that students mentioned were the friendly and responsive support staff; the quality of provided snacks and drinks; the physical layout, decoration, and cleanliness of the facilities; and the overall warm and inviting climate created by the entire team via enthusiasm, excitement, and friendliness. The external environment was present in student comments about how the Air Force was "putting its money where its mouth is" by so heavily resourcing a course dedicated to leadership of people that reflected Air Force values and how they respected and appreciated their chain of command for investing resources in their personal leader development. They also appreciated the opportunity for growth and interaction with people from different career fields with whom they would otherwise not engage.

The findings also provided two different conceptions of how time enhanced their experience, depicted as Chronos—or duration of experience—and Kairos, or depth of experience. For Chronos, students noted how the schedule felt very deliberate and that each module seemed to build off and complement previous content, demonstrating to them LDC's commitment to their growth rather than simply throwing varied leadership content at them. Comments also expressed how the eight-day duration felt "just right" in that it enabled enough time to cover a significant amount of content and form deep bonds with fellow students and was also sandwiched around a weekend that allowed them to decompress alone or continue spending time and bonding with fellow participants. Students also noted that LDC "practiced what it preached" by showing them that they valued their time by having the course run from a Tuesday to a Thursday so that participants would not be forced to travel on a non–duty day to attend.

For Kairos, students praised seminar time for allowing the space to dive deeper into and engage in content they found relevant with their peers, which is supported in the literature.[19] Peer engagement and experiential activities were most frequent aspects of the course that were praised, whereas they requested less lecture time and more seminar time to dig deeper into the content while also connecting with peers. This signified that while they enjoyed the eight-day duration, students appreciated the quality and depth of time spent and praised the variety of experiential activities that made content "come alive."

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19. Knowles, *The Modern Practice of Adult Education*.

Answering RQ 2: Development of the vSEE Model

The Virtual Student Experience Ecosystem Model (see figure 4), reflects the lessons learned through the deliberate effort of the entire 21-person LDC team to create a learning environment that remained student-centric and delivered the best experience possible to maximize student growth. Throughout the design process, the LDC team held the SEE Model at the forefront on planning and attempted to think through every aspect in terms of enhancing the student experience. To maintain the personability and friendliness that students experience from the staff and instructors upon arrival, students were mailed welcome packets in advance of the virtual course that include course materials, a journal, a welcome letter from the course director, and a handwritten welcome card from their seminar instructors. Students participated in a technical check-in session the day before the course began, where they moved between the Zoom rooms they would need to know for the course (student manager room, the main room, and their seminar room) and met the course director, student managers, the IT team, their seminar instructors, and some of their fellow seminar participants. This was done to familiarize them with the Zoom meeting IDs and introduce them to all the people and resources available to assist them so that they would know how much the Air Force has invested in their growth and development. They were also shown and practiced some of the most common Zoom functionalities they would be using so that they became more comfortable with the platform and understood that the course would be interactive, engaging, and discussion-based and not full of unidirectional knowledge transfer.

The Virtual or vSEE Model

LEARNING ENVIRONMENT
Internal
Support Management
Zoom familiarity
Canvas access

LEARNING ENVIRONMENT
External
Career field
USAF culture
Military values
Climate/Space
Snacks

Leader Preparation (Self guided Study)

Learning from Others

Team-building

PEERS

SELF

STUDENT EXPERIENCE

Self Reflection & Introspection

Networking

INSTRUCTORS SENIOR LEADERS

Applying and Practicing Course Content

Delivery of Relevant Content by Recognized Experts

Kairos
Content comes "alive"
Relational immersion
Experience of the moment

Chronos
Deliberate schedule
8-day immersion
Relevance over time

Source: Hinck and Davis, *"Re-Operationalizing and Measuring 'Impact' of a Leader Development Course."*

Figure 4. The vSEE Model

The LDC team's planning experience evidenced that eight hours per day on Zoom was overly exhausting and did not allow for COVID-19 work-from-home challenges like attending to families and households. Thus, the LDC team reduced the existing LDC model from 67 to 46 contact hours to include shorter blocks of Zoom instruction and an extended lunch, and a natural consequence of the realignment of contact hours was a shift in the SEE Model toward a slight increase in emphasis on the student. To cover (nearly all) the same material in the virtual environment, some preparatory material was moved to asynchronous "Leader Prep" each evening, allowing the student to set the stage for the following day's learning objectives by pre-learning material that was previously presented live in residence. Thus, the criticality of the arc for self-reflective microinteraction became more crucial to student experience in the vSEE Model, where delivery of content, content application, and practice were all slightly reduced at the expense of learning from others, teambuilding, and networking.

Additionally, the introduction of Leader Deepening opportunities as well as self-study, self-reflection, learning from others, and networking by using Zoom lounge rooms helped to create a virtual schoolhouse instead of it being thought of as only a classroom. Structured self-reflection was offered, referenced, and encouraged via providing time for silent reflection and journaling on deliberate prompts as a way to engage content privately and also to allow space for thought formation before sharing with peers.

While the peer interaction appears to be reduced dramatically, the depth of interaction—Kairos—countered this reduction in the linear function of time even in the virtual environment. The deliberate efforts to develop and define the space—the climate—of each seminar early on day one rapidly set the conditions for a learning environment to provide increased access to the head and heart for growth. To counteract the challenges of holding large group (12 participants) discussions in a virtual setting, vLDC made more use of small-group breakout discussions to increase student interaction and speaking time compared to in-residence, and students were also encouraged to have parallel side discussions using the chat function. This provided more opportunity for depth of connection and reflection than the in-residence course. Moreover, the effort and revisions that went into creating vLDC were shared with students who appreciated the dedication of the LDC team to provide a positive student experience and help connect instructors and students on a deeper, personal level. This, in turn helped enhance the affective connection between students and instructors and the content of the course itself.

Answering RQ 3: Lessons Learned and Recommendations for Going Virtual

Zoom.gov is the right technology because of the quality of video frames, ability to see nonverbals, and platform capabilities. Students were asked to keep their videos on full-time in seminar and during lecture. Paired with large 72-inch Microsoft Hubs, instructors were able to see 12-inch x 18-inch video feeds of all students, which allowed them to observe body language and level of engagement. Knowing they were on video made students feel they were "in a classroom," especially when gestures such as raising a hand, laughing, clapping, or shaking their head proved to be effective communication tools. Using multiple Zoom rooms and breakout rooms allowed for transference of the in-residence experience to remote students. Large group experiences—squadron commander perspectives and interactive "lectures"—were made interactive through Zoom capabilities such as using the poll function or answering a spoken question or prompt in the chat or by a visible hand ges-

ture such as covering the camera. Large group experiences were followed by breakouts with a discussion prompt in sub-groups different than in seminar to imitate the cross-seminar interactions during the in-residence walk from the auditorium back to seminar rooms.

Moving from a traditional in-person course to a virtual version can be done, but it must be structured. As advocated for in research fields, the DTPI and action research methods provided such a framework.[20]

Of the five key features in action research,[21] participants reported that multiple cycles and reflections were most important in relation to the DTPI so change could be enacted that reflected participant voices in the design process of the virtual course. A virtual Leader Development Course can be executed that aligns with the SEE.[22] Students reported feeling connected, and a new student even commented: "I don't know how you did it, but you created a culture in two days. . . . I feel more connected to you all than I do my own office, and I have a staff meeting with them every day." Another new student said, "This is the best mentoring I've received since I commissioned."

Teaching teams found they had to collaborate more to successfully hold the environment for students in seminar, which is supported in some literature.[23] To keep students engaged, students needed to be actively participating by speaking, listening to a peer, typing, calling another student, writing in their journal, and so on. To facilitate that interaction, instructors were required to remember to step in/out of the camera frame, mute their microphone to signal handing the discussion space to students, coordinate breakout rooms, respond to chats, set up current and future activities, actively listen to students, and watch the affective responses of students (body language, gestures, hand raises). That took 100 percent effort from our experienced teaching pairs.

Specific to LDC (Highly Interactive, Human-Domain Focused Course)

To keep the students' attention for vLDC, the content delivery must be synchronous during the times they are on Zoom.gov. Interaction among students and instructors was what kept their attention. Pushing a videorecorded lecture "live" via Zoom.gov was the only failed delivery method. Students dis-

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20. Beckman and Barry, "Innovation as a Learning Process"; Dunn, "Implementing Design Thinking in Organizations"; Liedtka, "Innovative Ways Companies Are Using Design Thinking"; Tschimmel, "Design Thinking as an Effective Toolkit"; Inoue, *Mirrors of the Mind*, 20; Inoue, *Psychology of Action Research*; Stringer, *Action Research*; and Torbert, Fisher, and Rooke, *Action Inquiry*.
21. Inoue, *Psychology of Action Research*.
22. Hinck and Davis, "Re-Operationalizing and Measuring 'Impact' of a Leader Development Course."
23. Hinck and Davis; Liedtka, "Innovative Ways Companies Are Using Design Thinking"; and Matusov, 2001.

engaged and lost interest because it was not live. They attribute this to the necessity for a "holding environment." The students were unable to secure 100 percent quiet/uninterrupted environments in their homes or offices, so they relied on the LDC environment to keep them engaged. When instructors pushed a recorded lecture, LDC became "just another computer-based training they could walk away from and disengage" (student words). During seminar discussions, any monologue or lecture-like speaking by instructors needed to be brief and pointed with a clear purpose, acknowledged to students as an interruption of the discussion-based learning environment and quickly followed up by handing the space back to students to resume an engaging discussion.

Delivering asynchronous lecture/perspective/presentation in the auditorium became like broadcasting a live TV show. What used to take one person on stage took at least three dedicated personnel and four Zoom.gov accounts. A "room manager" from the LDC staff was required to manage, admit, mute, and respond to students' technical requests, while this or an additional person monitored student feedback. A producer was required to focus on muting/unmuting the presenter, switch between the cameras, "share screen" slide presentation/video clips, and manage the Hub display for the presenter. None of these duties could be done by the presenter, who had to focus on delivering content into the camera and staying on-script with the producer. Additional Zoom.gov accounts were necessary to set up microphones and secondary cameras.

The events experienced by the community of educators during 2020 were challenging and stretched what many believed was possible, but they also provided an unmatched opportunity for innovation. While some remain skeptical of the ability to deliver human-domain centric material virtually, the results of vLDC show that educators can still touch the heart and mind in a virtual environment, but there is much more to learn. So, the question is what can educators learn from the trials of this year? While many of us would choose not to repeat the challenges of 2020, there is room for growth and improvement in the lessons and reflections of "COVID-19 operations." The lessons learned from virtual delivery of LDC provides a framework for vastly improving remote education for virtual learning in all communities.

Limitations and Implications

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 pro-

vided 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 US Air Force and are 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 research implications include an updated learning and teaching model, or SEE Model 2.0, and a learning model that represents the virtual world, called the vSEE model. Both models connect the head and heart and provide a deeper understanding of what is required to improve student experiences as well as instructor experiences. As many educational institutions, including military ones, begin to compare the cost advantages of temporary or permanent relocation or increasing online course offerings, this study provides a blueprint to improve learning and teaching in the virtual environment. This study offers empirically based methods for change to organizations that decide to move their professional military education and professional continuing education courses to the virtual world or enhance their existing courses. The impact of this study updates the SEE Model to the SEE Model 2.0. This updated model can serve as a guide for other leadership-related courses where student trust, vulnerability, openness, and sharing are a central focus. The vSEE Model as well as the lessons learned during the transition can provide a blueprint for designing interactive, experiential learning environments for all fields and disciplines. Lastly, the usage of the DTFI to deliberately translate in-residence LDC to a virtual product serves as a model for other organizations who seek similar large-scale overhauls of courses. Further study of the implementation of all three above implications will further strengthen their foundation and uncover additional challenges and lessons learned when applied to courses in other contexts and disciplines.

Conclusion

This research synthesized lessons from recent literature and then expanded on the previously developed Student Experience Ecosystem Model to include the instructor experiences—an important tool to understanding the larger framework of students' learning and experiences and the parallel instructors' experiences. The study sought to determine if new learning models could be developed for the virtual LDC and the resultant impact on teaching/learning modalities, course length, and technology.

The four themes of 22 categories along with the discussion of five key lessons learned help fill a gap in the scholarly field, add new discoveries to the field, and inform other institutions on the process, success, and failures of virtual course redesign. The application of the DTFI using action research methods produced results that contribute to the theory and practice on developing and teaching in a virtual learning environment. Multiple cycles and reflections that represented participant voices were key ways of informing the DTFI. The product of this research was the SEE Model 2.0 and the vSEE Model.

Because of the dedication of 121 participants and 22,000 work hours involved in six cycles of the DTFI, a new virtual LDC was created. The vLDC has since delivered 10 versions of the new vLDC and the 584 end-of-course critiques by students indicated the same high level of satisfaction and extremely impactful experience that was similarly reported in the in-person, in-residence LDC.

Abbreviations

DTFI	Design Thinking Framework for Innovation
DTPI	Design Thinking Process for Innovation
LDC	Leadership Development Course
LMS	learning management system
SEE	Student Experience Ecosystem
vLDC	Virtual Leadership Development Course
vSEE	Virtual Student Experience Ecosystem

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