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Format, Motivation & Support Predict Persistence in Virtual Leadership Development

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Contents

3 EXECUTIVE SUMMARY

5 INTRODUCTION

6 WHAT FACTORS CONTRIBUTE TO IMPACT?

7 PROGRAM FACTORS: PROGRAM STRUCTURE

8 LEADER FACTORS: TASK MOTIVATION

9 CONTEXT FACTORS: ORGANIZATION & MANAGER SUPPORT

10 METHODS

12 STUDY DESIGN

13 MEASURES

14 RESULTS

15 STUDY LIMITATIONS

16 IMPLICATIONS FOR PRACTICE

18 SUMMARY

19 FUTURE RESEARCH DIRECTIONS

20 CONCLUSION

21 REFERENCES

24 ABOUT THE AUTHORS

26 APPENDIX

Executive Summary

Understanding how to improve participants' persistence in virtual leadership development programs is critical to realizing the benefits of greater accessibility, flexibility, and reduced cost. In our study, we explore how **program design**, pre-program **motivation**, and perceived **organizational support** relate to program persistence in a virtual course.

The Study: We compared the number of lessons participants completed across two different cohorts during a six-week virtual leadership development course.

- Cohort 1 experienced one of three **Self-Paced** courses in which their learning experience was entirely self-paced within the program.
- Cohort 2 experienced a **Social** course that included the same content as Cohort 1, plus a live kick-off, discussion boards, and moderator support.

Persistence was measured by the number of lessons completed of the 32 available.

Key Findings: Our hypotheses were generally supported: Program design, greater motivation, and greater organizational support were all related to participants completing more lessons.

1. **Social design matters.** Leaders in programs with social components completed significantly more lessons than those in self-paced courses.
2. **Motivation predicts persistence.** Leaders who reported more confidence, more perceived value, and fewer time costs at the start of the program completed more lessons.
3. **Support fuels motivation.** Leaders who reported more organizational and managerial support at the start of the program also reported higher motivation and ultimately completed more lessons.

In Practice: Hybrid designs that combine self-paced content with scheduled check-ins yield better completion rates.

- **Design for connection.** Include structured social touchpoints to combat isolation and sustain engagement.
- **Prime motivation early.** Use onboarding and communications to link learning to leaders' goals and identities.
- **Engage the organization.** Equip managers to support participation, protect learning time, and reinforce application on the job.

The Takeaway: Virtual leadership development is not just about content. How the program supports learners, how organizations support their employees, and leaders' motivational factors all play a role in producing successful developmental experiences. By taking all these factors into account when planning a virtual learning experience, we can better support leaders in their developmental journey.

Introduction

Leadership development is a multi-billion-dollar global industry (*Future Market Insights*, 2025), with organizations investing heavily in programs designed to build leadership capacity (Day et al., 2021). Increasingly, these programs are delivered virtually, with the belief that they offer more flexible scheduling, scalable delivery, and cost efficiency. Together, these benefits create unprecedented opportunities to reach and develop more leaders than ever before — if we can leverage those benefits effectively.

Unfortunately, virtual learning faces a persistent challenge: low engagement and completion rates (Jia et al., 2019). Research on massive open online courses (MOOCs) clearly illustrates the problem, with dropout rates often exceeding 90% (European Association of Distance Teaching Universities, 2018; Eriksson et al., 2017; Psathas et al., 2023) and completion rates falling below 5%. Even after the global shift to online learning during the 2020 pandemic, dropout rates remain high, and facilitating persistence (i.e., remaining active throughout a virtual course) continues to be a challenge at scale.

Solving this problem requires looking beyond course content because content is irrelevant if learners never engage with it in the first place. When programs show low persistence and limited impact, it can be difficult to determine whether the issue lies in the material, the course structure, or other external factors. The root of this issue applies to leadership development courses as much as it does any other learning context.

The external factors mentioned previously include the ecosystem of support that sustains motivation and enables application. Many virtual programs launch without the supporting policies, systems, and practice opportunities that drive success (McCoy & Fry, 2022). Programs that fail to integrate with organizational culture, managerial reinforcement, and ongoing practice fall flat. Focusing solely on outcomes while disregarding the learning process undermines the very development those outcomes are meant to reflect.

This study examines the key factors that influence persistence in a virtual leadership development experience by testing variations in program structure and assessing pre-program attitudes and experiences.

What Factors Contribute to Impact?

The Leadership Development Impact (LDI) Framework (Stawiski et al., 2020) is a methodological framework for understanding the sources of and types of impact. One important contribution of the framework is its acknowledgement of three categories of factors that can help or hinder the likelihood of effective development experiences:

- ***Program Factors:*** Encompass design elements, such as duration, content, structure, interactive components, and engagement opportunities, within the leadership development program.
- ***Leader Factors:*** Include participant characteristics and prior experiences, such as leader level, demographic background, beliefs, and motivation.
- ***Context Factors:*** Represent environmental conditions that may affect an individual's experience, such as organizational support and ecosystem for learning, internal leadership encouragement, or external circumstances.

Because the LDI Framework is ultimately concerned with understanding the sources of impact, it must account for how Program, Leader, and Context Factors shape participants' ability to remain engaged in the learning experience. These factors influence participants' persistence, which is the extent to which they stay involved in the learning context. Persistence, in turn, determines how much of the intended learning experience participants can access. When individuals disengage or drop off, their opportunities to encounter learning also decrease.

Although program completion is often treated as a proxy for learning, learning itself accumulates over time. Even partial participation is likely to generate some impact, but greater persistence provides more opportunities for impact to occur. This means that stakeholders invested in leadership development should also invest in the conditions that support persistence.

In other words, impact is not possible without persistence.

As we demonstrate in this study, each contributing factor plays an important and unique role in facilitating leaders' persistence in virtual leadership development.

Program Factors: Program Structure

In order to evaluate persistence in a learning context, it is necessary to study it under different conditions. To do this, we begin with program factors, specifically different program structures. In this case, program is synonymous with course or learning experience. Structures refer to elements of the program design that are not the content itself but the ways in which the overall experience is set up.

The program structures of interest in the current study are the social elements. Researchers have identified social presence as one of several important elements of successful virtual learning (Garrison et al., 2000; Garrison & Aykol, 2009). Connection to real-life scenarios and facilitated reflection activities appear to foster better social experiences, which are theorized to be core to successful virtual learning situations (Kilis & Yildirim, 2019; Wilson & Berge, 2023).

Within a virtual space, the key is finding the balance between a fully autonomous course and what is effectively a face-to-face course held virtually. To this end, we considered two structures of a virtual learning program: the self-paced course and the social course.

Self-Paced Design. In a fully **self-paced course**, the content is prerecorded and designed to allow completely independent learning. Key advantages of a self-paced design include personalized pacing, flexible scheduling, and increased control over the learning environment. Self-paced learning designs are the extreme end of access to learning because they can be entirely autonomous. However, this format can create challenges, including reduced accountability, limited dedicated learning time, and feelings of isolation.

Social Design. In contrast, a **social course** offers opportunities to engage with peers who are consuming the same content. The extreme version of social design is effectively a face-to-face course held virtually. These can include live sessions with a facilitator or moderator interaction. Lighter elements can include discussion boards to lean more on the strengths of the virtual context.

The big question we want to address in this study is this: What mix of self-pacing and social design elements makes the virtual format most advantageous? To find out, we tested a few variations of fully self-paced programming against a more hybridized social format.

Hypothesis 1: Virtual programs with more social elements will foster greater persistence among participants.

Leader Factors: Task Motivation

The most effective learning environments can adapt to learners in ways that facilitate and sustain their motivation. Situated expectancy-value theory (SEVT; Eccles & Wigfield, 2020; Eccles et al., 1983) provides a framework for understanding motivation in achievement contexts and suggests that an individual's choices, engagement, and performance are most immediately predicted by the following:

Expectations for Success: Expectancies describe the extent to which individuals believe they possess the ability and resources needed to succeed at a certain task. These expectancies develop through prior experiences, social comparisons, and feedback from others.

Subjective Task Values: These indicate the degree to which individuals are motivated to engage in specific tasks. There are four value components:

- ***Interest Value:*** The extent to which an individual finds participation in the task itself engaging ("Learning about communication styles is interesting").
- ***Utility Value:*** The perceived usefulness of participating in the task for achieving objectives beyond the immediate activity ("Communication skills may help me lead an international team in completing a project").
- ***Attainment Value:*** The degree to which participation aligns with an individual's identity ("Improving communication skills reflects my identity as a leader").
- ***Cost:*** The perceived barriers associated with participating in the task, such as time investment, stress, or forgoing other opportunities ("While learning communication skills is valuable, this training conflicts with other deadlines").

While SEVT is not well-studied in leadership development settings, educational researchers and social psychologists have experimentally tested different ways to influence learners' motivation (Hulleman & Harackiewicz, 2020; Rosenzweig et al., 2019; Yeager et al., 2014). Importantly, identifying effective motivation interventions can improve motivation, interest, persistence, and performance overall.

In this study, we measure participant motivation at the beginning of the course to explore its relationship with subsequent persistence.

Hypothesis 2: Participants' pre-program motivation will positively relate to course persistence.

Context Factors: Organization & Manager Support

When considering how motivation may impact learners' experiences, it is important to account for various upstream factors that can shape motivation. SEVT identifies a wide range of processes and experiences, including individual goals, identities, prior experiences, perceptions of culture and authority figures, beliefs and behaviors of authority figures, and broader cultural influences.

Organizational and managerial support, the beliefs and behaviors of authority figures, and cultural context (Park et al., 2018) all profoundly influence learning outcomes (Kravariti et al., 2023), yet these factors receive insufficient attention in many leadership development programs.

At the most practical level, upper-level support affects resource availability, protected learning time, and opportunities to apply the learning. When organizations provide time and resources for development, and managers respect and support learning commitments, participants are more likely to engage fully and persist through challenges.

Research consistently demonstrates the critical role that organizational support plays in the effectiveness of leadership development (Kraimer et al., 2011).

Both 1) perceived organizational support and 2) employees' beliefs about how much the organization values their contributions and cares about their wellbeing predict employee engagement in development activities (Eisenberger et al., 2020).

This support is provided through multiple channels. These include providing resources, setting expectations, and communicating psychological safety. An organization that establishes policies and systems that facilitate learning and reduce barriers to learning while also providing opportunities for practice can boost the likelihood of results (McCoy & Fry, 2022).

Managerial support is a particularly critical contextual factor. Immediate supervisors serve as gatekeepers who can either facilitate or obstruct development opportunities.

Research on transfer of training consistently identifies supervisory support as among the strongest predictors of learning application and sustained behavior change (McCoy & Fry, 2022). One of the most powerful ways supervisors can influence sustained behavior change is by creating opportunities for their employees to develop.

Supervisors can promote persistence and bolster results by encouraging employees' pursuit of development, adjusting role expectations to make time for development, and supporting practice outside of a program.

In this study, we measured perceived support at the beginning of the course to explore its relationship with subsequent persistence.

Hypothesis 3: Participants' pre-program manager and organizational support will positively relate to course persistence.

Methods

This is a quantitative study with quasi-experimental and correlational design. We analyzed the pre-program attitudes and in-program behaviors of participants involved in a leadership development program pilot.

PARTICIPANTS

Two cohorts took part in a virtual CCL leadership development program in 2024. We recruited participants for Cohort 1 from a list of individuals who expressed interest at an earlier stage of program design. We recruited participants for Cohort 2 from individuals who had previously indicated interest in purchasing program access for their organization.

The participants in this study were nonprofit leaders from various US regions. Table 1 presents the participant data across the study conditions. Our participant pool consisted of 165 individuals registered for the program and completed the baseline survey. Individuals who did not complete the baseline survey were omitted from the study due to a complete lack of useable data.

For the sake of transparency, we must note that the participant pool represents 51% of the broader group of individuals who registered for the program. As discussed earlier, virtual learning courses often experience extremely high attrition rates, often reaching over 90% in massive, open online courses. In comparison, the percentage for this study is more moderate.

As a pilot program offered at no cost, there were no barriers to registration, which likely increased initial interest. However, the lack of external structure, incentives, and accountability may have contributed to the substantial early attrition. Industry conditions may have also played a role: More than half of

nonprofit leaders reported greater concern about burnout in 2024 compared with 2023, as the sector continued to recover from pandemic-related pressures (Im et al., 2024). These broader challenges likely reduced leaders' available bandwidth to fully engage in a development experience.

Psathas and colleagues (2023) recommend focusing on individuals who engage within the first week of a program as a preliminary engaged sample, noting a consistent gap between registration numbers and starting numbers. In the current study, only 198 individuals even opened the learning platform — of those, 83% completed the baseline survey, which was one of the first activities in the program.

Table 1: Participant Pool and Analytic Sample by Study Condition

Condition	Registrants	Starters	Baseline Completers	% of Registrants	% of Starters
Cohort 1: Self-Paced	**270**	**168**	**140**	**52%**	**83%**
Cohort 1a: Fully Self-Paced	100	58	47	47%	81%
Cohort 1b: Self-Paced Plus	95	55	48	51%	87%
Cohort 1c: Self-Paced & Grouped	75	55	45	60%	81%
Cohort 2: Social	**56**	**30**	**25**	**45%**	**83%**
Full Study	**326**	**198**	**165**	**51%**	**83%**

Study Design

All participants took part in a 6-week virtual course on CCL's Leadership Accelerator platform. The course included 32 lessons covering leadership fundamentals and program evaluation topics for nonprofit leaders. Each lesson incorporated a mixture of self-assessments, text materials, videos, and some interactive scenarios.

In Cohort 1 (n = 140), participants experienced one of three self-paced program designs:

- **Fully Self-Paced (Cohort 1a):** This cohort (n = 47) experienced a fully self-paced course in which they could engage at their own leisure. This cohort also served as the primary comparison group or control condition, as the remaining groups in the study included additional elements.
- **Self-Paced Plus (Cohort 1b):** This cohort (n = 48) was self-paced but included additional course management like general reminders and individual check-ins from program staff.
- **Self-Paced & Grouped (Cohort 1c):** This cohort (n = 45) mirrored the fully self-paced course in design, but all participants were enrolled with at least one other person from their organization. This could be considered a "light social" design in which individuals could benefit from social elements if they chose to do so on their own.

Notably, among the Fully Self-Paced (1a) course and Self-Paced Plus (1b) courses, participants were randomly assigned. Participants in the Self-Paced & Grouped (1c) course could not be randomly assigned because we did not know when multiple individuals from an organization were available.

In Cohort 2 (n = 25), participants experienced the same content as Cohort 1 but with additional synchronous and asynchronous components, including a live virtual kick-off, discussion boards, program moderator interactions, and a live virtual wrap-up session. For the purposes of this study, we refer to Cohort 2 as the **Social** design.

Measures

As a part of the program design, we embedded program evaluation questions throughout the course. Relevant to the current study were 11 questions asked during the first lesson of the course.

Motivation. We developed a three-item measure based on SEVT components, focusing on elements most relevant to professional development contexts, which were based on prior research and participant feedback. Items assessed expectancy ("To what extent do you think you can be successful in this course?"), utility value ("To what extent do you think this course is relevant to your personal or professional goals?"), and time-related cost ("To what extent do you think you have the time to fully engage with this course?"). Participants used a five-point scale (1 = Not at all, 5 = To a very great extent) to respond to all questions. The scale demonstrated adequate internal consistency ($\alpha = .87$).

While this brief measure cannot capture SEVT's full complexity, we focused on components most predictive of adult learning engagement based on prior research (Hulleman & Harackiewicz, 2020). The time-cost item proved particularly important given the competing demands working professionals face.

Support. We assessed perceived support using two items: manager support ("To what extent is your manager supportive of your professional development?") and organizational support ("To what extent is your organization supportive of your professional development?"). Participants used the same five-point response scale. The measure showed adequate reliability ($\alpha = .81$).

Persistence. We measured persistence as the number of activities completed out of 32 total course lessons. This measure provides more precision than binary completion indicators and captures varying degrees of engagement. The course required completion of at least 24 lessons to be classified as finished, but we used this measure to capture the full range of participation patterns.

To align our analyses with our hypotheses:

- **Cohort** represented *program factors* (Hypothesis 1).
- **Motivation** represented *leader factors* (Hypothesis 2).
- **Support** represented *context factors* (Hypothesis 3).
- **Lessons Completed** represented *persistence*.

Results

KEY FINDINGS

- **Social formats led to greater persistence.** Participants in courses with social elements (peer discussion, live sessions, or group participation) completed more lessons than those in fully self-paced versions.
- **Motivation predicted completion.** Leaders who began the program feeling more confident, seeing more personal relevance, and/or expecting more time to engage in the program completed more lessons overall than individuals with lower motivation ratings.
- **Support mattered indirectly.** Organizational and managerial support was related to higher persistence through its relationship with motivation.
- **The three factors were interdependent.** Motivation was linked design and context: social formats and supportive environments were related to higher motivation, which in turn predicted lessons completed.

ANALYSIS SUMMARY

In this study, we examined three hypotheses regarding predictors of persistence: that 1) program factors, 2) leader factors, and 3) context factors are predictors of persistence in a virtual leadership development course. Our results supported all three hypotheses, confirming theoretical expectations about the factors that influence virtual learner engagement (see Appendix 1 for an overview of the descriptive statistics, Appendix 2 for a full description of the analyses, and Appendix 3 for detailed results).

Finding 1: Participants in programs with social elements completed more lessons than those in programs without social elements.

Our first hypothesis was confirmed. On average, participants in the Social cohort completed 7.41 more lessons ($p < .05$) than the Fully Self-Paced cohort after adjusting for Support and Motivation variables.

Notably, the three self-paced cohorts did not differ statistically from each other, but the Self-Paced Plus and Self-Paced & Grouped cohorts both completed more lessons (0.94 and 1.85, respectively) than the Fully Self-Paced cohort.

While not statistically different, the Self-Paced & Grouped cohort participants completed nearly 2 more lessons than the Fully Self-Paced cohort participants, supporting a pattern of results indicating that social elements improve program design.

These findings are consistent with research suggesting that program design supported with social elements may lead to better engagement and outcomes.

Finding 2: Higher pre-program motivation was positively related to more lessons completed.

We also confirmed our second hypothesis. On average, participants completed 2.26 more lessons for each point higher in their reported pre-program motivation, after accounting for Cohort and Support.

This observation is consistent with existing research on achievement motivation, which indicates that individuals exhibiting greater task-level motivation are more likely to persist in completing assigned tasks.

Finding 3: Higher pre-program support was related to higher motivation and (indirectly) to more lessons completed.

Our third hypothesis was partially confirmed. Higher support was positively related to lessons completed, but only through its relationship with motivation. Like the previous finding, the relationship is relatively small ($ab = 1.63$, $p < .05$) but theoretically meaningful.

Although we expected a direct effect, this finding does align with research on achievement motivation, which states that more distal factors like culture and other influential social connections play a role in task motivation (Eccles & Wigfield, 2020).

Study Limitations

Several limitations affect the interpretation of these findings. The quasi-experimental design, with nonrandom assignment to social versus self-paced conditions, introduces selection bias that limits causal inference about format effects. Participants in the Social cohort may have differed in meaningful ways from those in the Self-Paced cohorts. Future studies will need to specifically test whether program design causes the observed differences.

The modest effect sizes, while practically meaningful, indicate that measured factors explain only a small portion of the variability in persistence. Other unmeasured factors like technological skills, competing priorities, life circumstances, and program-specific factors likely play important roles in determining persistence. Future studies will need to include a broader selection of variables to rule out other predictors.

The sample in this study has limited generalizability to other industries because it comprises nonprofit leaders from a single pilot program. Nonprofit organizations may create unique motivational and support contexts that differ from corporate or government settings. Replicating this study with other leader types would clarify its broad applicability.

Measurement limitations include the brief assessments of motivation and support, which captured only limited aspects of these complex constructs. The single-item support measures, while adequate for pilot research, would benefit from more comprehensive assessments in future studies.

While this study sheds light on factors related to persistence among individuals who begin a course, it lacks data on those who register but never begin. This is a common gap in virtual learning, and the research on preliminary attrition appears to be lacking. A future study that follows up with nonstarters could illuminate strategies to improve uptake or at least set expectations for reasonable participation rates.

Implications for Practice

Virtual leadership development promises scale and flexibility, but its success depends on leaders staying engaged long enough to benefit. This study shows three things: Program design (program factors), learner motivation (leader factors), and support (context factors) predict persistence. For practitioners designing or facilitating online leadership programs, several clear takeaways emerged.

1. **Design for connection, not just content**

Virtual learning often fails when it feels isolating. Even minimal opportunities for interaction, such as small groups, discussion prompts, or periodic live sessions, can make a difference in persistence.

- **Create small learning communities or buddy systems.** Pair participants from the same organization or similar roles to reflect together or share application stories.
- **Build "light touch" social presence.** Simple discussion boards or asynchronous comment spaces can enhance accountability and shared learning without sacrificing flexibility.
- **Facilitate connections asynchronously.** Visible instructor engagement (check-ins, short videos, personalized messages) reinforces signals that participation is noticed and valued.

A key insight for program designers: You do not need to turn a self-paced course into a fully synchronous one. Instead, add just enough social structure to create momentum and belonging.

2. **Address motivation before launch**

Pre-program motivation predicts persistence more strongly than program format alone. Before participants start, use brief activities or communications to help them connect the learning to their goals and their identity.

- **Encourage reflection from the start.** Pre-course reflection prompts ("How will this program help you achieve your leadership goals?") can increase program relevance and ownership.
- **Encourage participants as they begin.** Onboarding messages that reinforce confidence ("You have what it takes to succeed here") and relevance ("This course connects directly to your daily leadership challenges") help build expectancy and utility value.
- **Provide early confidence building opportunities.** Early wins, such as quick assessments or interactive tools in the first week, can boost participants' belief in their ability to succeed.

Motivation is not fixed; it can be designed for. Integrating short motivation moments into onboarding and early lessons can help leaders sustain engagement throughout the program. At a minimum, being aware of motivational challenges early on can help facilitators or course managers nudge leaders toward engagement.

3. **Strengthen organizational & managerial support**

Even the best-designed programs can falter if learners lack time, encouragement, or follow-up from their workplace. Leaders persist when their organizations actively support learning.

- **Secure visible sponsorship.** Have senior leaders communicate why development matters, and give them explicit permission to prioritize learning time.
- **Equip managers to coach participation.** Encourage them to check in on progress, discuss insights, and create opportunities to practice on the job.
- **Protect learning time.** Encourage organizations to schedule learning hours as part of work expectations, not as extra time outside of regular duties.

These small organizational practices send a strong signal: development is part of the job, not a distraction from it.

4. **Blend flexibility with accountability**

While flexibility attracts participants, accountability sustains them. Hybrid models that combine self-paced content with touchpoints often yield the best balance.

- **Provide progress metrics.** Set clear progress milestones with visible completion tracking.
- **Check in regularly.** Incorporate scheduled checkpoints (e.g., mid-program live sessions or group reflections).
- **Nudge participants to keep going.** Use reminders that emphasize purpose vs. policing ("You're halfway there — how are you applying what you're learning so far?").

The goal is to make the virtual experience feel supported, not supervised.

5. **Make data part of the design**

Finally, practitioners can borrow a page from researchers and evaluators: treat program data as part of the learning ecosystem.

- **Know what is happening.** Monitor persistence and engagement data weekly, not just post-program.
- **Be ready to adjust.** Learn from early patterns to identify at-risk learners and intervene with supportive outreach.
- **Keep feedback flowing.** Enact short feedback loops on motivation and support to guide program iteration.

Programs that adapt to real-time learner data signal care and responsiveness — two of the primary ingredients for motivation.

Summary

Persistence is not a learner trait, it is a system outcome. Leaders stay engaged when program formats foster connection, learners see personal value and feasibility, and organizations create space and encouragement for learning. Practitioners who align design, motivation, and support may significantly improve both engagement and eventual development outcomes.

IMPLICATIONS FOR THEORY

A major critique of current leadership development research is the lack of causal and theory-driven studies (Day et al., 2021). Current research on motivation in leadership development emphasizes motivation to lead (Badura et al., 2020), reflecting a general inclination toward leadership roles rather than achievement motivation, which this study introduces.

Beyond motivation to lead, individual characteristics and preferences (e.g., Boyce et al., 2010) seem to be more prevalent than task-level factors when motivational factors are considered.

Likewise, while extensive literature exists on leader self-efficacy (Dwyer, 2019), it often centers on individuals' confidence in their leadership abilities rather than on specific behaviors within the context of leadership development. Investigating achievement motivation in this field may reveal new avenues for maximizing the impact and understanding of both individual and group developmental trajectories.

It is crucial to distinguish the requirements necessary for effective leadership from those pertinent to leadership and leader development; the latter are processes fundamentally centered on learning. As such, leveraging findings from educational psychology could provide valuable methodologies to further enhance the efficacy of leadership development programs (Leis, 2024).

Future Research Directions

The findings and limitations of this study set a foundation for several future research directions.

Experimental Tests of Program Formats. The nature of virtual learning platforms enables many opportunities to conduct randomized experiments on various elements of virtual leadership development programs. Although this study was unable to establish causal relationships, further experimental tests may offer more substantiated evidence regarding specific design components. Because the content (i.e., lessons) on these virtual learning platforms is easily compartmentalized, it is possible to test different learning formats within an individual's experience. Should effective design elements be identified in further experiments, they could inform the development of more efficient leadership programs. As a result, leadership development initiatives could better address individual needs and present tailored content that contributes to improved program outcomes.

Develop a More Comprehensive Measure of Motivation. Although the motivation measurement applied in this study was brief and addressed only a limited range of motivational experiences, it still produced results. For instance, the item related to cost focused on time availability but did not address competing priorities, stress, or additional considerations. Creating and implementing a more thorough measure could result in more comprehensive, actionable insights into leader experiences. Determining specific needs could inform targeted support recommendations.

Translate More Achievement Motivation Research. While achievement motivation concepts are applicable to any learning context, how the concepts manifest and function requires targeted research. For example, motivational trajectories during a leadership development experience are likely to differ from those present in a college classroom because learners receive different kinds of feedback, depending on their learning environment (Kosovich et al., 2017). Furthermore, the nature of leadership development means three things: the bulk of leadership development is likely occurs outside a classroom context, is an ongoing process, and is qualitatively different from job motivation.

Conclusion

Leadership development is a critical organizational investment, and virtual leadership development programs offer greater and more flexible access than traditional in-person programs. Unfortunately, low persistence rates limit their potential impact, as leaders cannot benefit from content they do not experience. In this study, we show how program format, motivation, and organizational support shape persistence in virtual learning environments, and we provide new evidence that these factors jointly influence engagement.

From a practitioner standpoint, the results highlight **three practical levers for improving persistence:**

1. Design virtual programs that foster social connection.
2. Prime motivation before the program begins.
3. Ensure organizational and managerial-level support for learning.

Even modest social elements and clear motivational framing are related to significantly higher persistence. When organizations actively endorse development and protect learning time, leaders are more likely to persist and apply what they learn.

Importantly, participation itself is a meaningful outcome. While this study focused on persistence rather than learning transfer, participation is a prerequisite for any developmental benefit. Measuring and improving persistence helps organizations ensure their investment in development reaches its intended audience and creates the conditions for longer-term impact.

Perhaps most critically, **this study reinforces the fact that leadership development cannot be treated as an isolated intervention.** To fully realize the benefits of leadership development, organizations must create supportive systems that cultivate learner motivation, psychological safety, and opportunities for continued practice. For researchers, our findings underscore the value of integrating educational psychology and leadership theory to better understand the dynamics of learning engagement. For practitioners, it offers a roadmap for designing virtual leadership programs that are both accessible and sustainable, where leaders stay engaged, learn deeply, and apply what they learn in ways that strengthen their organizations.

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Appendix 1: Descriptive Comparisons

Table A1 presents baseline descriptive statistics for the three motivation items and the two support items for each group of individuals, as well as the aggregate cohort scores. On average, the self-paced cohort (Cohort 1) reported higher mean ratings than the social cohort (Cohort 2). These differences limited our ability to make strong causal claims, as factors unrelated to the program may have driven membership in different program conditions.

Table A1: Contributing Factor Descriptive Statistics by Cohort

							Response Frequencies				
Cohort 1a	**Variable**	**n**	**M**	**SD**	**Min.**	**Max.**	**1**	**2**	**3**	**4**	**5**
(Fully Self-Paced)	Expectancy	47	4.50	0.71	3	5	0	0	6	12	30
	Value	47	4.42	0.79	2	5	0	1	6	13	28
	Cost	47	4.15	0.85	2	5	0	2	8	19	19
	Manager Support	47	4.62	0.61	3	5	0	0	3	12	33
	Org Support	47	4.57	0.65	3	5	0	0	4	12	31
							Response Frequencies				
Cohort 1b	**Variable**	**n**	**M**	**SD**	**Min.**	**Max.**	**1**	**2**	**3**	**4**	**5**
(Self-Paced Plus)	Expectancy	48	4.04	0.82	2	5	0	2	9	22	15
	Value	48	4.40	0.82	2	5	0	2	4	15	27
	Cost	48	3.58	1.01	1	5	1	5	17	15	10
	Manager Support	48	3.98	1.06	1	5	1	2	15	9	21
	Org Support	48	3.94	1.12	1	5	1	4	13	9	21
							Response Frequencies				
Cohort 1c	**Variable**	**n**	**M**	**SD**	**Min.**	**Max.**	**1**	**2**	**3**	**4**	**5**
(Self-Paced & Grouped)	Expectancy	45	4.27	0.81	2	5	0	3	1	22	19
	Value	45	4.51	0.59	3	5	0	0	2	18	25
	Cost	45	3.80	0.87	1	5	1	0	16	18	10
	Manager Support	45	4.36	1.03	0	5	0	1	5	11	27
	Org Support	45	4.27	0.91	1	5	1	0	8	13	23
							Response Frequencies				
Cohort 1	**Variable**	**n**	**M**	**SD**	**Min.**	**Max.**	**1**	**2**	**3**	**4**	**5**
(All Self-Paced)	Expectancy	140	4.27	0.78	2	5	0	5	16	56	64
	Value	140	4.44	0.74	2	5	0	3	12	46	80
	Cost	140	3.84	0.91	1	5	2	7	41	52	39
	Manager Support	140	4.32	0.90	0	5	1	3	23	32	81
	Org Support	140	4.26	0.89	1	5	2	4	25	34	75
							Response Frequencies				
Cohort 2	**Variable**	**n**	**M**	**SD**	**Min.**	**Max.**	**1**	**2**	**3**	**4**	**5**
(Social)	Expectancy	25	3.76	0.93	2	5	0	3	5	12	5
	Value	25	4.00	0.91	2	5	0	2	4	11	8
	Cost	25	2.96	1.31	0	5	1	9	4	7	3
	Manager Support	25	4.24	0.78	3	5	0	0	5	9	11
	Org Support	25	4.04	0.89	2	5	0	1	6	9	9

Table A2 contains the descriptive statistics for Lessons Completed by Cohort, which represents the persistence outcomes by condition. Cohort 2 (Social Format) participants completed 4 more lessons than Cohort 1 — notably, Cohort 1c (Grouped Self-Paced) participants completed approximately 2 more lessons than the other Cohort 1 subgroups.

Table A2: Descriptive Statistics for Lessons Completed

	Lessons Completed					Program Completed	
	n	**M**	**SD**	**Min**	**Max**	**N**	**Completion Rate**
Cohort 1 (Self-Paced)	**140**	**11.02**	**10.39**	**0**	**32**	**26**	**18.6%**
Fully Self-Paced (1a)	47	10.45	9.54	0	32	8	17.0%
Self-Paced Plus (1b)	48	10.42	11.27	0	32	9	18.8%
Self-Paced & Grouped (1c)	45	12.33	10.33	0	32	9	20.0%
Cohort 2 (Social)	**25**	**15.07**	**12.04**	**0**	**32**	**9**	**33.3%**

Missing Data

Data analysis was limited to participants who completed at least the baseline survey, which included motivation and support variables. Unfortunately, the demographic/context variables had substantial, non-overlapping missingness that prevented further use in the study. Although it would be ideal to conduct multiple imputations, there did not appear to be enough information to do so in a valid way.

Appendix 2: Detailed Analyses

STATISTICAL MODELS

To investigate the relationships between contributing factors and lessons completed, we conducted a series of structural equation models (SEMs) using the *lavaan* package in R (Roseel, 2012).

We implemented diagonal weighted least squares (DWLS) estimation, which is the recommended algorithm for ordinal data (Li, 2021). We also collapsed response options 1, 2, and 3 for motivation and support items because they were used infrequently, which prevented our models from being able to run.

LATENT VARIABLE MEASUREMENT MODEL

First, we examined the viability of creating a motivation scale and separate support scales. To assess the psychometric structure of the motivation and support items, we conducted a confirmatory factor analysis (CFA). We tested two models: a one-factor solution that included all five items and a two-factor solution that grouped the motivation items and the support items.

The one-factor solution failed to display adequate fit ($\chi^2(5) = 59.50$, $p < .01$, CFI = .98, RMSEA = 0.258, SRMR = .10). The two-factor solution yielded excellent fit ($\chi^2(4) = 1.29$, $p = .86$, CFI = 1.00, RMSEA = 0.00, SRMR = .02) and strong reliability for Motivation ($\omega = .92$) and support ($\omega = .89$). As a result, we elected to include the two separate factors in our later analysis.

TESTING HYPOTHESES

To test our hypotheses, we included our cohort, motivation, and support measures along with our outcome, namely, lessons completed. We tested three models in our analyses.

Model 1 incorporated the two latent variables, Motivation and Support (see Appendix 2 for a summary of the measurement model), along with three dummy variables that represented the Self-Paced Plus, Self-Paced and Grouped, and Social groups as predictors of Lessons Completed.

Model 2 retained these variables but specified Support as a predictor of Motivation, based on the high correlation between the Support and Motivation and the theoretical ordering proposed in situated expectancy-value theory (i.e., contextual support precedes task-level motivation).

Model 3 mirrored Model 2 but added pathways from the cohort variables to both Motivation and Support to adjust for baseline differences.

Appendix 3: Detailed Results

Only Model 3 was of sufficient quality to interpret the results ($\chi^2(17) = 19.11$, $p = .32$, CFI = 0.999, RMSEA = 0.028, SRMR = .041). In this model:

- Cohort predicted Support and Motivation (see Appendix 2)
- Support predicted Motivation ($b = 0.72$, $p < .05$)
- Motivation predicted Lessons Completed ($b = 2.26$, $p < .05$)
- Cohort 2 predicted Lessons Completed ($b = 7.41$, $p < .05$)
- Support indirectly predicted Lessons Completed through Motivation ($b = 1.63$, $p < .05$)

See Table A3 for our model fit summaries, a simplified illustration of the final model in Figure 1, and the detailed illustration of the final model in Appendix 3. As we describe in the following section, our hypotheses were generally supported — all three contributing factors are related to the number of lessons completed, directly or indirectly.

Table A3: Structural Equation Model Fit

Model	χ^2 (df)	CFI	RMSEA	SRMR
Model 1	$\chi^2(22) = 92.73$*	.967	.138	.031
Model 2	$\chi^2(23) = 101.00$*	.963	.144	.040
Model 3	$\chi^2(17) = 19.11$	.999	.028	.041

Note: Determining model fit is a holistic assessment, and multiple values should be examined to decide if a model is acceptable or not. Researchers (Hu & Bentler, 1999; Marcoulides & Yuan, 2020) recommend the following values for concluding acceptable fit: χ^2: $p > .05$, CFI: ≥ .95, RMSEA: < .06, SRMR: < .08.

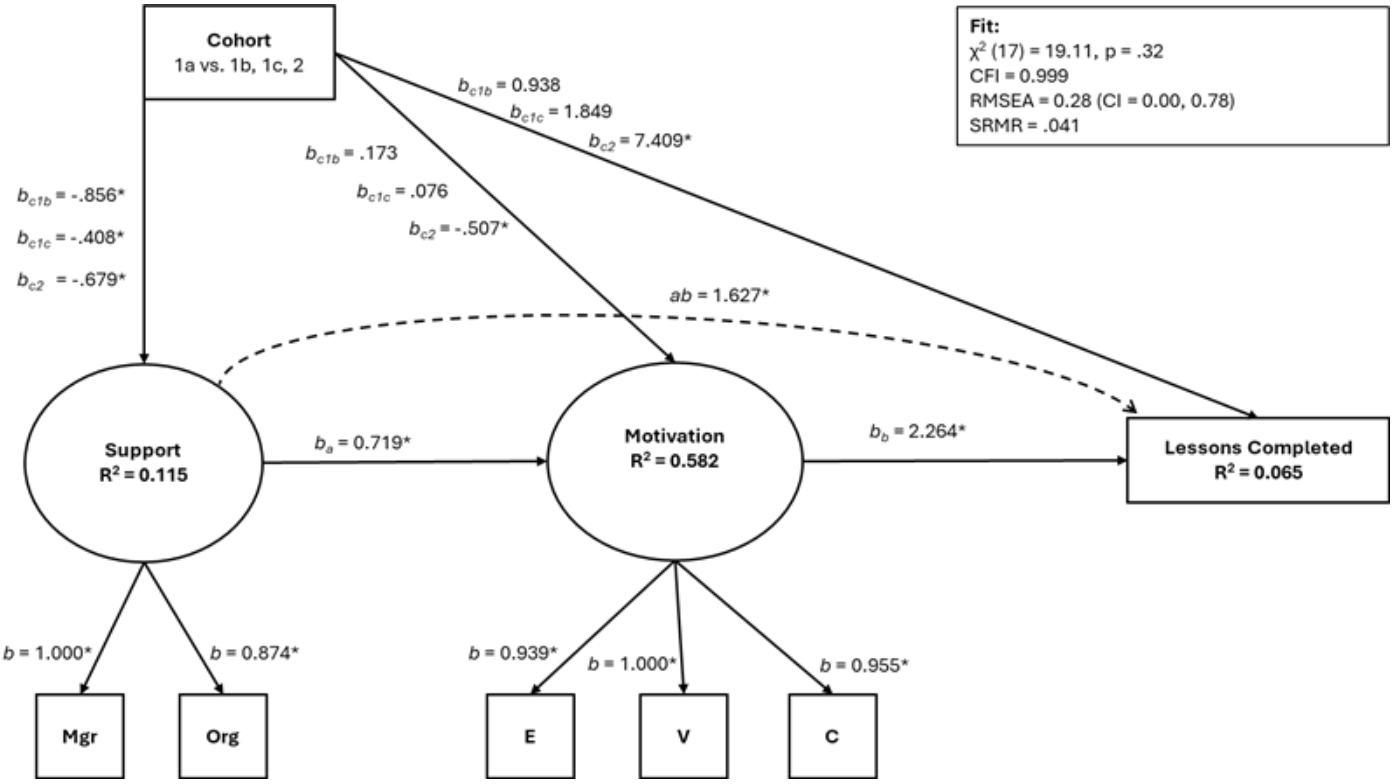

Figure A3: Structural Equation Model 3 — Model displayed adequate fit to interpret the results. Cohort was represented by 3 dummy variables, wherein Cohort 1a (Fully Self-Paced) was the comparison group. All three cohorts differed on pre-program support. Cohort 2 displayed lower average pre-program motivation. Only Cohort 2 significantly predicted lessons completed. Motivation predicted lessons completed, controlling for support and cohort. Support predicted motivation directly and lessons completed indirectly.

At the Center for Creative Leadership, our drive to create a ripple effect of positive change underpins everything we do. For 50+ years, we've pioneered leadership development solutions for everyone from frontline workers to global CEOs. Consistently ranked among the world's top providers of executive education, our research-based programs and solutions inspire individuals in organizations across the world – including 2/3 of the Fortune 1000 – to ignite remarkable transformations.