



Article

The Effects of Scenario Planning on Perceptions of Work Engagement

Thomas J. Chermack^{1,*}, William S. Freshwater¹, Lauren Hartig¹, Amanda Pearson¹, Rod Fowler¹, Lucia Delgado¹, Jimena Sagas¹

¹Colorado State University, 2545 Research Blvd, Fort Collins, CO 80526, USA

Abstract

This article reports the findings from a scenario planning study across four organizations. The primary focus of this study was to determine the effects of scenario planning on participant reports of work engagement. Researchers gathered pre and posttest work engagement data from the participants in four organizations provided by scenario work that last approximately four months. Results indicated that participants report of work engagement statistically and practically increased their work engagement scores attributable to scenario planning. Results, implications, limitations and conclusions are further discussed.

Keywords

Scenario Planning, Work Engagement UWES, Burnout, Quasi-experiment

Introduction

Scenario planning has many benefits that are increasingly documented in the related academic literature (Augier, Dew, Knudsen, & Stieglitz, 2018; Varum & Melo, 2010; Vecchiato, 2019). Indeed, the research on scenario planning is catching up with its practice (Lew, Meyerowitz, & Svensson, 2018). As the various dimensions of scenario planning continue to be explored, documented and studied, the need for rigorous research will only increase. Several recent developments in scenario planning suggest a need to put more focus on participant experiences and the changes they may undergo (O'Brien, 2004). Such an emphasis shifts the potential measurement options into the psychological domain. Positioning scenario planning as an intervention moves scenario planning research closer to the experimental form and this study is an example of intervention research with scenario planning.

Scenario planning is often described as a more inclusive approach to strategy (it usually requires the involvement of people from many levels of an organization). There is a logical argument that participating in scenario planning could potentially increase employee engagement (O'Brien, 2004). However, a logical argument is not sufficient for the development of hypotheses. While many scenario planning participants express excitement and energy as they contribute to scenario work (O'Brien, 2004; Phadnis, Caplice, Sheffi, & Singh, 2015) a thorough review is required to set the basis for any research into a potential relationship.

Purpose of the article and problem statement

Previous research has investigated a potential link between scenario planning and antecedents to work engagement (Hawkins & Chermack, 2014), but did not find significant results. The previous research study used the Gallup Q12 to measure engagement, which is a popular and well-known survey. However, it does not directly measure work engagement, rather it measures antecedents to work engagement (Harter & Agrawal, 2011). Further, the Gallup Q12

* Corresponding author.

E-mail addresses: tjchermack@gmail.com (T. J. Chermack), Scott.Freshwater@colostate.edu (W. S. Freshwater), Lauren.hartig@colostate.edu (L. Hartig), akpear@colostate.edu (A. Pearson), Rodney.fowler@colostate.edu (R. Fowler), Lucia.delgado@colostate.edu (L. Delgado), Jimena.sagas@colostate.edu (J. Sagas).

consists of 12 items measuring an overall construct. The research documented in this article addresses work engagement more directly by using the UWES measure of work engagement (Coo & Salanova, 2018). The UWES is an alternative measure of work engagement to the Gallup Q12. The UWES consists of three factors (vigor, dedication and absorption) that make up the construct of employee engagement, rather than the single factor approach evident in the Gallup Q12 (a detailed description of the development of the UWES and a summary of the various works that have explored its score reliability and validity is situated in the methods section of this article). The purpose of this article; therefore, is to measure the potential direct effect of scenario planning on participant perceptions of work engagement.

Research Questions

Based on previous research results (Hawkins & Chermack, 2014) and the fact that measurement instruments can be limited, this research was situated on the following question based on an interest in assessing the relationship between scenario planning and work engagement using an alternative measurement instrument:

RQ 1: Does scenario planning increase participant perceptions of work engagement?

Theoretical Framework

Given the research question and novelty of studying work engagement in the context of scenario planning, the theoretical framework builds the rationale for conducting the research. The core concepts of work engagement and scenario planning are presented and linked to suggest a contribution could make a contribution to both literatures.

Work engagement

Three main aspects of work engagement are reviewed to set the contextual theoretical framework. These are burnout, engagement as a means for countering burnout and the overall outcomes of work engagement.

Burnout

Burnout, as measured by the Maslach-Burnout Inventory (MBI: Maslach & Jackson, 1981; Petrou, Demerouti, & Schaufeli, 2018), was defined as a “three-dimensional syndrome of emotional exhaustion, cynicism (depersonalization), and lack of personal accomplishment” (p. 73). Originally, burnout was only understood to occur in individuals who work with people in some capacity, indicating that all three original dimensions of the MBI refer to contacts with other people in the workplace (Schaufeli, 2018). Reconsideration and evaluation of historical “research and practice has learned that burnout also exists outside the realm of the human services” (Schaufeli, 2018, p. 72), broadening its measurement to include all employees and not only those who do work with people (Maslach & Leiter, 1997; Schaufeli, Salanova, Gonzalez-Romá, & Bakker, 2002). The adaptation of the MBI for use outside of human services, the MBI-General Survey (MBI-GS: Schaufeli & Bakker, 2017) paralleled the three dimensions of the original survey but portrayed a more generic approach in that it does not make direct reference to people or specific attitudes towards people. Particularly in the context of professional efficacy, it included a broader focus encompassing both social and non-social aspects of occupational accomplishments (Bakker & Albrecht, 2018).

Engagement as the Antipode of Burnout

Engagement is defined as a positive, fulfilling, and work-related state of mind that is characterized by vigor, dedication, and absorption (Schaufeli, 2018). Not viewed as a momentary and specific state, but rather a more “persistent and pervasive affective-cognitive state that is not focused on any particular object, event, individual, or behavior” (Schaufeli & Bakker, 2004, p. 72). In the creation of the original MBI, Maslach and Leiter (1997) captured engagement as being characterized by energy, involvement, and efficacy, which are considered the polar opposite patterns of the three burnout dimensions of exhaustion, cynicism, and lack of professional efficacy (accomplishment). As Schaufeli and Bakker (2017) noted, the prevalent attitude in the recent Occupational Health Psychology research has almost exclusively been concerned with ill-health and unwell-being. More than 90% of all

articles published in the Journal of Occupational Health Psychology deal with negative aspects of workers' health. Conversely, only about 5% of the articles deal “with positive aspects such as job satisfaction and motivation” (Schaufeli & Bakker, 2004, p. 71). Luthans (2002) asserted that “the study of positively oriented human resource strengths and psychological capacities that can be measured, developed, and effectively managed for performance improvement in today’s workplace” (p. 698). In response, Seligman and Csikszentmihalyi (2000) suggested burnout research is shifting towards job engagement by not looking exclusively to the negative pole for a defined measurement; rather the research is instead focusing on the positive aspects of worker’s well-being. Accordingly, burnout is being redefined as an erosion of engagement with the job (Seligman & Csikszentmihalyi, 2000).

To this end (Schaufeli & Bakker, 2004, 2017) argued that even though in conceptual terms work engagement is the positive antithesis of burnout, it cannot be simply measured by the opposite profile of the MBI-GS as the measurement of both concepts is different. Fundamentally, the MBI-GS consists of only negatively worded items. It is a serious challenge to conclude that individuals who reject a negatively worded statement would automatically agree with a positively worded one (Schaufeli & Bakker, 2004; Schaufeli & Bakker, 2017). Theoretically, an employee who is not burned-out may score high or low on engagement, whereas an engaged employee “may score high or low on burnout” (Schaufeli & Bakker, 2004, p. 4).

However, Schaufeli and Bakker (2004) noted that employees will experience work engagement and burnout as being opposite psychological states, whereby the former has a positive quality and the latter a negative quality. Both need to be considered as “principally independent of each other” (Schaufeli & Bakker, 2017, p. 4). Therefore, Schaufeli and Bakker (2004) proposed that burnout and work engagement need to be observed as two opposite concepts that should be measured independently. It plausible to expect that the two concepts are negatively correlated and the relationship between both constructs cannot be studied empirically with the same instrument.

Outcomes of work engagement

The possible outcomes of work engagement involve the positive attitudes towards work and the organization, such as job satisfaction, organizational commitment, and low turnover intention (Demerouti, Mostert, & Bakker, 2010; Salanova, Llorens, Cifre, Martinez, & Schaufeli, 2003; Schaufeli & Salanova, in press). Other potential outcomes include positive organizational behavior such as, personal initiative and learning motivation (Sonnentag, 2003), extra-role behavior and proactive behavior (Salanova et al., 2003). Work engagement is not only an individual phenomenon, but it also occurs in groups as research has shown that employees in some teams are more engaged than in others (Salanova et al., 2003).

Scenario planning

The word “scenario” comes from the Italian and has its origins in the *Commedia dell’arte all’improvviso* (Mauelshagen, 2017). Scenarios were briefly written instructions that generally contained a list of the characters, locations and props as well as the plot. Often they were preceded by a short summary of the contents (referred to in the rhetorical tradition as an *argomento*), and followed by a description of the scenes act by act with the entrances and exits of the actors (citations). Unlike the texts of fully written plays or opera libretti, a scenario thus provided only a minimum of dramaturgical and thematic orientation (Mauelshagen, 2017).

A universally accepted definition of scenario planning is elusive. However recent scholars have made progress in suggesting a set of required components for anything called a scenario (Spaniol & Rowland, 2018). The authors suggested it is time to “sunset the use of claims” (Spaniol & Rowland, 2018, p. 1) that the scenario community is confused about what a scenario is. Regardless of agreement with Spaniol and Rowland, it is safe to say that the distinguishing factor for scenarios is that they are not predictions or forecasts (Chermack, Lynham, & Ruona, 2001). Rather, the aim of scenarios is to challenge the current way of thinking and create stories that view possible events likely to be overlooked. Scenario planning is designed to broaden and challenge decision-makers’ perspectives, allowing them to reconsider the standard assumption of business-as-usual (van der Heijden, 2000; van der Heijden, Bradfield, Burt, Cairns, & Wright, 2002).

More recently, Wilson (2017) described scenario planning as a way to help organizations think through their assumptions and become better prepared to flexibly respond to possible future conditions. Furthermore, scenarios provide organizational leaders with the ability to identify and understand blind spots and the agility to respond to

future events by developing a “description of a possible future that identifies possible significant events that may happen in the future, major parties involved in that future, and the assumed motivations of those parties” (Wilson, 2017, p. 373). Scenario planning can help decision makers to better understand the “nature and impact of forces driving its future” (Wilson, 2017, p. 374) with a process that “emphasizes the open exchange of knowledge from all involved parties and a mutual understanding of issues that are critical to the healthy functioning of the organization” (Wilson, 2017, p. 374).

Organizational benefits and outcomes

One major benefit of scenarios is the ability to deal with complex elements and weave them into a set of stories which are coherent, systematic, comprehensive, and plausible (Coates, 2000). Scenarios hold little interest if they are not pertinent, coherent, and plausible (Durance & Godet, 2010). Godet (2000) stated that the “uncertainty of the future can be appraised through the number of possible scenarios” (p. 5), within the field of probables but understanding that not all scenarios are equally probable or desirable. Godet also took the view that an important distinction must be made between scenarios of “the general environmental and scenarios of actors' strategies” (2000, p. 5). Scenarios that project both wishes and fears regarding the future, must not be confused with the choice of strategic options (Godet, 2000). The anticipation phase of organizational change must be collective and implies the involvement of the most influential decision makers (Godet, 2000). A scenario is not a future reality but rather a means to represent it with the aim of clarifying present action in light of possible and desirable futures (Durance & Godet, 2010).

The success of the word scenario has led to abuse of the term and confusion with the term strategy (Godet, 2000). Strategy uses foresight and innovation; whereas prospective uses pre-activity and proactivity (Godet, 2000). Scenarios are not a requisite part of strategic foresight, implying that foresight and scenarios are not synonymous. Many foresight studies projects stall because the group has decided to write scenarios without a context or purpose (Godet, 2000). However, a scenario is not an end in itself. It only has meaning as an aid to decision-making in so far as it clarifies the consequences of current decisions (Durance & Godet, 2010).

In a review of the literature, Wright, Bradfield, and Cairns (2013) found that the three main objectives of the application of scenario methods are to: (i) enhance understanding of causal processes, connections and logical sequences underlying events, (ii) challenge conventional thinking, and (iii) improve decision-making, so as to inform strategy development.

Foundations of scenario planning

Strategic planning has a long history in military action and the first documented outlines of what today might be regarded as scenarios, do not appear until the 19th century in the writings of von Clausewitz and von Moltke, two Prussian military strategists also credited with having first formulated the principles of strategic planning (Bradfield, Wright, Burt, Cairns, & Van Der Heijden, 2005). Modern day scenario techniques have emerged in the post-war period, and the 1960's saw the emergence of two geographical centers in the development of scenario techniques: the USA and France (Bradfield et al., 2005). After World War II, the US Department of Defense was faced with the task of deciding what projects should be funded for the development of new weapons systems. This was a difficult undertaking given the increasing complexity of weapons systems arising from advances made in the sciences during the war years (Bradfield et al., 2005). The US military's need for war game simulation models provided a platform for the emergence of scenario techniques at the Rand Corporation. Using this platform, Herman Kahn (the ranking authority on Civil Defense and strategic planning at the Rand Corporation in the 1950s) began developing scenarios for the Air Defense System Missile Command, a large-scale early warning system.

In 1961, Khan left the Rand Corporation and established the Hudson Institute where he began to apply his scenario method to social forecasting and public policy. Soon after his departure from the Rand Corporation, two other Rand alumnae, Helmer and Gordon also left and founded the Institute of the Future. Helmer, Gordon and Dalkey along with several individuals at the Stanford Research Institute ‘Futures Group’ (SRI) and the California Institute of Technology, began to experiment with scenarios as a planning tool and became the pioneers in the field of future studies in the US.

In 1967, Shell initiated the “Year 2000 study”, a project focused on the business environment that may exist in

the year 2000. Pierre Wack, a planner at Shell Francaise, (one of the participating companies in the exercise), was familiar with the scenario approach developed by Kahn, and decided to experiment with the technique using Shell Francaise as the testing ground (citation). The initial attempt at scenarios was not a success in that it resulted in what Wack labeled first generation scenarios (1985) which were useful in gaining a better understanding of situations but provided few insights beyond what was already known. Coincidentally, GE began to experiment with scenarios at about the same time as Shell and in 1971 produced four alternative scenarios of global and US economic and socio-political conditions in 1980.

The concept of future planning has been used in the environment of business corporations for decades (Varum & Melo, 2010). Since the early 1960's, scenarios have become a major concept and method in futures research (Durance & Godet, 2010). futures research (Durance & Godet, 2010). According to Wack (1985), Royal Dutch/Shell coined the term "scenario planning" after listening to their planners' analysis of the global business environment in 1973, prior to the oil crisis spurred by the Yom Kippur War in October of that year. According to Wack (1985), Shell realized success again during the outbreak of the Iran-Iraq war of 1981. When other oil companies stockpiled reserves, Shell liquidated its reserves before the glut became a reality and prices collapsed (Wack, 1985).

Scenarios have become a major concept and method in futures research, after first appearing in Kahn's works on geostrategy while Bertrand de Jouvenel was proposing the very closed concept of "futuribles" (Godet & Roubelat, 2000). During the 1980's scenarios generally connected with the field of strategic planning (citation), both public and private, with the methods developed and made popular by consultancy groups like Battelle, Sema and SRI (Godet, 2000).

Ramirez and Ravetz (2011) presented research on futures as focusing on the those that are predictable, or "tame", and those that are unpredictable, "wild" and that relied on contingencies that can be managed by methods inspired by those of the mathematical natural sciences. Gordon (as cited in Ramirez & Ravetz, 2011) described futures research as "the systematic study of what might be" but dichotomously, can be thought to involve an event, or gradually unfolding processes, which may be noticed -or not and understood- or not. According to Ramirez and Ravetz (2011), "futures are thought of and considered in the present" (p.479).

Van Der Heijden (2000) asserted that "one thing on which we can all agree is that the future is uncertain," (p. 17) but we continue to find it useful to discuss and study it. According to Van Der Heijden (2000), scholars and practitioners continue to believe that there is some part of the future that can be predicted. He also suggested that Futurists generally subscribe to a "critical realism" "model of interpreting knowledge about the world: "(a) how the world really is plays the decisive role -- it can be known; (b) knowledge is what we are justified to believe, based on our ability to refute; (c) knowledge and science are social processes" (p. 31). People continue to study the future in an attempt to gain a better understanding and to lend confidence to decision making. Janis, (as cited in Van Der Heijden, 2000) equated sound decision making to vigilance, and decisions are vigilant if: "1) reasons are rational with existing knowledge); (2) reasons stand up to appropriate search for relevant empirical data; and (3) reasons take account of future indeterminacy (contingency planning)" (p. 32).

Methods and approaches to scenario planning

Crozier and Friedberg (1977) viewed scenarios as having three basic elements: "(a) the base, -- the representation that is created of the current reality and the dynamics of the system being studied; (b) the paths that emerge in looking at a system along a time scale; and (c) the last images obtained at different periods, and aligned with to the horizon of the study, the result of the paths or routes mentioned thus far." (p. 46).

Ramirez, Churchhouse, Palmero, and Hoffman (2017) stated that approaches to scenario planning generally take on one of three stances. A probabilistic stance - making predictions in percentage terms or as best-case/worst-case scenarios, or a normative stance, envisioning what a future should look like), the Oxford scenario planning approach that is based on plausibility.

These external environment elements have equal and opposite forces that must be understood and emphasized. For example, to overcome volatility, one must use vision; to

address uncertainty, one must develop understanding; complexity yields to clarity; and

ambiguity can be addressed with agility (Chermack, 2011). Each of these solutions is based on an open-ended, continuous learning orientation (Johansen, 2007). Durance & Godet (2010) believe that there are two scenario

methods are used most frequently in practice: the one which we had developed at the Society of Applied Economics and Mathematics (SEMA) in 1974 and then subsequently at the CNAM (Conservatoire national des Arts et Métiers), and those developed at SRI (Stanford Research Institute).

Summary

The theoretical framework has provided brief descriptions of work engagement and scenario planning. Further, it has illustrated the potential overlap between the two phenomena and underscored the logic that employees often want to be involved in the larger direction of the organization. Scenarios provide an opportunity for engagement and making strategy a collaborative effort. The theoretical framework was intended to draw from, support and provide evidence for a logical connection and observations from practice.

Hypotheses

With this established theoretical framework, the overall hypothesis is that scenario planning will significantly and practically increase participant self-perceptions of work engagement. The null hypothesis is that there will be no statistically or practically significant mean difference between pre- and posttest work engagement scores. Symbolically, these hypotheses are as follows:

$$H0: \mu D = 0$$

$$H1: \mu D > 0$$

Because the UWES consists of three subfactors (Vigor, Dedication and Absorption), the associated sub-hypotheses are as follows:

H2: Perceptions of Vigor will significantly increase (statistically and practically) after participation in scenario planning as measured by the Agility Survey

H3: Perceptions of Dedication will significantly increase (statistically and practically) after participation in scenario planning as measured by the Agility Survey

H4: Perceptions of Absorption will significantly increase (statistically and practically) after participation in scenario planning as measured by the Agility Survey

Method

The following sections present the research design, power analysis, sampling procedures, data collection, instrumentation and scenario planning intervention used in the study.

Research design

The basic research design was a single subject quasi-experiment (Byiers, Reichle, & Symons, 2012). While true experimental research is generally viewed as the most rigorous form of intervention research, single subject quasi-experimental designs are useful in exploring relationships before the investments necessary for true experiments (Byiers, Reichle, & Symons, 2012).

Power analysis

Power statistics and sample size requirements were calculated using G*Power (Cohen, 1998; Faul, Erdfelder, Lang, & Buchner, 2007). Results indicated that 45 matched pairs (pretest to posttest) were necessary to accomplish a power of .88, an alpha of .05 and an effect size $f = .25$.

Sample

The sample was a convenience sample of scenario planning participants in four different companies. Researchers recruited 42 participants into the overall project, though the number of participants in each of the four organizations varied.

Data collection

Four scenario planning projects were the basis of this research. After approval to conduct the research was granted by a University Review Board, researchers worked with the four volunteer organizational leaders to set timelines and schedules for the scenario work. Paper survey data were collected from participants in all four organizations at the start of the initial scenario planning workshops. Participants were asked to identify a code and write it directly on their paper survey. The remainder of the scenario planning exercises were completed over the course of approximately three months, and at the conclusion of the final workshops, researchers gathered posttest data, again on a paper survey. Using participant codes, researchers were able to match pretest data with posttest data.

Instrument

The Utrecht Work Engagement Scale (UWES) was selected to measure participant reports of work engagement. The UWES was developed to measure three related factors of work engagement: vigor, dedication, and absorption. Vigor describes a willingness to persist in the face of obstacles in the workplace or the willingness to continue to invest effort in one's work when confronted with a challenge (Schaufeli, Bakker, & Salanova, 2006). Dedication designates a strong commitment to one's work and translates to a sense of "challenge, pride, and inspiration" and tend to view their work as meaningful (Schaufeli & Bakker, 2004). Vigor and dedication are considered polar opposites of exhaustion and cynicism with the range that is covered by vigor and exhaustion has been labelled energy or activation, whereas the range that is covered by dedication and cynicism has been labelled identification (Schaufeli & Bakker, 2004). Schaufeli and Bakker (2004) define absorption as "being happily engrossed in and concentrated on one's work" and where "one has difficulty detaching themselves from their work" (p. 4). Adsorption is a distinct factor in work engagement that is "not considered to be the opposite of professional inefficacy" (Schaufeli & Bakker, 2004, p. 5). Of note, the UWES can be done equally effective individually as well as in a group setting such as an employee satisfaction survey, or a psychosocial risk evaluation (Schaufeli & Bakker, 2004).

In developing the original self-reported survey questionnaire, Schaufeli et al. (2002) reformulated the MBI questions by augmenting the original vigor and dedication items, as well as with new absorption items to constitute the UWES-24. However, after "psychometric evaluation" in two different samples of employees and students, 7 items appeared to be unsound and were therefore eliminated so that 17 items remained that included 6 vigor items, 5 dedication items, and 6 absorption items (Schaufeli et al., 2002). The similarity of the MBI questions as well as the factorial validity has brought into question the utility of the UWES as a contemporary standard work engagement measure (Kulikowski, 2017).

UWES score validity development

The UWES-17 has sound psychometric features for its scores with internal consistencies (Cronbach's alpha) typically ranging between .80 and .90 (Demerouti et al., 2010; Schaufeli & Bakker, 2004). Kulikowski (2017) cited multiple longitudinal studies demonstrating that work engagement is associated not only with superior work performance but also with the mental and physical health of employees. Reis, Hoppe and Schröder (2013) longitudinal study of Dutch physiotherapists and students indicates that the UWES score is a predictor of long-term mental health. A 7-year longitudinal study demonstrated that the UWES scores negatively predict depressive symptoms and positively predict overall life satisfaction [26], whilst a 2-year longitudinal study in Norway showed that vigor is a negative predictor of depression symptoms and anxiety and helps predict the frequency of absence due to illness but not the duration of sick leave (Kulikowski, 2017).

Suffice it to say that the UWES has a significant set of research studies in a wide variety of contexts which collectively suggest it is a robust tool for assessing employee engagement. It is the engagement measure with the most rigorous and consistent reporting of score validity and for these reasons, was selected as the measure used in this study. Yet it is still prone to the issues associated with self-perception measures.

Description of the scenario planning intervention

The scenario planning intervention was the standard approach in which participants are led through several exercises in order to select two critical uncertainties that are then placed on a 2x2 matrix (Chermack, 2011; Schwartz, 1996). Additional study of the business environment and relevant trends led to four scenarios in each of the four

participating organizations. Drafts of the written scenarios were fed back to participants to assess the relevant, challenging and plausible nature of the scenarios before final editing. Additional workshops were held in all four organizations to wind tunnel (van der Heijden, 2000) the primary issues and connect the scenarios to decision-making.

Results

The following sections present the results of the data analysis, including descriptive statistics and assumptions, score reliability, score validity, and the primary *t*-test results.

Data analysis

Data were input into SPSS Statistics and analyses were performed in the categories as described below.

Assumptions for statistical tests

There are three assumptions that must be met for a matched-pairs *t*-test. They are (1) continuous data, (2) a normal distribution, and (3) a simple random sample from the population. Because researchers used the UWES, the data are continuous. Descriptive statistics below establish a normal distribution; however, a random sample was not obtained, which is a clear limitation to the research study in terms of meeting its fundamental assumptions and is discussed in detail.

Descriptive statistics

Researchers examined Q-Q plots for both pre- and post-test data and no deviations from normality were observed that suggested the use of non-parametric statistics was necessary (Jeon, Ahn, & Park, 2015; Lange & Ryan, 1989). Skewness and kurtosis values were examined and found to be ranging from -.95 to 2.4 (skewness), and -.98 to 3.4, (kurtosis). According to Leech and Onwuegbuzie, (2010), the data were slightly positively skewed and slightly positively kurtic.

Reliability of scores in the research data

Reliability coefficients (Cronbach’s Alpha) were calculated for the overall data set (pretest and posttest) and for each of the three factors of the UWES (pretest and posttest). Reliability coefficients are provided in Table 1.

Table 1: Reliability coefficients for UWES scores (overall, with pretests and posttests)

	Pretest	Posttest
Overall Scale	.88	.88
Vigor	.70	.81
Dedication	.82	.83
Absorption	.72	.70

All reliability coefficients were acceptable according to Nunnally (1970).

Validity of scores in the research data

Because of the small sample size, researchers debated the most appropriate analysis of score validity. While there are clearly standard sample sizes required for the various possible analyses (Costello & Osborne, 2005), Exploratory Factor Analysis (EFA) was determined to be the best approach given a generally small sample size (Chen & Zhu, 2004). Researchers selected a principal components analysis with varimax rotation and forced the number of factors to three, given the established structure of the UWES (Chen & Zhu, 2004). The rotated solution showed three factors that explained 62.06% of the variance. There were some cross-loadings among the items for vigor and absorption, but the higher estimates coincided with the factors expected. The rotated factor matrix is provided in Table 2.

Table 2: Rotated component matrix for the UWES

	Vigor	Dedication	Absorption
Item 1	.75		
Item 2		.56	
Item 3			.41
Item 4	.79		
Item 5		.59	
Item 6			.84
Item 7		.77	
Item 8	.76		
Item 9			.82
Item 10		.70	
Item 11			.77
Item 12	.76		
Item 13		.72	
Item 14			.63
Item 15	.65		
Item 16			.79
Item 17	.71		

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.
 a. Rotation converged in 6 iterations.

The preliminary data analysis generally supported the basic assumptions underlying *t*-tests, with the exception of random sampling. There were some slight deviations from the ideal results related to sample size but researchers found no shortcomings that would prohibit further data analysis.

T-test results

Participants showed a statistically and practically significant change in their perceptions of work engagement on all three factors of the UWES (Vigor $t(42) = 3.45$, Dedication $t(42) = 2.73$ and Absorption $t(42) = 6.28$). Cohen’s *D* statistics showed a medium effect size for each factor (Cohen, 1969); though, effect size statistics should be carefully considered. The results of the *t*-test analysis showed statistically and practically significant results for all three factors of the UWES and are reported in Table 3, including 95% confidence intervals and effect sizes.

Table 3: *T*-test results for the three factors of the UWES between pretests and posttests.

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval		<i>t</i>	<i>df</i>	<i>Sig.</i>	<i>D</i>
				Lower	Upper				
Vigor - Vigor_post	0.32	0.60	0.09	0.13	0.51	3.45	40.00	0.00	.60
Dedication - Dedication_post	0.25	0.58	0.09	0.06	0.43	2.73	40.00	0.01	.68
Absorption - Absorption_post	0.40	0.41	0.06	0.27	0.53	6.28	40.00	0.00	.58

Discussion

Results showed that participants statistically and practically increased their work engagement scores after participating in the scenario planning interventions. In other words, it appears that scenario planning had a positive influence on views of work engagement. While this study is preliminary and novel, it shows promise for future inquiry. The study also provides support for the assertion that scenario planning may create a sense of involvement in important decisions and foster a sense of inclusion for participants. However, results should be interpreted carefully, and in view of several important limitations.

Limitations

First, researchers were not able to achieve a control group, which is essential for making specific claims. Second, there was no random selection or assignment involved in the study. Finally, the UWES yields self-perception data, which generally produces low score validity overall. Each of these limitations is discussed in the context of interpreting the results and with implications for future research.

Lack of a control group

Researchers attempted to recruit control groups within each of the four organizations, and while initial data collection was achieved, the fall off between pre-test and posttest was excessive, leading to unusable control group data. This is the primary limitation of the study. Because of this limitation, the increase in work engagement scores is difficult to attribute specifically and entirely to the scenario planning intervention (Field, 2005, 2009). Researchers cannot rule out other possible reasons for the change in perceptions which could be attributed to team building, training or other events that may have occurred during the same timeframe. While the results show potential, the ideal follow-up study should replicate this study with the addition of a control group.

Lack of random selection and assignment

It is unlikely to achieve random selection or assignment in the context of scenario planning because participants are selected purposefully (O'Brien, 2004). In fact, organizational research generally does not lend itself to randomness because of the inherent dynamics and specific purposes of most organizational interventions (Cummings & Worley, 2014). Therefore, this limitation is a common one in field research and is difficult to overcome. Yet, there could be cases in which it may be possible to randomly select participants and randomly assign them. Such an achievement would significantly advance scenario planning research.

Self-perception measures

Finally, the use of self-perception measures always introduces issues that can affect research outcomes. In particular, self-perceptions measures are prone to confirmation bias – the tendency to respond in ways that support existing beliefs and perceptions (Field, 2005, 2009). Other more objective measures should be considered, such as observations of work behaviors or turnover data.

Conclusions

The purpose of this study was to determine if scenario planning could positively influence perceptions of work engagement. The research described here was preliminary, and several limitations were identified. However, researchers found evidence that scenario planning may have played a role in statistically and practically improved perceptions of work engagement. Future research studies have been described and suggested, considering the limitations of this exploratory study.

It seems worthwhile to view scenario planning as a potential tool for supporting employee engagement. Further reports from both research and practice realms are needed to understand any potential relationship further. To be sure, it will require a long-term effort to establish any definitive connection between the two phenomena, yet initial results suggest a potential benefit of scenario planning.

References

- Augier, M., Dew, N., Knudsen, T., & Stieglitz, N. (2018). Organizational persistence in the use of war gaming and scenario planning. *Long Range Planning*.
- Bakker, A. B., & Albrecht, S. (2018). Work engagement: current trends. *Career Development International*, 23(1), 4-11.
- Bradfield, R., Wright, G., Burt, G., Cairns, G., & Van Der Heijden, K. (2005). The origins and evolution of scenario techniques in long range business planning. *Futures*, 795-812.
- Byiers, B. J., Reichle, J., & Symons, F. J. (2012). Single-subject experimental design for evidence-based practice. *American journal of speech-language pathology*.
- Chermack, T. J. (2011). *Scenario Planning in Organizations*. San Fransisco: Barrett-Koehler Publishers Inc.
- Chermack, T. J., Lynham, S. A., & Ruona, W. E. (2001). A Review of Scenario Panning Literature. *Futures Research Quarterly*, 7-31.
- Coates, J. F. (2000). From My Perspective: Scenario Planning. *Technological Forecasting and Social Change*, 115-123.
- Coo, C., & Salanova, M. (2018). Mindfulness can make you happy-and-productive: A mindfulness controlled trial and its effects on happiness, work engagement and performance. *Journal of Happiness Studies*, 19(6), 1691-1711.
- Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical assessment, research & evaluation*, 10(7), 1-9.
- Crozier, M., & Friedberg, E. (1977). *L'Acteur et le système. Les Contraintes de l'Action Collective*.
- Cummings, T. G., & Worley, C. G. (2014). *Organization development and change*. Cengage learning.
- Demerouti, E., Mostert, K., & Bakker, A. B. (2010). Burnout and work engagement: A thorough investigation of the independency of both constructs. *Journal of Occupational Health Psychology*, 15(3), 209-222. doi:10.1037/a0019408
- Durance, P., & Godet, M. (2010). Scenario building: Uses and abuses. *Technological Forecasting and Social Change*, 1488-1492.
- Field, A. (2009). *Discovering statistics using SPSS*. Sage publications.
- Field, A. P. (2005). Is the meta-analysis of correlation coefficients accurate when population correlations vary?. *Psychological methods*, 10(4), 444.
- Godet, M. (2000, September). The Art of Scenarios and Strategic Planning: Tools and Pitfalls. *Technological Forecasting and Social Change*, 65(1), 1-20.
- Harter, J. K., & Agrawal, S. (2011). Cross-cultural analysis of Gallup's Q12 employee engagement instrument. *Omaha, NE: Gallup*.
- Hawkins, H. A., & Chermack, T. J. (2014). The Effects of Scenario Planning on Antecedents to Participant Engagement at Work. *Journal of Futures Studies*, 18(4), 77-92.
- Jeon, Y., Ahn, J., & Park, C. (2015). A nonparametric kernel approach to interval-valued data analysis. *Technometrics*, 57(4), 566-575.
- Johansen, B. (2007). *Get there early: sensing the future to compete in the present*. San Francisco, CA: Berrett-Koehler Publishers, Inc.
- Kulikowski, K. (2017). Do we all agree on how to measure work engagement? Factorial validity of Utecht work engagement scale as a standard measurement tool, A literature review. *International Journal of Occupational Medicine and Environmental Health*, 30(2), 161-175.
- Lange, N., & Ryan, L. (1989). Assessing normality in random effects models. *The Annals of Statistics*, 17(2), 624-642.
- Leech, N. L., & Onwuegbuzie, A. J. (2010). Guidelines for conducting and reporting mixed research in the field of counseling and beyond. *Journal of Counseling and Development*, 88(1), 61-69
- Lew, C., Meyerowitz, D., & Svensson, G. (2018). Formal and informal scenario-planning in strategic decision-making: an assessment of corporate reasoning. *Journal of Business & Industrial Marketing*.
- Luthans, F. (2002). The need for and meaning of positive organizational behavior. *Journal of Organizational*

- Behavior, 23, 695-706
- Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Occupational Behavior*, 2, 99-113. doi:10.1002/job.4030020205
- Maslach, C., & Leiter, M. (1997). *The truth about burnout: How organizations cause personal stress and what to do about it* (1st ed.). San Francisco, Calif.: Jossey-Bass.
- Mauelshagen, F. (2017). The Age of Uncertainty: Future Scenarios and Global Threats after World War II. doi:10.13140/RG.2.2.34432.84486.
- Nunnally, J. (1970). *Introduction to psychological measurement*.
- O'Brien, F. A. (2004). Scenario planning—lessons for practice from teaching and learning. *European Journal of Operational Research*, 152(3), 709-722.
- Petrou, P., Demerouti, E., & Schaufeli, W. B. (2018). Crafting the change: The role of employee job crafting behaviors for successful organizational change. *Journal of Management*, 44(5), 1766-1792.
- Phadnis, S., Caplice, C., Sheffi, Y., & Singh, M. (2015). Effect of scenario planning on field experts' judgment of long-range investment decisions. *Strategic Management Journal*, 36(9), 1401-1411.
- Ramirez, R., & Ravetz, J. (2011). Feral Futures: Zen and Athsteics. *Futures*, 478-487.
- Ramirez, R., Churchhouse, S., Palmero, A., & Hoffman, J. (2017). Using Scenario Planning to Reshape Strategy. MIT Sloan Management Review.
- Reis, D., Hoppe, A., & Schröder, A. (2013). Reciprocal relationships between resources, work and study engagement, and mental health: Evidence for gain cycles. *European Journal of Work and Organizational Psychology*, 24(1), 59-75. doi:10.1080/1359432x.2013.834891
- Salanova, M., Llorens, S., Cifre, E., Martinez, I., & Schaufeli, W. B. (2003). Perceived collective efficacy, subjective well-being and task performance among electronic work groups: An experimental study. *Small Groups Research*, 34, 43-73.
- Schaufeli, W. B., & Bakker, A. B. (2004). Test manual for the Utrecht Work Engagement Scale. Unpublished manuscript, Utrecht University, the Netherlands. Retrieved from <http://www.schaufeli.com>
- Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire. *Educational and psychological measurement*, 66(4), 701-716. doi:10.1177/0013164405282471
- Schaufeli, W. B., & Bakker, A. B. (2017). Utrecht Work Engagement Scale: Preliminary Manual. Utrecht, Netherlands: Occupational Health Psychology Unit, Utrecht University; November 2003.
- Schaufeli, W. B. (2018). Work engagement in Europe. *Organizational Dynamics*, 47(2), 99-106.
- Schaufeli, W. B., Leiter, M. P., Maslach, C., & Jackson, S. E. (1996). MBI General Survey. Maslach Burnout Inventory Manual (3). In Maslach, C. Jackson, S.E. & Leiter, M.P. (Eds.). Palo Alto, CA: Consulting Psychologists Press.
- Schaufeli, W. B., & Salanova, M. (in press). Work engagement: An emerging psychological concept and its implications for organizations. In S. W. Gilliland, D. D. Steiner, & D. P. Skarlicki (Eds.), *Research in social issues in management: Vol. 5. Managing social and ethical issues in organizations*. Greenwich, CT: Information Age Publishers.
- Schaufeli, W. B., Salanova, M., Gonzalez-Romá, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: A confirmative analytic approach. *Journal of Happiness Studies*, 3, 71-92.
- Schwartz, P. (1996). *The Art of the Long View: Paths to Strategic Insights for You and Your Company*. New York, NY: DoubleDay.
- Seligman, M., & Csikszentmihalyi, M. (2000). Positive Psychology: An Introduction. *The American psychologist*. 55. 5-14. doi:10.1037/0003-066X.55.1.5.
- Sonnentag, S. (2003). Recovery, work engagement, and proactive behavior: A new look at the interface between non-work and work. *Journal of Applied Psychology*, 88, 518-528.
- Spaniol, M. J., & Rowland, N. J. (2018). Defining scenario. *Futures and Foresight Science*, 1(1), 1-13.
- Van Der Heijden, K. (2000). Technological Forecasting and Social Change. *Scenarios and Forecasting*, 65, 31-36.
- Varum, C. A., & Melo, C. (2010). Directions in scenario planning literature—A review of the past decades. *Futures*, 42(4), 355-369.

- Vecchiato, R. (2019). Scenario planning, cognition, and strategic investment decisions in a turbulent environment. *Long Range Planning*.
- Wack, P. (1985). Scenarios: Uncharted Waters Ahead. Harvard Business Review.
- Wilson, R. (Ed.). (2017). Principles of Business: Management. Salem Press.
- Wright, G., & Goodwin, P. (2009). Decision making and planning under low levels of predictability: Enhancing the scenario method. *International Journal of Forecasting*, 25(4), 813-825.

