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Table of contents

Introduction .......................................................................................................................... 4
Theoretical background ................................................................................................... 6
Learning through experience .................................................................................. 6
Our digitized world .................................................................................................... 7
Virtual learning ............................................................................................................ 7
Blended Learning ........................................................................................................ 9
Influence of personality on outcomes from different teaching methods ........ 9
Aims and objectives ..................................................................................................... 10
What we did .................................................................................................................... 11
What we measured ...................................................................................................... 12
What we found ............................................................................................................ 13
Learning ......................................................................................................................... 13
Learning Transfer ......................................................................................................... 14
Personality Measures ................................................................................................. 14
Heart Rate Variance ..................................................................................................... 15
Heart rate and learning ............................................................................................... 15
Heart rate and personality .......................................................................................... 15
Discussion of our findings ............................................................................................ 16
Implications for practice ............................................................................................... 17
Conclusion .................................................................................................................... 17
References .................................................................................................................... 18
About the authors ........................................................................................................... 20
Virtual and blended environments which individual high in extraversion, virtual and blended experiential learning L&D practitioners need not be concerned. Experiential learning may be a valuable tool. Program evaluations conducted immediately in encouraging application of learning back in the workplace, and confidence in doing so is due to the program.

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.

Implications for practice

• Virtual environments and blended learning environments offer the potential to effectively develop leaders across the globe within the limitations 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.

• 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.

• 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.

• 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 experiences.

• 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.

Key findings

Executive Summary

Introduction

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Key findings
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?

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 competencies, 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 emotional intensity 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 impairing 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 impaired 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 Excellence Program (TEL) 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 increasing 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 professionals 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, Eisen, Lisa, Harush, Gibson, Noun, 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 online 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 30-45% of training hours being delivered online in 2019. 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 online whiteboards.

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 effective 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.
Inherent in the format. Research suggests that its impact on learning, as such, despite the promise of virtual learning, offers little opportunity for feedback, which is for clarification and explanation from the teacher. 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-Qahharn 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 offer sustained gain face to face. Similarly, Demirci 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 learning. 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 experimentation 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 types, personality traits, 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 suggests a trait theory perspective, and suggests individual differences in personality, such as extraversion, openness to experience, 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 to be more open to new experiences, whereas introverted individuals tend to have an internal thinking style and to be more focused on internal processes. Li and Armstrong’s research also suggests that individuals who are more open to experience are more likely to benefit from experiential learning. 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 participators who are more learning agile coped better in some situations, such as challenging environments, and learn better from experience than less learning agile leaders. Moreover, Demirci 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 experimentation, and as such 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 individuals may continually develop, grow and utilize new strategies which enable them for the increasingly complex problems they encounter in their organizations. There is however, some discrepancy in its definition. 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.

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 toam 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 provide little opportunity for feedback, which is considered to be an integral part of the learning cycle; whereby students receive feedback from teachers on the application of learning and guidance on how they are progressing, allowing them to adapt their action accordingly and develop the competencies which may continue to evolve.

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 sharing experiences 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.
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 degree 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 delivered 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 comprised 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 (Walker 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 confident 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 rate their colleague, Team, 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 “I am aware of their strengths as a leader” and “I am 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 sub-scale.

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 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.

2. Difficult Situations
Two of the learning scales were significantly improved following attendance on a program:
1. Self as Leader
Improved significantly across time (F(1,157)=4.408, p=0.04, partial Eta=0.025) 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.

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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.

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

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.

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(2,24)=4.340, p=0.047, partial Eta²=0.148) for all three programs between Time 1 and Time 2.
- LTI Feeling: improved significantly across time (F(2,24)=5.156, p=0.032, partial Eta²=0.165) for all programs between Time 1 and Time 2.

In addition, there was a significant interaction between program and time (F(6,22)=3.028, 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(2,24)=5.156, p=0.032, partial Eta²=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(1,78)=7.88, p=0.006, partial Eta²=0.076) 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 = 0.85, p = 0.039).
- 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 Blended group (r = 0.85, p = 0.039).
- Self as Leader: There was a significant positive correlation between change in HR during the Presentation CI and learning as self as leader between T1 and T2 for the Blended group (r = 0.85, p = 0.039).
- Self as Leader: There was a significant positive correlation between change in HR during the Communication CI and learning as self as leader between T1 and T2 for the Virtual group (r = 0.85, p = 0.039).

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 = 0.039).
- 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 = 0.033).
- There was a significant positive correlation between change in HR during ALL CI and BFI Openness for those in the F2F group:
  - Media (r = 0.83, p = 0.033)
  - Difficult conversation (r = 0.77, p = 0.059)
  - Aggressive behavior (r = 0.74, p = 0.045)
  - Comms: (r = 0.66, p = 0.037)
  - Presentation (r = 0.68, p = 0.028)
- There was a significant negative correlation between change in HR during the Media CI and BFI Neuroticism for those in the Virtual group (r = -0.75, p = 0.028)
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 of participants reporting in relation to self as a 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 get 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 is better deal with on my own than to manage both stressful and difficult situations” (Virtual participant); and “Stop 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); “Stopping 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 mediated 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.

Our results found that our virtual and blended programs were as effective as face to face environments in improving 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.

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.

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 impart, but may also develop learning agility, developing leader’s capacities to learn from others, and through application, 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.

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.
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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.

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