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Developing global leaders in a digital world

Lee Waller

Sona Sherratt

Vicki Culpin

Sam Wilkinson

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For more information please contact_research@ashridge.hult.edu

Hult International Business School

Ashridge House, Berkhamsted

Hertfordshire, HP4 1NS

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Executive Summary

Introduction

As our world becomes ever more global, our ways of working become increasingly virtual. Operating across countries demands digitized communication and collaboration – a trend which is also being reflected in the way in which we develop our leaders. But research suggests that in order to prepare leaders for the challenges of leadership, development programs need to incorporate emotionally charged experience. So can virtual, online platforms really replicate this level of interaction, involvement and emotional engagement, or are there limitations to the benefits that can be afforded through virtual methodologies?

The research regarding the efficacy of virtual and blended learning is mixed with some suggesting it is the poor cousin of face to face, whilst other research finds it to be just as effective in terms of both learning and learning transfer. What appears to be critical is the methodology employed rather than the environment per se, and that so long as virtual and blended learning offers the opportunity for experience, for interaction, and for feedback it should be just as effective in developing our leaders. Perhaps therefore, a development program that incorporates the emotional experience of face to face experiential learning might be as effective as a classroom based experiential learning approach?

Research also suggests however, that different personalities may be more comfortable with and learn better from different environments and through different methodologies. As such, might personality characteristics such as extraversion, anxiety, behavioral inhibition or learning agility attenuate the benefits afforded by face to face or virtual experiential learning?

This research report addresses these questions with 37 participants on three experiential programs using different environments: face to face, virtual and blended. Through pre and post measures of heart rate variance, learning, learning transfer and personality, the research explores whether the learning gained through a face to face, experiential behavioral simulation might be replicated in virtual or blended environments, as well as considering whether different personality characteristics might moderate the impact on learning from these different approaches.

Key findings

- Virtual and blended environments which employ experiential methodologies incorporating interaction, experience and feedback, are as effective as face to face in developing competences around 'self as leader' and 'dealing with difficult situations'
- Virtual and blended experiential learning is as effective as face to face in increasing heart rate indicating a level of challenge and stress, an increase which is also related to learning as 'self as leader' and 'dealing with difficult situations'
- Virtual, blended and face to face experiential learning methodologies are effective in encouraging application of learning back in the workplace, and confidence in doing so is due to the program
- Experiential learning methodologies, irrespective of environment are effective in not only developing competence, but developing learning agility in terms of learning from others, managing emotions, and reflecting on experience
- Individuals high in extraversion, conscientiousness and openness have higher increases in heart rate during experiential learning which might mean they are more engaged in this type of methodology
- True learning from experiential methodologies takes time to embed, with significant improvement occurring between pre-program and three-month's post-program, but not one-week post-program

Implications for practice

- Virtual environments and blended learning environments offer the potential to effectively develop leaders across the globe without the impracticalities of travel and long periods of time out of the office, facilitating the scalability of L&D initiatives
- Experiential learning may be a valuable tool for L&D professionals not only in developing specific competences, but in developing their leaders' learning agility and capacities for learning and dealing with change
- In order for programs to lead to lasting learning, development needs to be real, challenging, and induce a certain level of stress. By taking leaders out of their comfort zone into the 'stretch' zone and raising their heart rate, programs can improve cognitive performance during the experience and learn from it
- Program evaluations conducted immediately after a program should be followed up three-month's post-program to get a meaningful picture of impact on both learning and learning transfer
- L&D practitioners need not be concerned as to whether a potential program participant is an extrovert, introvert, anxious, or behaviorally inhibited when selecting an appropriate learning intervention. All personality types are equally (and positively) impacted by interactive, experiential learning experiences





Introduction

As our world becomes ever more global, our ways of working become ever more virtual. Operating across countries demands digitized communication and collaboration – a trend which is also being reflected in the way in which we develop our leaders. But can leaders really learn how to lead, can they develop the competences, resilience and resourcefulness to step up to the challenges of leadership through learning that is online? Or are there limitations to the benefits that can be afforded through virtual methodologies?

This research report addresses these questions. Drawing on experiential learning theory and research from the management development arena, this report explores whether the learning gained through a face to face, experiential behavioral simulation might be replicated in virtual or blended environments, and in addition considers whether different personality characteristics might moderate the impact on learning or application of learning from these different approaches.

It will begin with a review of the relevant literature regarding learning from experience, the impact of different learning methodologies, and the moderating role of different personality characteristics, before presenting what we did and found in our research, and discussing the implications for practice.

Theoretical background

Learning through experience

Experiential learning is defined by Kolb as the process of knowledge creation through the transformation of experience. The theory contends that in the management arena, real learning occurs through engagement in challenging experiences, and later reflection on those experiences. Research supports this assertion finding learning through experience to be related to the development of both critical leadership competences, such as cultural intelligence, and to provide a valuable vehicle for preparing individuals for future leadership challenges and development as a leader.

The level of challenge and stretch in the experience would also appear to be important, as more challenging experiences which require leaders to solve complex problems present opportunities for the acquisition of new skills, knowledge, and competences and result in more developmental learning.

Whilst learning through experience may be a valuable vehicle for learning, research also suggests that for such experiences to have long-lasting effects, they need to be emotionally charged. For example, D'Mello and Graesser found that negative emotions were related to deep learning, and Bolte et al., found that positive emotions during a learning event were related to improved cognitive performance. The impact of emotion on learning is also supported by a wealth of research that has shown that emotional experiences are retrieved more reliably from memory than neutral events, and that clarity and vividness of memories is related to the emotionality of the recalled experience. Whilst both positive and negative emotions have been found to be related to learning, what appears to be critical to the impact of experience is the intensity of the emotion, which has been found to be more consistently related to memory than the valence of the emotion.

One explanation for the impact of intense emotional experiences on learning comes from the field of neuroscience, and from our understanding of what occurs in the brain and body during times of stress. During such experiences our body's stress hormones produce a state of arousal, our sympathetic nervous response, which prepares us for fight or flight. When the brain and body are moderately aroused by a situation we respond in challenge state, which optimizes cognitive performance such as decision making, learning and the formation of memories. But if we do not believe we have the resources available to meet the challenge, we become over aroused, and the body, perceiving threat, prepares to fight or retreat sending blood away from the brain towards the extremities impeding our cognitive performance.

Given the above, it has been argued that for leadership development experiences to have a lasting impact, they need to invoke a moderate level of stress which will induce the body's sympathetic nervous response. However, to ensure that this arousal results in improved rather than impeded cognitive performance, such experiences need to equip participants with the resources and support to ensure they respond in challenge rather than threat state.

This proposition was the focus of previous Ashridge research, The Neuroscience of Leadership Development: Preparing through Experience, which explored the relationship between a measure of the difference between resting heart rate (HR) and HR during critical incidents on Ashridge's The Leadership Experience program (TLE) with self-reports of learning to assess impact on perceived learning. As predicted, the research found that an increase in heart rate during the critical incidents was significantly related to learning, and as such supported the proposition that stress inducing experiences are powerful vehicles for learning.

Our digitized world

Whilst our earlier research demonstrated the impact of experiential methodologies on learning and learning transfer, the research focused only on an in-classroom, face to face approach. Given the growth in reliance on virtual collaboration in our increasingly global environment, and the development of new technologies facilitating virtual collaboration, working virtually is becoming increasingly common in many organizations, and this trend is being reflected by learning and development professional and in academia with increasing use of virtual technologies to deliver distance learning, virtual learning and e-learning.

The question arises therefore whether the same level of impact as an experiential, face to face behavioral simulation could be achieved in a virtual environment. Indeed, Erez, Lisak, Harush, Glikson, Nouri, and Shokef call for management development to mirror the global environment and develop opportunities to both develop virtual global programs as well as methods that will facilitate the development of the leadership skills required to work in this global, virtual world.

So what do we mean by virtual learning?

Virtual learning

Learning in a virtual environment primarily involves the use of the internet to access materials, interact with content, and interact with other students and faculty through discussion boards, sharing documents and learning content in support of the learning process. The terms virtual learning and e-learning are often used interchangeably, the latter having been defined as all forms of electronically supported or mediated learning which involves the acquisition of knowledge distributed and facilitated by electronic means.

In recent decades the use of virtual learning, initially through distance learning and then through more interactive approaches has increased rapidly, with 77% of organizations in the US using online corporate training and 30.4% of training hours being delivered online in 2015. This increase in online courses and programs is likely attributed to the advancement of information technology and the flexibility and convenience provided by this delivery format. Online learning provides a viable and flexible option for students, especially for those who have distance, time, career, family or language constraints, enhances access to large amounts of knowledge and information, and now, through the advent of new technologies, allows interaction between student and teacher through chat rooms and discussion forums.

From a learning institution's perspective, virtual learning removes the geographical and perhaps political constraints of participant recruitment, enables scalability and is financially cost-effective, whereas from the perspective of the organization it minimizes the cost of developing a geographically distributed workforce and reduces the number of days required away from the office.

However, there is lot of research that suggests that face to face learning is more impactful than online distance learning, in terms of various learning outcomes. Brown and Liedholm for example found that face to face students significantly outperformed online students in exam results, and Figlio et al., found that face to face students' average exam grades were higher than those who received online delivery.



The reason for these findings could be down to the variety of challenges that virtual environments present to the learning experience. For example, learning in a virtual environment limits the presence of non-verbal cues and contextual information and may attenuate the potential for the development of various outcomes such as team dynamics, community building and communication. Indeed, Badii and Culan assert that soft skills, such as interpersonal skills, verbal and communication skills, and leadership skills cannot be taught via e-learning. Despite the growth in e-learning reported above, there is evidence that this concern is reflected in practice, particularly in relation to the development of soft skills, with almost 82% of learning and development professionals rating live, classroom based teaching as their preferred method of teaching soft skills for emerging managers and 75% of organizations reporting that they continue to use traditional classroom methods to teach soft skills.

It has also been argued that virtual environments offer little opportunity for feedback, which is considered to be an integral part of the learning cycle, whereby students receive feedback from tutors on the application of learning and guidance on how they are progressing, allowing them to adapt their action accordingly and develop the confidence to continue.

Finally, virtual learning may also isolate the learner through limited social interaction, which is argued to be vital to fostering learning, and which has been suggested by some researchers to be a contributory factor in the poor performance of virtual learning programs. The absence of interaction also results in a lack of opportunities to establish relationships and networks as well as share perspectives which may limit the opportunities for clarification and explanation from the teacher, and require greater levels of motivation.

As such, despite the promise of virtual learning, research suggests that its impact on learning, particularly in terms of the development of soft skills may be restricted by the lack of social interaction, feedback, and non-verbal cues inherent in the format.

However, as is typical of psychological research, there also exists a body of literature that suggests that in fact online education may provide a superior learning experience for students than traditional, face to face methods. These benefits may be in part the result of the move from primarily asynchronous learning to more synchronous, interactive learning environments potentiated by the advent of new technologies such as wikis, webinars, and interactive discussion forums which offer the potential for greater levels of interaction as well as more experiential forms of learning. This proposition is supported by research that has found that the level of effectiveness of online courses is associated with the level of instructor support, interaction, and delivery quality, and that impact on student competence depends on the level of challenge and communication offered by the instructor.

It could be therefore that the divergence in findings in terms of the performance of virtual over face to face learning could be due to the learning methodology incorporated in both face to face and virtual learning rather than the learning environment itself. Additionally, it could be that methodologies that include peer-to-peer and student-to-teacher interaction, as well as elements of experiential learning may be as impactful in a virtual environment as a face to face environment. DeBard and Guidera concur, proposing that the principles of experiential learning, particularly the active learning element whereby students learn by doing, should be transferable to virtual environments. They argue that synchronous communication avenues and the potential for building a community through peer and teacher led discussion should result in satisfaction and greater perceived learning.

Blended Learning

An alternative approach to either pure face to face or pure virtual learning is blended learning, which is broadly defined as a combination of face to face and online learning, blending face to face interaction with technologically-mediated interaction between students, teachers and resources. As such, blended learning combines the benefits of synchronous learning which facilitates communication and development of a sense of community with the benefits of asynchronous learning which allows for just-in-time learning as well as interaction with and sharing of learning.

A blended approach therefore may be more valuable than both a face to face or virtual environment, and indeed research

suggests that blended learning may be the same or more impactful on learning than traditional face to face only programs. Al-Qahtani and Higgins for example in their investigation of the impact on level of knowledge of e-learning, face to face and blended learning programs found that the blended program out-performed both the face to face and e-learning programs.

This result also holds true for learning transfer with research finding that blended programs often out-perform face to face. Similarly, Demirer and Sahin found no difference between face to face only learning and blended learning approaches (whereby students and teachers interacted synchronously

and asynchronously in an online environment as well as face to face) in terms of academic achievement, but a significant difference between the two groups in terms of learning transfer four weeks post-program, with the blended version outperforming the face to face.

Given the extant literature, one objective of the current research was to explore whether virtual and blended learning which incorporated opportunities for interaction, feedback, and experience, might be as impactful on both learning and learning transfer as face to face experiential learning.

Influence of personality on outcomes from different teaching methods

However, there is also a wealth of research that suggests that different personality characteristics, such as learning styles, personality types, or psychological traits, may moderate the impact of learning outcomes of different learning methodologies. A recent study by Li and Armstrong for example, investigated the relationship between experiential learning and the Five Factor Model (FFM) of personality. The FFM of personality assumes a trait theory perspective, and suggests individual differences characterize a person and influence thoughts, feelings and behaviors (McCrae and Costa, 1991). The factors in this model include neuroticism, extraversion, openness, agreeableness and conscientiousness. Li and Armstrong's research explored the impact of the FFM with international managers, and found that extraversion was positively related to learning from experiential learning. This result is consistent with previous research which suggests that extraverted individuals tend to have an external thinking style and tend to be more innovative and adaptive in their cognitive style, which may impact their experience of and outcomes from experiential learning.

Other personality characteristics have also been found to be related to the different elements associated with experiential learning. For example, individual differences in negative emotional arousal (as potentially induced

by experiential learning) have been found to moderate the effect of stress on cognitive performance. The level of anxiety has been found to be positively correlated with sympathetic nervous system response which, as discussed above, is stimulated through stretching experiential learning, and individuals with high behavioral inhibition scores (those who are driven to move away from something unpleasant) have been found to react with more intense negative affect in response to threats as potentially presented by experiential learning.

The literature also suggests potential relationships between virtual learning and personality, with a study that examined the effects of personality traits on antecedents of perceived usefulness and intention to use virtual resources by Jaques, Garger, Brown and Deale finding that personality traits significantly predicted propensity to trust and technology communication anxiety, two indicators of potential success.

All of the above suggests that different personality characteristics might well influence the impact of different methodologies on our ability to learn, and as such should be included in any exploration of the impact of those methodologies.

Finally, the literature also suggests that learning agility may play a role in the impact of different methodologies. Most research suggests that learning agility is a mind-set and a corresponding collection of practices that allow leaders to continually develop, grow and utilize new strategies which equip them for the increasingly complex problems they face in their organizations. There is however, some discrepancy in its definition with De Meuse et al., defining learning agility

as an individual's ability and willingness to learn from experience, LePine et al., consider learning agility to be about an individual's ability to learn quickly from an experience, be flexible moving across ideas, and ability to maximize learning from that experience, and DeRue, Ashford and Myers propose that individual differences in goal orientation, metacognitive ability and openness to experience are associated with learning agility.

This intuitively suggests that learning agility might be related to enhanced learning from experiential learning, an assumption which is supported by research which has found that participants who are more learning agile cope better in some situations, such as challenging environments, and learn better from experience than less learning agile leaders. Moreover, DeRue et al., suggest that the concept of learning agility offers the most valuable application in consideration of an individual's speed and flexibility in dealing with experiential learning.

Taken together, the extant research suggests that, whilst virtual learning and blended learning environments might be beneficial to learning, if they incorporate elements of interaction, feedback and experience, and as such be as impactful as face to face experiential learning, various personality variables may moderate that impact, and it could be that different learning environments may be more impactful for different individuals, and indeed that the experiential nature of the methodologies employed in the current research may be beneficial for some but detrimental for others.

Aims and objectives

As such the current research builds on the previous Ashridge research into the impact of experiential learning, but explores the possibility that such experiential learning and the associated benefits might be replicated in a virtual or blended learning environment. The research therefore compares three environments: face to face experiential learning, virtual experiential learning, and blended experiential learning.

The research investigates the comparative impact of these environments on the development of specific leadership competences and does so from the perspectives of others as well as self, through a 360 measure of competence development. Finally, it aims to understand whether different personality characteristics moderate the impact of the learning methodology in order to understand which individuals benefit most from the different approaches.



What we did

Participants

The research involved 37 participants on three experimental versions of Ashridge Executive Education's The Leadership Experience (TLE) program. The groups comprised fourteen females and twenty-three males. Fifteen participants were aged 26 to 35, fourteen were aged 36 to 45, six were aged 46 to 55 and one participant was aged 55 or over. Participants were a mix of Hult MBA and Executive MBA students and employees from Ashridge client organizations. All participants were randomly assigned to each program by way of their availability for the program dates.

Programs

Three programs were delivered by the same three members of faculty, utilizing three different learning environments: Face to Face Experiential (F2F); Blended Experiential (Blended); and Virtual Experiential (Virtual). The three methodologies aimed to teach the same content in terms of addressing the same specific competences which form the learning objectives of the TLE. These competences included: self-awareness; stepping into leadership; dealing with change; dealing with peers; personal impact; difficult conversations; dealing with staff; managing self in times of stress; personal development and resourcefulness.

The F2F 2-day program was residential, held at Ashridge, in Hertfordshire. The Blended 2-day program was conducted one day virtually (approximately four hours over a two-week period prior to the program and four hours the morning after the program), and one day residentially at Ashridge. The Virtual 2-day program was fully virtual and participants were either at their own home or in their office.

The behavioral simulation which formed the basis of the three programs consisted of a simulated exercise where participants ran a company of

the future, during which time they had to deal with critical incidents typical of leadership challenges, including dealing with a difficult conversation, public speaking, dealing with the media, and board presentations. This simulation was run face to face at Ashridge for the F2F program.

The Blended program involved participants accessing relevant information virtually and asynchronously for approximately four hours over the two-week period prior to the program. This was followed by the same day long face to face simulation as the F2F program, and then by a half day feedback session conducted synchronously in a virtual environment utilizing the Zoom platform that allowed participants to see one another and interact live, in the moment.

The Virtual program followed the same format and schedule as the F2F program but was conducted entirely in a synchronous virtual environment, again utilizing the Zoom platform that allowed participants to see one another and interact live, in the moment.

Measures

Heart Rate Variance monitors were used to provide a proxy measure for neural activity in the sympathetic nervous system through indicating changes in level of arousal. The difference between participants’ resting heart rate overnight and maximum heart rate during the critical incidents was used to provide a measure of difference in HR. Participants were fitted with the heart rate variance monitors upon their arrival for the F2F and Blended programs. Virtual program participants were sent their HRV monitors by post with instructions. All participants were instructed to wear their monitors at all times, including whilst sleeping.

Pre-program measures

The self-learning questionnaire

The learning questionnaire was composed of 28 questions based on the competences that the program was designed to develop. Participants were asked to indicate to what extent they agreed with statements on a five-point Likert scale, ranging from ‘strongly disagree’ to ‘strongly agree’. A factor analysis conducted in the previous research (Waller et al., 2014) reduced these to four factors. The first factor, self as leader, consisted of questions such as: “I feel more confident in my skills as a leader”. The second factor, adapting to others, related to responses to others and the ability to adapt when dealing with others and consisted of questions such as “I feel more motivated to adapt my approach with different people”. The third factor, difficult situations, included questions such as “I feel more confident about tackling difficult conversations”. The final factor, learning and development, contained more general questions around learning and development during the program, for example “I now see more clearly my responsibility for my own learning”.

Learning 360

Learning 360 comprised of the same factors as the self-learning questionnaire. However, participants were asked to nominate respondents: Peers; Line Manager; and Direct Reports. These individuals were then asked to indicate to what extent they agreed with the statements about their colleague. The 28 questions were also rated on a five-point Likert scale ranging from ‘strongly disagree’ to ‘strongly agree’ but were phrased slightly differently, such as “Is aware of their strengths as a leader” and “Is motivated to develop themselves as a leader”. However, as we had a significantly low response rate for many of the participants on this measure we excluded it from our analysis.

State-Trait Anxiety Inventory

State-Trait Anxiety Inventory (STAI) comprises separate self-report scales for measuring state and trait anxiety. The current research involved the Trait scale only which consists of twenty statements that assess how people generally feel. Participants are asked to indicate their agreement with statements on a four point Likert scale, ranging from ‘not at all’ to ‘very much so’. Scores on this test range from 20 (not anxious) to 80 (extremely anxious).

Behavioral Inhibition Scale / Behavioral Approach Scale

Behavioral Inhibition Scale / Behavioral Approach Scale (BIS/BAS) assesses individual differences in motivational systems. A behavioral approach system (BAS) is believed to regulate appetitive motives, in which the goal is to move toward something desired. A behavioral avoidance (or inhibition) system (BIS) is said to regulate aversive motives, in which the goal is to move away from something unpleasant. The questionnaire is made up of 24 statements such as “I go out of my way to get things I want” and “I feel pretty worried or upset when I think or know somebody is angry at me”. Participants are asked to indicate their level of agreement on a four-point Likert scale which ranges from ‘very false for me’ to ‘very true for me’. Once scored the BAS scale is divided into three sub-scales; drive, fun seeking and reward responsiveness. Whereas, the BIS scale has no subscales.

Learning Tactics Inventory

Learning Tactics Inventory (LTI) profiles a person’s preferred learning behavior. In essence the LTI addresses two questions associated with the practice of learning managerial and leadership skills: Why do some people learn from the opportunities of the workplace, while others fail; and can individuals improve their ability to learn from experience? The 32 item scale is made up of statements such as “Getting advice from other people” and “Carefully considering how I feel”. The questionnaire assesses four learning styles: Action; Thinking; Feeling; and Accessing Others. Participants are asked to indicate to what extent the approaches characterize them, on a five-point Likert scale which ranges from ‘I have almost never used this approach’ to ‘I have almost always used this approach’.

Big Five Inventory

Big Five Inventory (BFI) is a questionnaire that measures an individual on the Big Five Factors (dimensions) of personality. The Big Five Dimensions are: Extraversion vs. Introversion; Agreeableness vs. Antagonism; Conscientiousness vs. Lack of Direction; Neuroticism vs. Emotional Stability; and Openness vs. Closedness to Experience. The questionnaire consists of 44 characteristics such as “Is talkative” and “Can be somewhat careless”. Participants are asked to rate the extent to which they agree with the characteristics on a five-point Likert scale ranging from ‘strongly disagree’ to ‘strongly agree’.

Post-program measures

The self-learning survey and LTI was administered again, one-week post-program. Three-month’s post-program the self-learning survey was administered again, along with the 360 survey.

Learning transfer

Also administered three-month’s post-program was a learning transfer survey which assessed participants’ ability to apply their learning from the programs and consisted of 12 questions with participants asked to indicate to what extent they had engaged in a behavior, on a five-point Likert scale, ranging from ‘never’ to ‘always’. Statements captured potential actions or behaviors, such as “I have sought out more challenging leadership tasks or situations” and “I have requested feedback from others”. Each action statement was followed by a question asking “To what extent do you feel more confident in doing so because of the program”.

What we found

Given the complexity of the research design, a large number of statistical analyses were conducted on the data. For brevity and clarity, only the statistically significant findings are reported in the results section. A series of statistical tests were conducted to examine the learning gained by participation in each of the three different teaching environments (F2F, Virtual, and Blended) as well as relationships between learning, heart rate and personality.

Learning

Two of the learning scales were significantly improved following attendance on a program:

1. Self as Leader improved significantly across time ($F(1.446,36.162)=4.408$, $p=0.030$, partial $\eta^2=0.150$) for all program types, with a significant difference found between Time 1 (pre-program) and Time 3 (three-months post-program) and Time 2 and Time 3. No significant difference was found between Time 1 and Time 2 (one-week post-program). These results were found for all three programs.

2. Difficult Situations improved significantly across time ($F(1.415,35.370)=4.705$, $p=0.025$, partial $\eta^2=0.158$), for all program types, with a significant difference found between Time 1 (pre-program) and Time 3 (three-months post-program) and Time 2 and Time 3. No significant difference was found between Time 1 and Time 2 (one-week post-program). These results were found for all three programs.



Learning transfer

The table below details the percentage of participants from the three groups that reported having engaged ‘sometimes’, ‘regularly’ or ‘always’ in a particular behavior or action since the program as well as the percentage of participants who reported that they felt confident to do so because of their attendance on the program.

There was also a significant correlation between every ‘action’ or ‘behavior’ question and the corresponding ‘confidence’ question. For all 12 sets of questions, there was a positive correlation between the application of learning in terms of reported actions and the contribution of the program in this development. That is, participants reported that confidence in applying their learning was significantly related to the program they attended. These correlations were across all of the program types.

	Face to Face		Blended		Virtual	
Behavior/ Action	Engaged in	Confidence	Engaged in	Confidence	Engaged in	Confidence
Reflected on leadership style	92%	85%	90%	100%	100%	100%
Reflected upon how others are likely to perceive them	100%	92%	100%	100%	100%	92%
Requested feedback from others	92%	92%	90%	100%	77%	85%
Sought out more challenging tasks/ positions	92%	85%	100%	100%	92%	92%
Recognized and responded well to ambiguous circumstances	92%	85%	100%	100%	100%	85%
Actively made changes which aim to improve personal impact with others	85%	92%	100%	100%	100%	100%
Tackled a difficult conversation	92%	85%	90%	80%	100%	100%
Actively sought to manage state and behavior during a difficult conversation	85%	85%	90%	100%	100%	85%
"Stepped into the shoes" of stakeholders to understand their needs	92%	85%	90%	90%	92%	85%
Proactively sought to manage stress levels	77%	85%	80%	100%	100%	100%
Reflected upon personal development and made plans to progress it	92%	92%	100%	100%	100%	92%
Considered and tried different strategies to deal with challenging situations	85%	77%	90%	100%	92%	92%

Personality Measures

The only personality measure to exhibit a significant relationship with the programs was the Learning Tactics Inventory which assesses learning agility.

- **LTI Thinking** improved significantly across time ($F^{(1,26)}=4.340$, $p=0.047$, partial $\text{Eta}^2=0.143$) for all three programs between Time 1 and Time 2.
- **LTI Feeling** improved significantly across time ($F^{(1,26)}=17.440$, $p=0.001$, partial $\text{Eta}^2=0.401$) for all programs between Time 1 and Time 2

- In addition, there was a significant interaction between program and time ($F^{(2,26)}=3.928$, $p=0.032$), with participants who completed the Blended program demonstrating the greatest change in LTI Feeling scores between pre and post program, with no other differences between the groups.
- **LTI Accessing Others** improved significantly across time ($F^{(1,26)}=5.156$, $p=0.032$, partial $\text{Eta}^2=0.165$) for all programs between Time 1 and Time 2.



Heart Rate Variance

Heart rate and learning

- Heart rate variance increased significantly between resting heart rate over night and maximum heart rate during the critical incidents ($F^{(5, 125)}=78.88$, $p=0.000$, partial $\text{Eta}^2=0.76$) for all program types. No significant difference was found between the programs
- **Self as Leader.** There was a significant positive correlation between change in HR during the Difficult Conversation CI and learning as self as leader between T1 and T2 for the F2F group ($r = 0.80$, $p = 0.031$)
- **Self as Leader.** There was a significant positive correlation between change in HR during the Communication CI and the Presentation CI and learning as self as leader between T1 and T3 for the Blended group Comms: ($r = 0.87$, $p = 0.025$); Pres: ($r = 0.85$, $p = 0.031$)
- **Difficult Situations.** There was a significant positive correlation between change in HR during the Communication CI and learning as Difficult Situations between T1 and T3 for the Blended group ($r = 0.87$, $p = 0.029$)
- **Difficult Situations.** There was a significant positive correlation between change in HR during the Communication CI and learning as Difficult Situations at T3 for the F2F group ($r = 0.64$, $p = 0.047$)

Heart rate and personality

- There was a significant positive correlation between change in HR during the difficult conversation CI and BFI *Extraversion* for those in the F2F group ($r = 0.68$, $p = 0.035$)
- There was a significant positive correlation between change in HR during the aggressive behavior CI and BFI *Conscientiousness* for those in the F2F group ($r = 0.67$, $p = 0.0333$)
- There was a significant positive correlation between change in HR during ALL CIs and BFI *Openness* for those in the F2F group:
 - Media ($r = 0.83$, $p = 0.003$)
 - Difficult conversation ($r = 0.77$, $p = 0.009$)
 - Aggressive behavior ($r = 0.74$, $p = 0.015$)
 - Comms ($r = 0.66$, $p = 0.037$)
 - Presentation ($r = 0.68$, $p = 0.029$)
- There was a significant negative correlation between change in HR during the Media CI and BFI *Openness* for those in the Virtual group ($r = -0.75$, $p = 0.008$)

Discussion of our findings

Our results found that our virtual and blended programs were as effective in improving learning for two of the four learning scales, suggesting that despite the reticence of using virtual and blended delivery as a primary source of teaching soft skills, virtual learning might be equivalent to face to face delivery in terms of some forms of competence development.

As our virtual and blended programs were experiential in nature, our findings suggest that rather than the learning environment, it is the quality of the learning methodology which impacts learning, and that virtual learning which incorporates opportunities for interaction, feedback, experience and non-verbal cues is likely to yield similar results as face to face programs.

In terms of our learning outcomes, all three groups' self-reported learning found an increase in learning about *self as a leader* and were better able to deal with *difficult situations*. This quantitative data was also reflected in the open text responses with participants reporting in relation to 'self as leader': "*[The program provided] very profound insight regarding my blind spots and insecurities as a leader*" (Blended participant); and "*I think that the most I got is from the exposure in the simulation, which highlighted even more what I have to overcome to feel better and become a better manager/leader*" (Virtual participant).

In relation to dealing with 'difficult situations' participants reported: "*[Learning] to better deal with and manage both stressful and difficult situations*" (Virtual participant); and "*Step in and learn from new situations (e.g. challenging discussions, etc.)*" (Virtual participant).

Interestingly the significant change in self-reported learning for all of the environments was found between pre and three-months post-program, but not between pre and immediate post-program, suggesting that real learning takes time, reflection, and opportunities for application in order to embed.

We found that all three programs were as effective in encouraging application of learning in terms of a variety of behaviors and actions, and that participants also

reported that confidence in applying their learning was significantly related to the program they attended. This confidence in doing things differently was again reflected in the qualitative data: "*I have more proactively addressed issues and spoken up on problems*" (F2F participant); "*Stepping up and being more confident as a leader and facilitating change and growth*" (F2F participant); and "*Volunteering to take a leadership role in a recent key presentation*" (Virtual participant).

In addition, our research did not find that any of the personality variables moderated the impact of the different environments on learning.

We also found that despite the lack of physical proximity and face to face interaction, virtual and blended experiential learning were just as effective in raising heart rate and inducing a level of stress as face to face experiential simulations. Importantly, we also found a significant correlation between this change in heart rate and learning in terms of both *self as leader* and *difficult situations* for the blended and face to face programs, again supporting our previous research and suggests that development programs which stimulate this response should be valuable tools for preparing leaders for the challenges of leadership.

In addition, we found some interesting relationships between heart rate and the Big Five Inventory personality measure, with those high in *extraversion* in the face to face group also having a higher change in heart rate during the difficult conversation critical incident. This incident offers the greatest opportunity for participants to engage as either part of the collective group or as an individual, and as such, extraverts who get their energy from interacting with others may have felt more energized,

and as such had higher heart rates than the other participants during this critical incident. We also found that those high in *conscientiousness* in the face to face group also had higher change in heart rate during the aggressive behavior critical incident. As this incident is the only one in which nobody is assigned responsibility for dealing with the aggressive behavior, those who are highly conscientious may feel more morally responsible regardless of whether they felt able to act, and as such, have higher heart rates during the incident. Finally, we also found that those high in *openness* also had a greater change in heart rate during all critical incidents. This makes intuitive sense as those with a more open disposition are more likely to engage in and therefore physiologically respond to the critical incidents presented.

Finally, we also found that all three programs enhanced three of the learning agility scales: *Thinking*, *Feeling*, and *Accessing Others*, with the blended group reporting significantly greater improvement in *Feeling* than the other programs. *Thinking* tactics involve reflecting on and processing past experience to guide future behavior and problem solving⁵⁶, *feeling* tactics involve acknowledgement and management of feelings that arise from experience and apply that awareness in the way they respond to challenge⁵⁷, and *accessing others* involves learning from others. This suggests that as well as developing specific competences, experiential learning programs can also enhance individual's learning agility, specifically increasing their capacity for reflection and relying on past experience, managing their own emotions, and learning from others which in an increasingly fast paced and task-oriented world, is very valuable to organizations.

Implications for practice

Virtual learning is as effective as face-to-face. Virtual environments and blended learning environments can be as effective as face to face environments in developing the soft skills needed to be effective and resilient leaders. However, the methodologies must present opportunities for interaction, collaboration and experience, and for participants to receive feedback on their learning. The ability to effectively develop leaders across the globe without the impracticalities of travel and long periods of time out of the office should allow organizations to scale their L&D activities, broadening the potential benefit of their initiatives as well as allow them to develop their leaders in an environment that reflects the one in which they are increasingly expected to operate.

Experiential learning enhances learning agility. Experiential programs can increase participant's learning agility helping leaders to learn from all manner of experiences in the workplace, enhancing their ability to reflect on experience, manage their emotions in response to that experience, and modify their actions to incorporate new knowledge and insights. As such, experiential learning may be a valuable tool for L&D professionals not only in developing specific competences, but in developing their leaders' capacities for learning and dealing with change.

Development programs need to challenge. In order for programs to lead to lasting learning the development needs to be real, challenging, and induce a certain level of stress. By taking leaders out of their comfort zone into the 'stretch' zone and raising their heart rate, programs can improve cognitive performance during the experience and learning from it.

Learning takes time to embed. 'Happy sheets' don't always capture the full extent of participant learning, and with well delivered experiential learning programs learning continues to grow and develop over the next several months.

As such, program evaluations conducted immediately after a program should be followed up three months' post program to get a meaningful picture of impact on both learning and learning transfer.

Experiential learning works for all. L&D practitioners need not be concerned as to whether a potential program participant is an extrovert, introvert, anxious, or behaviorally inhibited when selecting an appropriate learning intervention. All personality types are equally (and positively) impacted by interactive, experiential learning experiences.



Conclusion

Overall, our research found that virtual and blended learning environments can be as effective as face to face environments in terms of developing learning around *self as leader* and dealing with *difficult situations*, as well as increasing heart rate variance which is also related to improved learning. What is critical to this impact however, is that the learning methodologies employed in these different environments involve opportunities for experience, for interaction, and for feedback. If adhering to these principles virtual learning environments hold as much promise as face to face for developing our leaders.

What is also significant is that such experiential learning environments might not only develop the competences the programs are designed to impact, but may also develop learning agility, developing leader's capacities to learn from others, and through reflection, and manage their emotions, helping them to learn more from future learning interventions and from their everyday experience, and developing them as agile and adaptable leaders.

Taken together virtual experiential learning holds enormous promise for a scalable, practical solution to developing our leaders in our global, digital environment.

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About the authors



Lee Waller
BSc (Hons), MSc

Lee Waller is the Director of Research Fellows and Specialist Services and the Research Lead for Transforming Behavior. Her recent research projects have explored the neurological processes involved in experiential learning, the transfer of learning, and the role and influence of the leadership development professional. Lee teaches in the areas of neuroscience and learning, and developing a high performing learning organization.

She has worked with clients in both the private and public sectors to explore the learning needs of their individuals and the strategic objectives of their organizations, supporting faculty in designing learning and development interventions to meet those needs.

Lee has an Honors degree in Psychology, and a Masters degree in Occupational Psychology. She is also a graduate member of the British Psychological Society, and is qualified in a range of psychometric tools. She is currently undertaking a PhD at the University of Reading.

Sona Sherratt
BA, MSc

Sona Sherratt is the Global Adjunct Network Director and a faculty member at Ashridge where she designs, teaches and client directs on several executive education programs with clients such as SAB Miller, Swarovski, Heineken, Erste Group Bank, Avis, Renew and Continental.

Sona has designed and delivered senior leadership and general management programs for clients around the world. Her interests are predominantly in leadership, change management, influencing, motivation and long-term sustained learning. She facilitates learning support groups, action learning sets and provides executive coaching to help improve individual performance.

Sona was born in India and is an American citizen and has lived and worked in the US, Spain and the UK. Before joining Ashridge Sona worked in sales, marketing and HR for Astra Zeneca and for Nortel Networks, covering Europe, the Middle East and Asia Pacific regions.

Sona speaks fluent Hindi and Spanish. She has a BA Honors degree in Psychology and Spanish, and an MSc Honors in Organizational Psychology. She is an accredited member of the British Psychological Society and has extensive experience in using psychometric tools.



Vicki Culpin
BA (Hons), MSc, MPhil, PhD, CPsychol, FHEA

Vicki Culpin is a member of faculty at Ashridge Executive Education. She works with a range of clients, nationally and internationally, from the public, private and cultural sectors and delivers guest lectures around the world on a variety of psychological topics.

Vicki specializes in organizational behavior, specifically well-being at work. She has spent over 17 years in academia, researching memory with a variety of individuals including older adults, children and forensic populations. More recent research and teaching interests include the relationship between sleep, well-being and derailment and the relationship between sleep and resilience in management populations.

Vicki studied Psychology at Manchester University, followed by an MPhil and PhD in Psychology from Lancaster University and an MSc in Applied Forensic Psychology from Leicester University. She is an Associate Fellow of the British Psychological Society, a Chartered Psychologist and a Fellow of the Higher Education Academy.

Sam Wilkinson
BSc (Hons), MSc

Sam Wilkinson is a Research Specialist, supporting faculty globally across Hult International Business School. Her research interests include Virtual Learning, Engagement, Chronic Illness in the Workplace, Diversity and Inclusion and Organizational Change.

Sam has a Honors degree in Psychology, and a Masters degree in Occupational Psychology, where she studied at the University of Worcester.





Hult Research

Ashridge Executive Education at
Hult International Business School
Berkhamsted
Hertfordshire HP4 1NS
United Kingdom
T: 01442 8413491
E: research@ashridge.hult.edu

hult.edu/research

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