

Examining Leadership Development Program Educational Delivery Models and Perceived Participant Connection at a Military Research Institution

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Abstract

Connectedness is a key aspect of participant retention in academic programs as well as in the workplace. Achieving high levels of connectedness is often considered difficult in a virtual or hybrid environment. By producing supervisor development programs that create feelings of connection and community to both the learning environment and the participants within it, program managers can ensure better outcomes for participants and the organization.

In this mixed-methods study, a pre/post participation implementation of the Rovai Classroom Community Scale as well as post-participation interviews were used to assess levels of participants perceived learning and connectedness to the cohort communities established in three leadership development programs. Using these methods, we hope to determine which of the three educational delivery models have the greatest effect on participants perceived learning and connectedness to their cohort community and the broader organization.

Introduction

Background

Recognizing that supervisors are instrumental in shaping organizational climate and more directly the employee experience, an organizational development team at a military research institution committed to the design and delivery of programming that would grow our supervisors into people focused managers [1]. Traditionally, supervisor training is focused on competency and skill development, both critical to success on the job, but this content is often delivered unidirectionally, in an asynchronous model, not allowing for group reflection, feedback, collaboration nor community building. This military research institution supervisory development programs differ from this traditional format by not only focusing on competencies and skills, but by also focusing on developing learners vertically, in an environment in which learners are embedded within peer cohorts over a nine-month span. Vertical development refers to the stages that adult learners progress through as they advance in their cognitive sophistication [2]. An important aspect of cognitive sophistication is widening one's perspective through interaction with others in order to establish an inclusive viewpoint [3]. A learner cohort provides a community in which diverse members bring their unique challenges and perspectives to bear on group learning.

As evidenced in educational theory, these supervisor programs take into account that adults (andragogy) learn differently from children (pedagogy) by bringing unique life experiences, a significant knowledge base and well-formed mental schema to their learning (e.g., [4], [5], [6], [7]). Foundationally, the organization's supervisor programs consider adult learning principles including self-concept, experience, motivation and relevance (e.g., [4], [5]). In order for educational programs to hold value for adults they must meet the identified needs of the adult learner. Adult learners' needs may be defined "as those that motivate the learners and substantially enhance their learning, the lack of which will lead to demotivation and failure to achieve major learning and personal goals" [8]. The military research institution's supervisory development programs ensure learning needs are met by requiring learners to enumerate their individualized goals and objectives at the onset of programming. Coaching support ensures that

learners focus on their self-identified learning needs in order to maintain motivation for reaching their goals. Throughout the duration of the supervisor programs, learner feedback is encouraged and collected continuously. Previous cohort feedback informs modifications to instructional design and delivery. Beyond having a say in what they learn, adults must also see the relevance in material they have not weighed in on (e.g., [4], [5]). The supervisor programs allow learners to bring their real-life challenges to bear on program content and group discussions.

The military research organization's supervisor programs are further grounded in social, constructivist and social-constructivist learning theories. The cohort model is social by design. They allow participants to engage in ongoing professional and social journeys together [9]. Social learning theory acknowledges that the learner is part of a community, and the teacher is responsible for creating a learning conducive environment where learners observe desired behaviors modeled by the teacher and peers[7]. The OHD team, academic partners and instructors are intentional in creating the sense of community amongst all those involved. This sense of community results in a shared learning experience that enhances their sense of purpose and sustains meaningful relationships while fostering networking and critical thinking skills [9]. Within this community knowledge is exchanged. How this knowledge is assimilated by a learner is best described when viewed with a constructivist lens. "The constructivist theory of learning, whose philosophical origins are frequently ascribed to Kant and whose educational origins to Piaget, is based on the premise that the act of learning is based on a process which connects new knowledge to pre-existing knowledge" [10]. Vertical development, for example, has both social and constructivist underpinnings [3]. Social-constructivism derives its roots from the social development theory of Vygotsky (1978), where he describes a "zone-of-proximal development" in which a learner can advance their problem-solving ability by relying on support from more capable peers. The interdependence of social and individual processes in the co-construction of knowledge is the focus of social constructivist theory [11].

Cohort Based Learning

Cohort models have become increasingly popular as a method for grouping students throughout the completion of an academic program, especially for adult learners [12]. Researchers discuss the use of cohorts as a means to engage older adult learners [13], facilitate deeper classroom discussion [14], and provide support and connectedness throughout the learning experiences (Swayze & Jakeman, 2019). The organization and structure of these cohorts is also critical to the overall success of the venture [12].

With adult learners, the needs are diverse and often quite different than the traditional K-12 or undergraduate student, especially when considering the working adult [13]. This is one reason why learning cohorts are a valuable structural method for adult learners. Spaid and Duff [13] define a learning cohort as "a group of 10-30 students that enroll at one time and advance through a program taking the same courses at the same time" (p. 104). These cohort groups offer stability and continuity that is often not readily provided in a traditional collegiate format [13]. Cohort models that allow students to move through courses and the program together aid in establishing a bond between adult students that persist well beyond the date of formal program graduation [13]. In addition, a study conducted by Mauldin, et al. [15] in which students found that the cohort system was not only instrumental in their ability to form relationships with diverse and similar peers but created a sense of safety for them as they went through the program.

In her analysis of group work among adult learners, Imel [16] examines the best methods for ensuring that students receive maximum impact in a group-based learning environment. She specifically addresses the importance of relationships in this space. Imel [16] stresses that the structure of the learner-facilitator relationship is an important aspect of group learning. The facilitator is responsible for the establishment and maintenance of learning environments and the dissemination of relevant course and program related information [16]. Additionally, they will structure the groups in a purposeful manner that furthers the learning of all members of the group [16]. While Imel's [16] work applies to group work broadly, there are still lessons to learn when considering cohort models. Activities and group composition remain a critical piece of cohort construction as does the role of the facilitator.

In her later work, Imel [12] indicates facilitators must structure cohorts deliberately and effectively to ensure success since it is not always guaranteed. Teaching and facilitation must be structured to develop relationships, balance group and individual development, provide supports and challenges, and acknowledge and address tensions between learners and instructors [12].

Teitel [14] shares Imel's perspective. In his writing on "The Power of the Cohort Model," Teitel [14] stressed that there are benefits and drawbacks to this model of teaching and learning. Benefits include a gain in support and connection between students as well as increased depth of discussion [14]. Some unexpected drawbacks include change in dynamics and power relationships between students and faculty and among student groups [14]. Faculty must be prepared to address these changes to maintain a healthy learning environment, especially when they are familiar with more traditional classroom dynamics.

Swayze and Jakeman [17] further explore the deep relationships, communication, and connectedness fostered through a cohort model. In their qualitative study the authors examined student perceptions of their cohort experience through a social constructivist framework using saturation theory as a guide [17]. They found students in a cohort reported an increase in all types of communication as well as greater depth of communication [17]. The students also felt the learning environment facilitated a "strong academic and personal support network...among members" [17]. Students also emphasized shared leadership as an underlying tenant of a successful cohort group, emphasizing aspects of a team with a shared goal centered around learning and mutual respect [17]. This team dynamic is an important aspect of what makes a cohort model powerful for programmatic learning.

Connectedness

Connectedness is defined as a "feeling of relatedness and identification of differences" [18]. A sense of community and connection with the organization are key factors in improving retention of learning program participants [18]. Research also links perceived learner connectedness and overall academic success, specifically in virtual learning environments [19]. Lee and Robbins [20] assert that those with higher perceived levels of connectedness to the learning group are better able to "manage their own needs and emotions through cognitive processes." This creates individuals that possess higher levels of trust with others which enables them to take advantage of social opportunities that in turn, continue to increase their sense of connectedness [20].

Sense of community is central to creating feelings of connection within an academic cohort [19]. In a virtual setting, extra effort must be expended to ensure time for learners to participate in activities that encourage a sense of community and connection [19]. Research suggests that

opportunities for collaboration and interaction with cohort peers and instructors over the course of the learning session are considered valuable element of perceived student connectedness [21].

To effectively meet these needs, opportunities for small group and partner discussion and collaboration are encouraged across all organizational development sponsored development programs. Instructors are also carefully chosen for their use of interactive and engaging teaching methods. Social time is provided between sessions, and participants are encouraged to attend lunches and dinners together during in-person sessions.

Connectedness and Belonging

Connectedness is a key component of belonging [18] which is an organizational construct we strive to provide for all employees in the military research organization. When employees feel as if they belong, organizations experience multiple benefits [22]. Specifically, research by Carr et al. [22] linked belonging with a “56% increase in job performance, a 50% drop in turnover risk, and a 75% reduction in sick days.” The financial benefits of these figures are staggering at more than \$52 million in savings for a 10,000-person organization [22].

Conversely, exclusionary behaviors take a significant toll on both the organization and the individual. Research by Eisenberger, et al. [23] showed that social exclusion or pain and physical pain induce similar responses in the brain. In short, social rejection does, in fact, hurt. From an organizational perspective, additional research indicates exclusionary behaviors also reduce motivation to work as a team [22]. As we pursue the endeavor of an employer of choice, it is critical that we create educational experiences for our supervisors that encourage connectedness and induce a sense of belonging to both the cohort and the organization.

This study will add to the body of literature related to both cohorts and in-person versus hybrid delivery models of education. *Intended/potential use of study findings:* As military research organizations pursue the endeavor of becoming an employer of choice, it is critical to create educational experiences for supervisors that encourage connectedness to a higher purpose and induce a sense of belonging to both the cohort and the organization. Results of the study can be used to inform the design of future military research organization leadership programming. Results can also be generalized to other areas of training and development across the Department of Defense and any organization that offers executive development, particularly organizations with a high volume of scientists and engineers.

Research Questions

H1: Perceived connectedness and learning will increase over the course of the program amongst members of all three cohort groups regardless of the instructional delivery model as measured by the Rovai Classroom Community.

Specific Aims: To determine if perceptions of connectedness and learning increased amongst members of all three cohort groups, we will use descriptive statistics such as the mode and median to make comparisons of pre/post course submissions of the Rovai Classroom Community Scale. Thematic analysis of the post-participation interview transcripts will add additional insight into potential differences in experiences of all participants represented in the cohorts.

H2: Military members and government civilians will exhibit similar increases in perceived connectedness and learning over the course of the programs as measured by the Rovai Classroom Community Scale.

Specific Aims: To determine if perceptions of connectedness and learning increased amongst members of military and civilian groups, we will use descriptive statistics such as the mode and median to make comparisons of pre/post course submissions of the Rovai Classroom Community Scale. Thematic analysis of the post-participation interview transcripts will add additional insight into potential differences in experiences of all participants represented in the cohorts.

H3: Regardless of instructional delivery model, military members and government civilians will exhibit similar increases in perceived connectedness and learning over the course of the programs as measured by the Rovai Classroom Community Scale.

Specific Aims: To determine if perceptions of connectedness and learning increased amongst members of military and civilian groups, we will use descriptive statistics such as the mode and median to make comparisons of pre/post course submissions of the Rovai Classroom Community Scale. A two-way ANOVA will also be used to make comparisons across the three instructional delivery models. Thematic analysis of the post-participation interview transcripts will add additional insight into potential differences in experiences of all participants represented in the cohorts.

H4: All genders surveyed will exhibit similar increases in perceived connectedness and learning over the course of the programs as measured by the Rovai Classroom Community Scale.

Specific Aims: To determine if perceptions of connectedness and learning increased across gender groups, we will use descriptive statistics such as the mode and median to make comparisons of pre/post course submissions of the Rovai Classroom Community Scale. Thematic analysis of the post-participation interview transcripts will add additional insight into potential differences in experiences of all genders represented in the cohorts.

H5: Regardless of instructional delivery model, all genders will exhibit similar increases in perceived connectedness and learning over the course of the programs as measured by the Rovai Classroom Community Scale.

Specific Aims: To determine if perceptions of connectedness and learning increased across gender groups, we will use descriptive statistics such as the mode and median to make comparisons of pre/post course submissions of the Rovai Classroom Community Scale. A two-way ANOVA will also be used to make comparisons across the three instructional delivery models. Thematic analysis of the post-participation interview transcripts will add additional insight into potential differences in experiences of all genders represented in the cohorts.

Methods

Mixed-methods, within-subjects design will be used through preparticipation/post-participation administration of the Rovai Classroom Community scale and post-participation interviews conducted by a research assistant not affiliated with any of the three participating programs. These methods map to our research questions by garnering the change in participant perspectives before and after completing the described programs using the three different delivery models.

- This is a recognized study design and methodology used in the field of social psychology.

- This is not a multicenter study.

b. Study population: The study population consists of government civilian and military members that are actively participating in one of the following programs in leadership programs designed to enhance supervisors' skills through vertical development with the hopes of enhancing overall employee experience in a military research institution. Participants will voluntarily self-select to participate in the surveys by scanning a presented QR code. Study PI and/or Co-PI recruited participants by presenting information regarding the study and QR code for potential participants to scan on the morning of their first programmatic session. The same process will be used to solicit participation in the post program survey on the afternoon of their last programmatic session. Volunteers for one-on-one interviews were solicited via email. Individuals self-selected to participate in interview sessions via web-conference systems.

- We plan to make inferences about the results of our study to learning environments throughout the DOD construct.
- Those not enrolled in one of the above programs will be ineligible to participate.
- Potential participants will be given the option to scan a QR code and opt-in to the pre/post implementation survey and interview portion of the study.
- Within subjects sampling will be used for the pre/post survey.

c. Variables/Interventions:

- The validated Rovai Classroom Community scale was used to survey participants on their programmatic experiences (Rovai, 2002). No identifying data was collected.
- Survey was implemented the first day of class for each program and the last day of class for each program.
- Post-participation interview consisting of the Rovai Classroom Community Scale questions with prompts to elaborate will be conducted via web conferencing systems by a research assistant. The interview protocol has not been validated but uses questions from a validated scale with opportunity to further elaborate on why individuals chose specific responses.

Study Context

This study was conducted in a military research organization with the primary mission of scientific research and development in support of warfighting capabilities. This is a highly complex, geographically separated organization with over 12,500 employees with a variety of skillsets including scientists, engineers, and support staff.

In recognition of the critical role supervisors play in shaping the overall employee experience, multiple programs were designed by a team of organization development professionals. These innovative leadership programs combine the power of cohort-based learning with vertical development principles to create transformative experiences. They are designed to expand participants world views and organizational perspectives, raise their consciousness to higher levels, and develop more sophisticated ways of thinking and interacting with others. Programs also offer opportunities for elevated sense-making through group and individual coaching, mentoring, and self-reflection.

Curriculum includes aspects of culture design, psychological safety, emotional intelligence, effective communication, change management, and tailored feedback through 360 and/or personality assessments. Each program is further tailored to the developmental needs of the groups to include advanced/experienced leaders, new supervisors, and those considering supervisory positions. Opportunities for groups, individual, and peer coaching are a part of each curriculum at a developmentally appropriate level. By bringing to awareness the idea of self-authorship as defined by Keegan [24], programs help participants develop a personal leadership philosophy/narrative.

Several delivery models are currently used to accommodate participants in these programs. All programs are nine months in length. One includes four, weeklong, in-person sessions. Another includes one session monthly alternating between in-person and virtual meetings. The final includes one, week-long session in month one and another in month nine, with one-day virtual sessions in months two through eight.

Results and Discussion

Pre & Post Test Mean Difference Comparison

The quantitative analysis considered data from the pre and post surveys for each of the leadership development programs. The first part of the analysis evaluated mean scores for each of the questions from the Rovai Community Scale and determined the differences of mean to understand how each question improved the leadership development program intervention. In summary, the Leadership Program C had the most improvement across all 20 questions with a mean difference of .91 compared to the Leadership Program A at .70 and Leadership Program B at .65. The .91 mean difference signifies almost a full rating increase over all the questions on 0 to 4 point scale. For each leadership program, the top and bottom 3 mean differences questions were identified.

For Leadership Program A, Questions 9 (“I feel isolated in my OHD sponsored program”), 16 (“I feel that I am given ample opportunities to learn”), 20 (“I feel that OHD sponsored programs do not promote a desire to learn”) were the top 3. Question 1 (“I feel that OHD sponsored programs do not promote a desire to learn”), 2 (“I feel that I am encouraged to ask questions”), and 15 (“I feel that members of my OHD sponsored program depend on me”) were the bottom 3. Question 2 and 15 showed no improvement based on the mean differences.

For Leadership Program B, Questions 18 (“I feel that my educational needs are not being met”), 19 (“I feel confident that others will support me”), 20 (“I feel that OHD sponsored programs do not promote a desire to learn”) were the top 3. Questions 5 (“I do not feel a spirit of community”), 7 (“I feel that my OHD sponsored program is like a family”), and 15 (“I feel that members of my OHD sponsored program depend on me”) were the bottom 3. Question 15 actually saw a slight decrease in mean difference after the leadership development program.

For Leadership Program C, Questions 3 (“I feel connected to others in my OHD sponsored program”), 5 (“I do not feel a spirit of community”), 18 (“I feel that my educational needs are not being met”) were the top 3. Question 6 (“I feel that I receive timely feedback”), 12 (“I feel that my OHD sponsored program results in only modest learning”), and 15 (“I feel that members of my OHD sponsored program depend on me”) were the bottom 3. Question 15 was a bottom 3 question for each leadership program however, Leadership Program C relatively outperformed

the others on that particular question. See appendix A for the full results of each question for the pretest, posttest, and differences.

One-way and Two-way ANOVA

The second part of the quantitative analysis includes one- and two-way ANOVAs. Two separate one-way ANOVAs were conducted to determine if the differences between gender and perceived connectedness and learning, and OHD program and perceived connectedness and learning were significant. Both tests showed that there were no significant differences between the dependent variable of perceived connectedness and learning and the two independent variables. ***Speaks to the H4 hypothesis; disproves it to some degree ***

A two-way ANOVA was also carried out to ascertain if the two independent variables (OHD program and gender) simultaneously affected the dependent variable of perceived connectedness and learning. Also, it informed us whether there was an interaction between OHD program and gender. The test showed that the only variable with a significant main effect on perceived connectedness was OHD program. Gender had no significant main effect and there was no interaction between gender and OHD program. Neither variable was significant for perceived learning ***Speaks to the H1 & H5 hypothesis; proves them to some degree ***

The table below shows the results of the two-way ANOVA for perceived connectedness.

	DF	Sum Sq	Mean Sq	F Value	Pr(<F)
Leadership Program	2	269.7	134.85	3.949	0.0245
Gender	2	172.7	86.36	2.529	0.0882
Leadership Program:Gender	2	133.5	66.76	1.955	0.1505

The table below shows the results of the two-way ANOVA for perceived learning.

	DF	Sum Sq	Mean Sq	F Value	Pr(<F)
Leadership Program	2	10.3	5.146	.456	0.
Gender	2	22	11.005	0.975	0.383
Leadership Program:Gender	2	18.7	9.342	0.828	.442

Chi Square Analysis

A chi square was calculated to determine if there was a relationship between the dependent variable and the items on the survey. We found that there was a significant relationship between perceived connectedness and learning and four items in the survey as they were analyzed in terms of the gender of participants. The four items were: GenderFeel (“I do not feel a spirit of community”); GenderFamily (“I feel that my OHD sponsored program is like a family”); GenderDepend (“I feel that members of my OHD sponsored program depend on me”); and GenderUncertain (“I feel uncertain about others in my OHD sponsored program”). It was also determined that there was a significant relationship between perceived connectedness and learning and four items on the survey as they were analyzed in terms of the OHD Program

attended. The four items were: OHDFamily (“I feel that my OHD sponsored program is like a family”); OHDCare (“I feel that participants in my OHD sponsored program care about each other”); OHDDHelp (“I feel that other participants do not help me learn”); and OHDReluctant (“I feel reluctant to speak openly”). For government affiliation and perceived connectedness and learning, there was one significant item on the survey, GovtTime (“I feel that I receive timely feedback”)

I do not feel the spirit of community

	Female	Male	Prefer not to Say
Strongly Agree	9%	2%	0%
Agree	0%	0%	50%
Neutral	5%	0%	0%
Disagree	32%	16%	50%
Strongly Disagree	55%	81%	0%

Males outperform Females on feeling a spirit of community across all leadership cohorts, whereas more females are neutral or strongly disagree in terms of not feeling a spirit of community.

I feel that my OHD sponsored program is like a family

	Female	Male	Prefer not to Say
Strongly Disagree	0%	2%	50%
Disagree	5%	7%	0%
Neutral	9%	26%	50%
Agree	59%	40%	0%
Strongly Agree	27%	26%	0%

Females agree or strongly agree at a higher rate than males when considering the program like a family. Males are significantly more neutral on this question compared to females.

I feel that members of my OHD sponsored program depend on me

	Female	Male	Prefer not to Say
Strongly Disagree	0%	2%	50%
Disagree	18%	19%	0%
Neutral	27%	35%	0%

Agree	55%	42%	50%
Strongly Agree	0%	2%	0%

This question is lacking responses on each end of the spectrum, but females agree more with feeling members depend on them.

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I feel uncertain about others in my OHD sponsored program

	Female	Male	Prefer not to Say
Strongly Disagree	41%	35%	0%
Disagree	50%	51%	0%
Neutral	9%	9%	100%
Agree	0%	5%	0%
Strongly Agree	0%	0%	0%

A small percentage of males feel uncertain about the program after completion. Females predominately feel certain about the programs.

I feel that my OHD sponsored program is like a family

	Program A	Program B	Program C
Strongly Disagree	0%	0%	5%
Disagree	18%	6%	0%
Neutral	18%	47%	13%
Agree	36%	35%	51%
Strongly Agree	27%	12%	31%

Program C outperforms other programs in regards to feeling the program is like a family, although program C was the only program that has responses for strongly disagreeing with the statement.

I feel that participants in my OHD sponsored program care about each other

	Program A	Program B	Program C
Strongly Disagree	18%	6%	5%
Disagree	0%	0%	0%

Neutral	18%	6%	0%
Agree	27%	50%	26%
Strongly Agree	36%	39%	68%

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Program C outperformed other programs in caring about each of the participants with the majority at agree or strongly agree.

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I feel that other participants do not help me learn

	Program A	Program B	Program C
Strongly Agree	18%	0%	3%
Agree	0%	0%	0%
Neutral	18%	6%	3%
Disagree	45%	65%	38%
Strongly Disagree	18%	29%	56%

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Program A significantly underperformed on participants helping others learn. Program A had the strongest disapproval and neutral ratings.

I feel reluctant to speak openly

	Program A	Program B	Program C
Strongly Disagree	55%	65%	46%
Disagree	27%	24%	51%
Neutral	18%	0%	0%
Agree	0%	12%	3%
Strongly Agree	0%	0%	0%

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Overall, across programs, participants seem to not be reluctant to speak openly, however Program A had the most neutrals and Program B had the most dissatisfaction. No one across programs strongly agreed they felt reluctant to speak.

I feel that I receive timely feedback

	Civilian	Military

Strongly Disagree	9%	17%
Disagree	2%	0%
Neutral	9%	0%
Agree	53%	50%
Strongly Agree	27%	33%

For the most part, participants felt they received timely feedback, but there was a relative difference in dissatisfaction from military members compared to civilians.

Interview Analysis

Interviews were conducted with 11 participants of the various programs. Thematic analysis of the interview transcripts resulted in three key themes that impacted participants in relation to their learning and connectedness to the cohort and organization. The three themes that emerged were networking and relationship building, an open collaborative environment, and improvement in leadership skills and feelings of purpose.

All of the participants appreciated the opportunity to network with other people in the program. They stated that the program gave them more points of contact that worked in their area and outside of it. Two of the benefits of these connections were they could use those contacts as informational resources and for mentoring. They also discussed the great value and support they found in the relationships they have built with the members of their cohort. Many stated that they remain close to the people in their cohort after the program ended with one participant stating, “I was initially concerned that it would be a kind of a one and done once we split our ways, we wouldn't have any communication, but that has not been the case.” It was clear that lasting friendships were formed as they met in class, shared lessons, and talked outside of the classroom.

The participants all stated that the environment created in the instructional delivery method allowed people to feel comfortable to share and that the length of the program permitted them the time to get to know each other so they felt secure opening up to one another. Several of the participants revealed that there was a significant level of trust within the cohort. One member stated, “There was definitely a feeling of trust. I think we all really you know, leaned into that. So, there was, you know a lot of high trust to be able to express our emotions and show our, you know, dissatisfaction not only with the system as a whole, but also with each other and what our opinions were.” In addition, they discussed how the facilitators in the group created a safe zone within the class. As one participant stated, “Just the mentality that came across from the facilitator and leaders. It just really opened that up without them having to directly say this is a safe space and they didn't have to hard line that...they showed it not only in their actions, but in their statements. So, everything coincided; it opened up the doors and made it comfortable for all of us to discuss the pieces that we felt needed to be discussed and learn about.” The willingness of the facilitators to open up and share their experiences increased the willingness of the participants to open up. The facilitators established a safe zone where everyone's voice was heard and they were allowed to be themselves which was integral to the creation of a collaborative environment where participants felt free to share.

The program was successful in impacting the leadership skills of participants. They believed that the program gave them a better understanding of how to lead and what it takes to be a leader; in addition to giving them a sense of purpose in their current jobs. Participants mentioned how the program helped them look at the bigger mission professionally so they could see, as one participant stated, “Where I fit in and where my team fits in, in the organization as a whole versus just doing my little part.” Many indicated that they left the program with newfound leadership tools and tips that they could use on their jobs, and that the program gave them insight into how they are currently leading their employees and how they can improve as leaders. For instance, one participant stated, “It gave me insight into how my employees view me and think about me personally and things that I needed to work on as a leader that I continue to refocus myself so that I am a better leader. So that helped me give like a tool set and a level setting of where I'm at.” The program highlighted the importance of leading people. It conveyed the value of leadership in achieving the overall mission of the organization and how all the skills learned in the program can translate to other positions and organizations.

Implications

The findings of this research are broad and significant and will have an impact on future research and the way hybrid education is conducted in the future. The quantitative findings implicate that leadership programs have a significant impact on the overall connectedness and learning metrics of the Rovia classroom scale. This means participants feel more connected to each other after the leadership program and also have enhanced learning. Specifically, the format of Leadership Program C produced elevated results compared to the other programs. The elements of that format resonate with the participants when considering connectedness and learning. What was consistent across all leadership groups was the relatively low score for question 15 (“I feel that members of my OHD sponsored program depend on me”). This could signify that the curriculum did not focus on creating a dependence between cohort members, but the connectedness score is still significant for each leadership program. When considering this result with the qualitative data, members felt connectedness within the program and after the program, but they didn’t necessarily feel they needed to depend on cohort members within the program to succeed at specific tasks. Participants were then able to establish long-term relationships compared to only depending on cohort members when in the classroom.

The implications of the findings of the thematic analysis are just as compelling. The study shows that participants can feel comfortable enough to share their problems, concerns, dreams etc. with the members of their online cohort and this sharing creates a collaborative community that results in long lasting friendships. However, the participants in our study were clear that this does not occur unless the facilitators create a safe zone where there is a high magnitude of trust. An environment where participants feel free to be themselves and their thoughts and ideas are listened to and appreciated by every member of the cohort. Facilitators create this type of environment partially by their willingness to be open with participants about their experiences and feelings, which is a significant finding that should impact future research in this area.

Positionality

Before exploring limitations and concluding this research, it is important to acknowledge the positionality of the researchers in terms of them contributing to bias in the analysis. Positionality plays a role, as three of the researchers participated in a doctoral program together

in a cohort model, which may lead to a predisposition of favoring the cohort experience. Two of the researchers are also designers and executors of the leadership program and are impacted directly by the current outcomes of the program and its future success. Although the researchers are interested in opportunities to improve the programs, it is important to acknowledge their own connection to the research and outcomes of the program's success.

Limitations & Future Work

There are many areas where research in this area could be improved. There is an opportunity to ensure the pre and post survey is a required component of the leadership program to ensure there is a way to compare the same sample. This would allow for leveraging more sophisticated analysis like the paired-samples t-test. This would also mean that the test would utilize a unique identifier to compare each participant from before the leadership program to after.

Considering Program C outperformed the other Leadership programs, there could be an opportunity to conduct a document analysis to understand the components that are differentiators across programs and determine the impact through additional qualitative analysis with participants. This could help identify the impactful components that contributed to elevating the leadership program. Another component that was not investigated in this analysis was the design of each of the Programs. There were some variations in the participants, but the design of the program elements, may have contributed to the variation in results and would require a deeper analysis to understand the root cause of that variation.

Because of the lack of civilian data, this research really did not demonstrate the differences in experiences compared to military members. This could be an area to explore when considering differing expectations working at a Military Research Institution as a civilian compared to a military member. This would include understanding the leadership program intake process to provide opportunities for both civilians and military member engagement. There could be some unknown barriers that are creating the current disparity with civilian participation that would be powerful to explore.

We believe that future work on this topic should also include a plan to interview more participants in the program. This could include scheduling the interviews on the last day of the program so participants feel committed to participating in the study. Also, the facilitators should offer more assistance to those needing extra support in participating in the program, particularly in the areas of scheduling and coordination; not having this support makes it difficult for participants to completely immerse themselves in the program and feel as if they are part of the team. In addition, future hybrid education courses should consider including spending more time on discussions between all the members of the cohort as more interpersonal time was cited by participants as being something they wanted to have more of in the program. Last, it was suggested in Mauldin et al., [15] that administrators should consider exclusively surveying participants during the programs to get a better understanding of how their efforts to increase connections are being received and to gain ideas about the best way for them to facilitate the building of relationships within the cohort. We believe this would be very beneficial for future researchers in this area.

Conclusion

Both the quantitative and qualitative data show that the participants felt a spirit of community within each cohort. The surveys showed males scored higher than females in this area, but this could be due to the programs being set in a Military Research Institution. However, females outperformed males when considering the program feeling like a family. Leadership Program C outperformed the other programs especially in the area of caring about each other. Overall, participants felt satisfied with their connectedness and learning across the board regardless of their leadership program.

The result of working in a cohort where there is a spirit of community is that there is openness among the group. This was supported in the survey results and interviews as participants strongly communicated that they did not feel reluctant to speak within the cohort. The key to creating this open environment that allowed the spirit of community to flourish was, according to participants, the willingness of facilitators to share and be open about their experiences. The freedom to be themselves in the programs led to participants forming strong relationships and bonds that have endured. In addition to these lasting relationships, participants came away from these programs with new leadership tools they can utilize now or in the future. Based on the mixed methods analysis, the programs were a success in creating learning and connectedness between cohort members. Learning and connectedness that is still enduring months after the programs ended.

Appendix A- Rovai Classroom Community Questions

1. I feel that students in this course care about each other
2. I feel that I am encouraged to ask questions
3. I feel connected to others in this course
4. I feel that it is hard to get help when I have a question
5. I do not feel a spirit of community
6. I feel that I receive timely feedback
7. I feel that this course is like a family
8. I feel uneasy exposing gaps in my understanding
9. I feel isolated in this course
10. I feel reluctant to speak openly
11. I trust others in this course
12. I feel that this course results in only modest learning
13. I feel that I can rely on others in this course
14. I feel that other students do not help me learn

15. I feel that members of this course depend on me

16. I feel that I am given ample opportunities to learn

17. I feel uncertain about others in this course

18. I feel that my educational needs are not being met

19. I feel confident that others will support me

20. I feel that this course does not promote a desire to learn

Appendix B- Mean Differences Detail

Pre Test Average	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20		
711 HPW NLLP	2.428571		3	2.142857	2.571429	2.285714	2.357143		2	2.642857	2.357143	2.428571	2.285714	2.214286	2.357143	2.285714	2	2.285714	2.428571	2.714286	2.428571	2.714286
ADPS	2.625	2.6875		2.5	2.4375	2.75	2.25	2.375	2.5	2.6875	2.75	2.5	2.5	2.5625	2.375	2.25	2.625	2.3125	2.4375	2.5	2.6875	
ASAP	2.428571	2.714286	2.321429	2.535714	2.392857	2.571429	2.178571	2.178571		2.5	2.607143	2.392857	2.214286	2.428571	2.607143	2.107143	2.535714	2.214286	2.428571	2.678571	2.642857	
Grand Total	2.482759	2.775862	2.327586	2.517241	2.455517	2.431034	2.189655	2.37931	2.517241	2.603445	2.396552	2.293103	2.445276	2.455517	2.12069		2.5	2.293103		2.5	2.568966	2.673414
Post Test Avg	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20		
711 HPW NLLP	2.636364		3	2.454545	3.363636	3.272727		3	2.727273	3.181818	3.363636	3.090909		3	3.272727	3.272727	2	3.363636	3.090909	3.454545	3.272727	3.727273
ADPS	3.166667	3.823529	3.235294	2.941176		3	3	2.529412	3.352941	3.470588	3.411765	3.176471	3.117647	3.176471	3.352941	2.176471	3.411765	3.117647	3.352941	3.411765	3.705882	
ASAP	3.526316	3.564103	3.451538	3.358974	3.589744	3.296842	3.025641		3	3.538462	3.410256	3.410256	2.74359	3.435897	3.666667	2.410256	3.526316	3.230769	3.564103	3.487179	3.467179	
Grand Total	3.283582	3.537313	3.238806	3.253731	3.38806	3.136364	2.650745	3.119403	3.492537	3.402983	3.298507	2.860597	3.343284	3.522368	2.283582	3.469697	3.179104	3.492537	3.432636		3.58209	
Mean Difference	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Average	
711 HPW NLLP	0.21	0.31		0.31	0.79	0.99	0.64	0.73	0.54	1.01	0.94	0.81	0.79	0.92	0.99	0.05	1.05	0.66	0.74	0.84	1.01	0.70
ADPS	0.54	0.54	0.74	0.50	0.50	0.75	0.13	0.85	0.78	0.66	0.68	0.62	0.61	0.98	0.07	0.79	0.81	0.95	0.91	1.02		0.65
ASAP	1.10	1.10	1.14	0.82	1.23	0.93	0.85	0.82	1.04	0.80	1.02	0.53	1.01	1.05	0.39	0.99	1.02	1.14	0.81	0.84		0.91
Grand Total	0.80	0.75	0.91	0.74	0.93	0.71	0.66	0.74	0.96	0.80	0.90	0.59	0.90	1.06	0.16	0.97	0.89	0.99	0.86	0.91		0.81

Appendix C-Interview Thematic Analysis Codebook

Codebook for Interview Responses

Networking and Relationship Building

“It was a networking opportunity. A opportunity or community sharing was established, the answer was yes, it I do feel that it was and and mainly one of the aspects that I appreciated most about the program was the opportunity to to network with other people.” (Q1; IW#1)

“[Program helped me] Understand the organization and to get to know people and expand my network.” (Q1; IW#1)

“It was a wonderful experience to build, to see that take place and still continue afterwards. all” (Q1; IW#2)

“So I definitely formed connections with with the people in my cohort. There's there's been some some back and forth. You know a little more. Like I've been able to reach out to, to people I feel more comfortable reaching out to some of the people in that were in the cohort.” (Q1; IW#7)

“Yes, yes, I did [feel supported] both in and out of the program as we would reach out to each other and I'm still reaching out to folks to talk about what's going on in their careers and. And sort of the path that they're trying to take.” (Q4; IW#4)

“I did. Yes, there was a lot of support and like I said, you know, even though we didn't agree on a lot of things, there was some. There was definitely respect and there was like, hey, I can see where you're coming from with this. You know, even though I don't necessarily agree with it, so I definitely still supported.” (Q4; IW#7)

“Yes. I still stay in touch with several people in my cohort. Some of them I previously have known, but also. Able to learn about other people and I've stayed in touch with them as well, even for technical expertise or needing expertise from functionally as well.” (Q4; IW#9)

“...but there were a good handful of them, good handful of cohort members that I really had a nice bond with and and we bonded over, you know, in depth conversation and through those in XXX. Conversations you create that relationship and that relationship fosters that supportive environment. And I would say that those. Those instances where I didn't feel supported it would probably be because I hadn't yet established that. Level of trust in that in that relationship.” (Q7; IW#1)

“I look forward to running into these other people and seeing them succeed later in their endeavors, like absolutely right. And and that I that's why I think that program is really the whole thing is like the the content is what it is but the camaraderie, the relationship building, the cross talks between organizations and flights. That's really what that was, at least according to me, that this the lessons learned in the and and the the coursework was just the way to facilitate that.” (Q7; IW#5)

“Yes, yes they did. There's a lot of friendships formed there and we did a lot of we do a lot of meeting and and talking outside of classroom time.” (Q7; IW#7)

“Yes. Yeah. Even in one of the one of the sessions, it got very personal for someone and we were all able to feel that personal link.” (Q7; IW#9)

“Yeah, it might just be something that I, I mean it's kind of weird. Like, how do we get from here all the way up to the Military Research Institution level for connectedness? You know, I think it's kind of a building block, you know, again, you and then using networking and being able to meet with people. Getting connections, you know, to kind of help understand and tie all that together.” (Q8; IW#6)

“We've kind of drawn that connection, kind of bringing somebody from quote UN quote upstairs way upstairs, you know, down to the down to the thing to provide some some input, you know, you know, a whole complete session with him was actually one of my favorites was one of my favorite parts of it. I've actually been able to utilize him since. Since then, you know, just for some mentoring and things like that.” (Q9; IW#6)

“Share lessons learned or things like that, you know, after the program, I think you know, even just knowing names and being able to tie back, if I had to send someone, you know, an e-mail or ask for something or get information. Being able to make that connection through Leadership Program B via the Military Research Institution was was helpful in that.” (Q9; IW#11)

“So not only did it help create, you know, some of those relationships of people who again, I I know if I have a question about, you know, cybersecurity or security clearances, I can contact Jeff, right? Can he do anything? No, but could he answer a question? Absolutely.” (Q10; IW#5)

“I think it's really impacted me. Personally, and professionally, I think. Personally, it's given me a lot more points of contacts. To to to sort of bounce things off of, not just in. In my area of expertise, but in in other areas. For, for example, you know, I can I can chat with with somebody who's more in the the HR area and and say, hey, you know this this.” (Q10; IW#7)

Open Collaborative Environment (Free to Share)

“Allowed for an environment where people felt comfortable to share as well as the length of the program. Allowed the the time to get to know other people, for them to be able to open up” (Q1; IW#4)

“And so overall, I would say there wasn't that many barriers in regards to trust and things like that. And as a result, the the sharing and collaborative environment I thought was really was really good. I really enjoyed it.” (Q1; IW#5)

“I do think that maybe initially people were a little skeptical about sharing openly and being vulnerable, but as the sessions, as the sessions moved on, I think we became more comfortable with each other.” (Q2; IW#1)

“Sure. I I think it's for a lot of the same reasons that folks because of the environment they felt comfortable with sharing and therefore they felt comfortable with sharing.” (Q2; IW#4)

“Maybe you might not share amongst people that you haven't known that long. You know, some professionally, some personally, some a mixture of both you know. So again, I think that just leads to the environment that Doctor Myers was able to create.” (Q2; IW#6)

“There was definitely a feeling of trust. I think we we all really you know, we really leaned into that so there was, you know a lot of high trust to be able to express our emotions and and show our our, you know, dissatisfaction not only with like the system as a whole, but more like, you know with but also like with each other and and what our opinions were you.” (Q2; IW#7)

“Yes. People listened instead of like talking over you. They they accepted and worked with what you said so for everybody and myself. It wasn't. Denigrated it was, they were accepted of what you're saying.” (Q3; IW#3)

“We were given time to share our own unique history and stories and. It was a very open environment. I just felt like it was, you know, I was. I felt I was able to participate and and talk freely.” (Q3; IW#4)

“I didn't feel like I I had to hold back, in a sense of like again being guarded.” (Q3; IW#5)

“I felt like that, you know my, my, my thoughts and ideas were listened to, and I also felt like, you know. I felt like, you know what I was saying, even if it wasn't agreed with, it definitely had value.” (Q3; IW#7)

“Yes, I yes, I felt like a valued member. You know, able to share freely and openly non retribution environment, yes.” (Q3; IW#9)

“Yes. Being an individual with a group you know not everyone gets to have a a voice, but I felt during the cohort I did have a voice.” (Q3; IW#10)

“But I would say that the environment was conducive. It was conducive to having people be open and honest about, you know, what they thought and what they felt.” (Q5; IW#1)

“My nerdy, whatever self was able to be the fullest and not worry as well as I got to see others be that way. Those that had a military police mindset from the former role and a lot seeing them flourish in that, you know, vice versa, those that we normally think of quiet, introverted engineers, scientists. Seeing them express different sides. I don't normally get seen because they were comfortable to express themselves. So absolutely I felt like I was.” (Q5; IW#2)

“Yes, and again, I I felt like the environment fostered the ability to do that [allow participants to be themselves] to allow that.” (Q5; IW#4)

“Yes, even though I was kind of like a black sheep, like there was an officer there. But I was like the only enlisted person. And even though that was kind of like I was the only person of that nature, I still felt like I was able to share my thoughts, and everyone was like, very forthcoming with them.” (Q5; IW#10)

“But they also wanted people to feel comfortable and safe, whether it's just the basic non-attribution statement to the very supportive of I understand your feelings and you know we can get them out.” (Q6; IW#2)

“Just that mentality that came across from this facilitator and leaders. Just really opened that up without having to directly say this is a. Safe space and they didn't have to hard line that they they showed it not only in their actions, but their statements. So, everything coincided, and that opened up the doors and made it comfortable for all of us to discuss the pieces that we felt needed to be discussed and learn about.” (Q6; IW#2)

“Yes, they they again fostered open communication and non-attribution which made everyone feel safe ensuring openly.” (Q6; IW#4)

“it was kind of established that it was a safe zone, you know, kind of what, you know, quote UN quote what happens here stays here, you know, type environment you know and it.” (Q6; IW#6)

“They they all did a fantastic job just. Reiterating that. That it was non attribution, that it was a safe place to to talk about things and then also knowing that they were. That some of them you know had. Add real world examples that could help us so. Their their their willingness to open up also helped our willingness to to open up. (Q6; IW#7)

Improvement in Leadership Skills & Feelings of Purpose

“It showed the value of the leadership aspect to the mission, and since it was a supervisors acculturation course, it highlighted the value of being a supervisor, not only in the administrative sense, but in the sense of the importance of leading people.” (Q4; IW#8)

“I'm thinking so for me personally. It it it did. It gave me a lot of tips and tricks and tools to utilize within my branch. As a branch, you know, even as a leader. To how? How to lead, how to even how to improve myself as a leader. It gave me those tools to utilize.” (Q8; IW#9)

“And learning and seeing the different parts help tie what I'm doing mission wise to what they're doing and help me build that connection of why it's so important what I do.” (Q10; IW#2)

“So, as I came out of it. Now a much more sense of purpose with what I'm doing. As well as some insight as to help lead. Whether it being a direct supervisor or just a subject matter expert, but still be able to help lead the mission needs and focus on the people. To make sure that we meet the mission. So, all of that kind of came from bits and pieces of the entire program.” (Q10; IW#2)

“Sure, a lot of ways. Obviously, the the 1st is that learning a lot about leadership and leading people and different techniques and tactics. So basically, just an understanding of leadership and networking and just seeing the different Military Research Institution locations and missions.” (Q10; IW#4)

“In dealing with the the part that probably did the most was having difficult conversations with people you know and kind of being able to break things down and meet them. Their level, you know, and kinda, you know, do you know 'cause difficult conversations are difficult, you know? You know, but when you can kind of break it down and kind of understand, you know, where they're coming from, like, what made. What makes them do something? What makes them not do something, you know, and kind of being able to show them, you know, submission impact, you know, and what happens when you don't do something or you don't do something correctly, you know, or you do something incorrectly. You know those kinds of things. That was probably the most impactful for me.” (Q10; IW#6)

“So, it made me feel more comfortable not understanding stuff and asking for explanations for things, but also, it's it's helped me see like like you had asked before. It's helped me see the the bigger mission professionally so I can see. Where where I fit in and where my team fits in in the organization as a whole versus just doing my my little part.” (Q10; IW#7)

“But I still feel that the skills and everything that I learned within the Military Research Institution is going to translate to this other position. So, yeah, it wasn't a Military Research Institution kind of, you know, only a Military Research Institution thing. So, I feel I can use these skills everywhere.” (Q10; IW#8)

“So, the program gave me tools on how to look at things. More factual not to bring emotion into. Into things. It also gave me knowledge on how to be a I'll say better writer that if than this type of statement that was brought to it. It gave me insight into how my employees view me and think about me personally and things that I needed to work on as a leader that I continue to refocus myself so that I am a better leader. So that helped me give like a tool set and a level setting of where I'm at.” (Q10; IW#9)

“Well, I got a lot more like understanding of what it takes to be a leader. The the whole idea of the program was if you want to continue to supervise or being a supervisor.” (Q10; IW#10)

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