INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 14, Issue 4, (2024) E-ISSN: 2222-6990

Data-Driven Gut Feeling? A Conceptual Paper of Situational Awareness for Effective Educational Leadership in a VUCA Environment

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To Link this Article: http://dx.doi.org/10.6007/IJARBSS/v14-i4/21272 DOI:10.6007/IJARBSS/v14-i4/21272

Published Date: 04 April 2024

Abstract

Effective leaders in education have key characteristics and skills that enable them to navigate the current environment, which is known as volatile, uncertain, complex, and ambiguous, or aptly, VUCA. A number of literatures discussed effective leadership skills such as adaptability, resilience, collaboration, innovation, and strategic thinking. However, one critical skill that is equally important to becoming an effective leader in education has need to be explored in depth, namely Situational Awareness. It refers to the ability of leaders to understand and interpret the context, dynamics, and challenges they face in their own settings. While this concept is recognized as one of the critical skills in fields such as aviation, the military, and healthcare, little attention has been paid to the application of SA in the field of educational leadership. Therefore, this paper will explore the concept of SA and how it can help educational leaders to become effective leaders and decision- makers in dynamic and unpredictable situations, i.e., in the VUCA environment. By exploring the relationship between situational awareness and effective educational leadership, this study aims to provide insights into how educational leaders can develop and improve their situational awareness to better cope with the challenges and opportunities in the VUCA world.

Keywords: Educational Leaders, Effective Leadership, Decision-Making, Turbulent, Unpredictable

Introduction

In today's educational landscape, there is a growing need for leaders who can navigate the complex and unpredictable environment of VUCA. Educational leaders are facing numerous challenges that require adaptive and innovative solutions to improve educational outcomes. The VUCA environment, characterized by volatility, uncertainty, complexity and ambiguity, increases the complexity and unpredictability of the challenges faced by education leaders. The VUCA nature of the world remains a particular concept that is especially relevant in the

context of leadership, as leaders need to be able to deal with the turbulent environment (Alkhaldi et al., 2017; Bennett & Lemoine, 2014; Codreanu, 2016; Johansen, 2012; Johansen & Euchner, 2013).

Effective educational leadership in a VUCA environment requires a deep understanding of the key concepts and theories that underpin leadership practices. One such concept that can lead to effective leadership is situational awareness (SA) of the environment. SA is highly relevant to the practice of decision-making, especially in the context of decisions that are made in-the-moment and have the potential to influence the outcome of a situation (Laurila-Pant et al., 2023; Marcus et al., 2020). The term situational refers to the immediate environment, while awareness means being able to understand and assess the momentary environment; thus, SA means understanding the momentary circumstances of the immediate environment (Parse, 2018). In a VUCA environment, the environment is often dynamic and changes can occur quickly, with uncertainties looming most of the time. Therefore, the ability to 'read' and 'understand' the data gathered from the environment could be crucial for leaders to make relevant decisions and take appropriate action.

The concept of SA in education is still emerging, as it has been used primarily in contexts where human factors confront practitioners, such as air traffic control, manufacturing systems, firefighters, and the military (Endsley, 1995, 2015; Endsley & Garland, 2000). The literature still does not emphasize enough the discussion of SA in the educational leadership landscape, although the ability to assess situations correctly is crucial before making a decision. Recent literature highlights that educational leaders faced an unprecedented crisis context and some are unprepared to lead under enormous pressure (Espiritu, 2021; Spyropoulou & Koutroukis, 2021; Urick et al., 2021). This can lead to a domino effect where these leaders are exposed to increasing stress that impacts their physical and mental health and ultimately affects the school's ability to function successfully (Millar et al., 2018; Rimita et al., 2020). As the educational environment has also been considered to be in turmoil since the last century, the discussion about SA needs to be broadened to include leaders in education, as little attention has been paid to this concept. Leaders in education face various complex and dynamic challenges arising from internal and external aspects and there should be a model to guide these leaders look for a direction when making decisions. The aim of this conceptual paper is therefore to provide a discussion of Situational Awareness, in particular the model developed by Endsley (1988, 1995), and how it can contribute to effective educational leadership in a VUCA environment

Educational Leadership and Situational Awareness

There is a growing consensus that the quality of leadership has a significant impact on school and student outcomes (Bush, 2007; Bush et al., 2012; Bush & Glover, 2014; Leithwood, 2008; Leithwood et al., 2008). Educational leaders at all levels of the education system (headmasters, principal, directors and university deans) are recognized as custodians, key figures and influential people in their respective institutions and within the communities they serve (Day et al., 2016). It has therefore been concluded that schools and educational institutions need effective leaders and managers to provide the best possible education for their students (Bush, 2007).

The VUCA environment has become increasingly important in the field of educational leadership. Official reports from the Organisation for Economic Co-operation and Development (OECD) and the United Nations Educational, Scientific and Cultural Organisation (UNESCO) have highlighted the challenges of the VUCA world and the skills

needed for future generations to thrive in turbulent circumstances. The education system today is challenged by a range of global conditions such as artificial intelligence, unstable political situations, environmental problems and health issues (OECD, 2018, 2019, 2020, 2021; Reimers et al., 2021; UNESCO, 2014). This is leading to significant change that affects the responsibilities and practices of educational leaders at all levels. Leaders in education must now recognize that 'one size fits all' no longer applies to leadership in the VUCA world (Marlia Jamail et al., 2020). Instead, they need to demonstrate their leadership skills in VUCA contexts in order to create not only a conducive but also a safe learning and teaching environment, while dealing with turbulent situations that may affect their ability to lead successfully (Browne, 2020).

One of the most devastating events to have had a significant impact on the education landscape was the emergence of the Covid-19 global pandemic. The health pandemic was and still a unique event that has fundamentally changed the way the traditional education system operates, exacerbating pre-existing problems and creating a host of new challenges (Harris, 2020; Harris & Jones, 2020, 2022; Parveen et al., 2022). According to available literatures, despite early warnings, education leaders were caught off guard by the current health crisis (Harris, 2020; Harris & Jones, 2020; McLeod & Dulsky, 2021). The role of these leaders has shifted to a new level where, in addition to their existing responsibility of maintaining the teaching and learning process in uncertain times, they are tasked with making quick decisions while providing support and always prioritizing the health and safety of students, teachers and staff (Kruse et al., 2020; McLeod & Dulsky, 2021). As the pandemic began to create chaotic and uncertain circumstances, educational leaders at all levels struggled and were forced to respond quickly, effectively and appropriately at the same time (McLeod & Dulsky, 2021; Netolicky, 2020; Stone-Johnson & Miles Weiner, 2020; Weiner et al., 2021). The impact of the pandemic has been so troubling because numerous studies have found that the unprecedented crisis in education will bring with it a host of unprecedented obstacles not only in the present but also in the years to come (Browne, 2020; Harris & Jones, 2020; OECD, 2021). Thus, the exaggerations brought by the VUCA environment have become a driving force for revising various leadership practices, especially because of challenging times. In these times, past experiences or known practices cannot be relied upon, even in education (Browne, 2020; Harris & Jones, 2020, 2022).

Due to volatile, uncertain, complex and ambiguous events, situational awareness is increasingly recognized as one of the key skills for leaders in various fields, including education. Developing accurate and pragmatic situational awareness is a fundamental task for leaders (Marcus et al., 2020). The ability to read and understand ‘the situation’ - what is happening and how to deal with it - has become a crucial task for leaders, especially when faced with a crisis (Marcus et al., 2006, 2020). A recommendation paper on leadership competencies for successful leaders in higher education points out that situational awareness is one of the most important characteristics of contextual agility (Thompson & Miller, 2018). It is about leaders’ understanding the challenges and opportunities in a context that operates within one’s organization and outside the system. In this environment, leaders gather so much knowledge about their own organization, have a deep understanding of the ‘disruptions’ of the academic environment, and are able to make decisions to move forward based on the surrounding variables (Thompson & Miller, 2018). While this concept of awareness is not new, schools or educational organizations are becoming more turbulent and complex, requiring educational leaders to not only see what is happening around them, but moreover to consider the many elements around them, understand the relationships

between each element, and make informed decisions that can impact the future state of the organization in question.

Based on a meta-analysis of 69 studies on school leadership by Marzano et al. (2005), SA was identified as one of the 21 'responsibilities' of school leaders. In the school context, educational leaders who possessed SA expressed awareness of the details and undercurrents of their school's functions and used the information to address current or potential challenges (Marzano, 2005). In the meta-analysis of this responsibility, educational leaders demonstrated three specific behaviors from SA, namely: (i) accurate prediction of what might happen on a daily basis; (ii) knowledge of groups and relationships among students and staff; and (iii) being aware of issues around the school that have not yet surfaced but could potentially lead to discord within the school community. To illustrate, a leader demonstrates SA when he or she is aware of and investigates informal relationships/ groups among the staff to identify hidden problems that could affect the day-to-day running of the school. The leader has fulfilled this responsibility when he encounters some teachers who he has heard are unhappy with recent decisions. Educational leaders who have SA are better able to anticipate and respond to challenges and opportunities and develop effective strategies that not only support student outcomes but also improve school climate (Marzano et al., 2005, 2012).

In addition, educational leaders who possess SA can create collective efficacy in the school setting, i.e., the shared perception or belief among group members that they can significantly increase organizational effectiveness (Marzano, 2005). In the school environment, the ability of SA provides leaders with the opportunity to be aware of the positive and negative dynamics that occur between individuals - staff, teachers and students - and to use these elements to predict and anticipate potential challenges (Marzano, 2005). A mixed-methods case study was conducted in a K-8 school to explore teachers' and headmasters' perceptions of collective teacher efficacy to determine whether leadership interventions promote collective teacher efficacy (Ernst & Fothergill, 2021). Three main themes were discovered and overall SA was one of the themes associated with the source of collective teacher efficacy. The study highlighted the concept of SA, which includes understanding school culture, high expectations and leadership from school administrators. The school's success in coping with the crises together was related to the affective states and coping experiences of both teachers and leaders (Ernst & Fothergill, 2021). Teachers indicated that they felt reassured by the actions of school leaders in coping with crises because they had the opportunity to promote collaboration, empower them by giving them the opportunity to take on more responsibilities outside the classroom, and consciously involve teachers in the school's decision-making process. From their perspective, the leaders said that they would offer support if their staff needed it and that they appreciated the work they put into the school. Support during difficult times is crucial. By knowing and understanding the school environment, leaders can focus on building supportive relationships with staff.

All this shows that leaders who have sufficient SA are aware of their school environment and can deal with potential threats and opportunities by developing an awareness of school functioning (Marzano, 2005). In the context of typical leadership in complex educational settings, it is particularly important that leaders are able to quickly assess the environment and surroundings and then translate this awareness into responsive action (Marcus et al., 2020). Every action the leader takes will change the course of the situation, so the practice of situational awareness must be continuous and adaptive (Marcus et al., 2020). In a study

of leaders from two academic medical centers, it was found that situational awareness of team members, their roles and the events that unfolded during the Covid 19 pandemic was critical (Aagaard & Earnest, 2021). During the turbulent state, academic leaders paused to meet educational goals and made the health and safety of their students, faculty, staff and patients their priorities when the situation warranted. For example, the clinical director scheduled short daily meetings to discuss the priorities of the day and to allow the educational leaders sufficient time to make decisions about educational goals that would be compromised due to the necessity of the situations. The leaders hold these face-to-face meetings, even when they are not necessary, to ensure that the discussions allow for a more nuanced understanding of each situation they have faced. While the situations have become relatively 'new normal', the leaders have brought education back into focus and made informed decisions about the situations that are relevant to them.

From these studies, it can be concluded that SA is important and crucial for educational leaders to make informed decisions, especially in extremely turbulent circumstances. As the world changes at an accelerating pace, leaders in education need to be able to adapt quickly to new circumstances and make decisions based on their environment and circumstances. This is especially true after the pandemic outbreak and now in the post-pandemic education environment. The situations are characterized by a high degree of uncertainty and unpredictability (Stone-Johnson & Weiner, 2020; Weiner et al., 2021).

Endsley Model of Situational Awareness (SA)

SA is defined as "the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future" (Endsley, 1988). According to Endsley (1995), perception of the environment is an important part of the information processing approach, which is a higher order cognitive process. It is not only about processing data, but also about the ability to understand dynamic situations and predict the future, which can influence the goals of individuals or organizations (Endsley, 1995). For some, SA refers to the ability to perceive, understand and anticipate the situation in a particular context (Adams et al., 1995; Stanton et al., 2001).

Historically, the concept of SA was first implemented in the aviation industry and has been extensively discussed in other high-demand industries such as healthcare, energy and transportation (Endsley, 2015; Parse, 2018; Endsley & Garland, 2000). There are several models available at SA. One of the best-known models was developed by Dr. Mica Endsley, a former Chief Scientist of the United States Air Force, and focuses mainly on perception and understanding of the world with some aspect of future projection (Stanton et al., 2001). The concept of SA was initially developed for pilots to recognize, understand and process environmental elements in missions in order to avoid situations that could potentially end in tragedy (Endsley, 1988, 1995, 2015). In the earlier seminal paper, Endsley (1988) pointed out, the importance of SA as a critical skill for pilots was widespread due to accidents caused by human error and it became clear that one of the main causes of such accidents was a lack of awareness of the various situations including environmental factors, equipment performance and pilot actions. For Endsley (1988), even the most experienced pilots can make wrong decisions if they do not have an accurate SA and are not able to take the appropriate actions to avoid disasters.

The model developed by Endsley (1995) breaks down into three levels of situational awareness, with each level being necessary and serving as a precursor to the next level (Stanton, 2001). Endsley (1995) identified three levels that characterize situational

awareness: (1) perceiving relevant information; (2) understanding key information and how to deal with it; and (3) predicting future outcomes based on the information. Figure 1 shows Endsley's model of Situational Awareness explains the three phases of SA. As a linear model, it emphasizes that information flows from perception to understanding, where it is used for analysis and synthesis, and then on to projection, where it is used to anticipate and plan for the future (Endsley, 1995). The arrows in the figure indicate that each stage is dependent on the preceding stage and that the quality of the projection stage is directly influenced by the accuracy and completeness of the preceding stages (Stanton, 2001). The different size of the boxes in each stage explains the increasing complexity, which at the first stage is related to collecting data about a situation before moving on to making sense of the data and 'seeing' what is happening. The last level is the highest level of SA, where the accuracy of levels 1 and 2 enables the individual to project the future of the elements, whether in resolving conflicts or developing strategies to achieve the planned goals (Stanton, 2001).

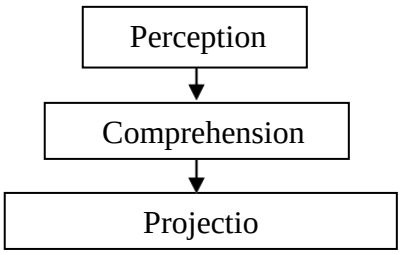

Figure 1: A simplified version of Endsley's three level situational awareness model

The hierarchical levels of this model emphasize the importance of timely assessment and understanding of the situations that lead to decision-making. Each level of the model is equally important as it forms not only the basis but also the process of decision-making that influences the future (Endsley, 1995). As Endsley stated, without the basic level of perception of important information, the faulty formation of the situation will increase dramatically (Endsley & Garland, 2000). An example of the importance of the initial and intermediate levels of perception is motorcycling. This involves watching the road, listening for sirens or cars, feeling the vibrations of the motorbike, smelling the smoke and tasting the air for strange smells. If we do not pay much attention to this initial level, we may not properly perceive the environment around us, which then makes it difficult to spot potential problems that could lead to accidents. Therefore, in order to make informed decisions and plan the right course of action in turbulent situations, individuals need to be able to be strong from the beginning and consider every element they are in and make sense of the relationships between the elements.

Furthermore, Endsley's model has emphasized that context plays a role in SA ability, as different people with different training, experience and knowledge may make different decisions and reach different conclusions (Stanton, 2001; Endsley, 1995). In other words, it is about understanding the situation - influenced by contextual factors - that is happening around us and how we deal with it at that time (Marcus et al., 2020). As SA is strongly influenced by different contexts and factors, it is not surprising if there is a variety of conclusions/solutions that individuals will draw, as people differ in their abilities, knowledge, and experiences (Stanton, 2001).

Integration of Endsley's Model of Situational Awareness for effective educational leadership in the VUCA Environment

In the field of educational leadership, SA is crucial for effective leadership in a VUCA environment. The ability to assess situations requires leaders to be outward-facing, listening and observing the dynamics of situations, and inward-facing, dealing with strengths and weaknesses in order to be most effective. SA is a necessary tool that enables leaders to make informed decisions when operating in a complex and ambiguous environment. Especially in VUCA contexts, leaders need to be able to assess and respond to changes in their environment quickly and effectively. In a seminal paper, Endsley (1995) argues that SA is critical to decision-making because it enables leaders to gather and interpret information, anticipate possible outcomes, and select the most appropriate course of action. SA, when done properly, enables leaders to make timely and effective decisions and to adjust their leadership approach as needed (Endsley 1995; Marcus et al., 2020).

Endsley's three level model of situational awareness provides leaders with a framework for assessing, understanding and responding to a variety of complex and dynamic situations. Central to this model is the importance of integrating all three levels: awareness of the environment, understanding of key elements, and projection of future outcomes to create a comprehensive understanding of situations (Endsley, 1995; Stanton, 2001). The combination of all three levels enables leaders to make informed decisions based on the needs and context of their school community. Educational leaders who have SA are better able to anticipate and respond to challenges and opportunities while developing effective strategies that support teaching and learning**.**

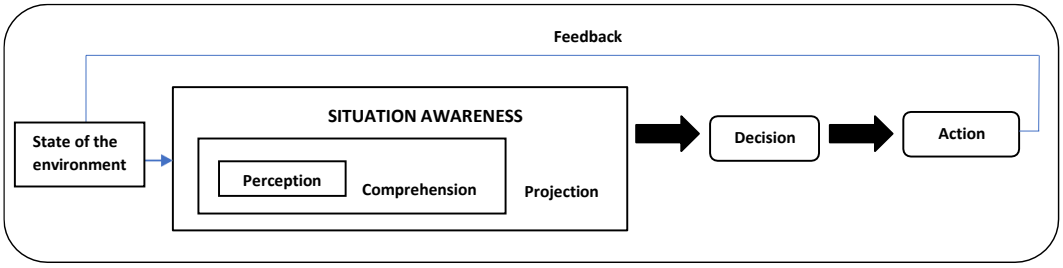

Figure 2: Endsley's model of situational awareness

Level 1: Perception of the elements in the environment

This lowest level deals with cognitions about the environment, position, characteristics and dynamics of the context in question. The 'perception of cues' is fundamental and important in the exercise of SA (Endsley & Garland, 2000, p. 3). At this level, educational leaders perceive the element around them in their own context. At this initial stage, the leaders' perception is about using all their senses (sight, hearing, touch, smell and taste) to gather important information about their own environment. For example, in a context where there is conflict between teachers, the leader in this initial phase might observe heated arguments between teachers in the hallway that have disrupted the learning environment and caused tension among students and staff nearby. The leader could use their perceptual skills to find out which teachers are involved, when the arguments began, where this change has taken place and how close this place is to the classroom.

Level 2: Comprehension of the Current Situation

Understanding is about making sense of information gathered at the perceptual level and making connections. It involves integrating multiple pieces of information and making them relevant to a person's goal (Endsley & Garland, 2000). This level goes beyond the previous step where leaders piece together the individual elements and develop an understanding of the meaning of the elements surrounding them. In addition, the leaders' understanding of the elements creates a further understanding of what is actually happening at that time. The holistic understanding of what is happening in their environment forms the basis for their decision-making. Using the same example as in level 1, the leader quickly analyses and synthesizes the information in the perception stage and identifies the cause of the conflict, the potential consequences if it is not stopped, and the opportunities/ possible solutions to deal with the situation. At this level, educational leaders begin to make judgements about the unexpected incident and make decisions based on the information available to them at the time and the impact on the intended outcomes. If leaders are not able to form a clear picture at Level 1, this can definitely affect the way they choose to resolve disputes between teachers.

Level 3: Projection of future status

The highest level of SA refers to the ability to project the future of the elements in the environment. Projection occurs when leaders have the highest level of understanding of the situation based on information gathered at the perceptual and comprehension levels (Endsley & Garland, 2000). As a result, leaders are able to use this ability to anticipate what might happen in the future and what the implications will be (Endsley & Garland, 2000). At this highest level, leaders can synthesize and have a deeper understanding of the situation so that they are able to forecast future events in a timely manner. Furthermore, at this level, leaders can identify potential risks and predict the different consequences of different actions. This level emphasizes the importance of training, experience and knowledge in planning a course of action to resolve conflicts and achieve the planned goals.

In the case of teachers arguing in the hallway, the leader could predict the possible outcomes and consequences of different strategies to deal with the situation. For example, if they ignore the argument, it may escalate and lead to further disruption of the learning environment. However, if they intervene too forcefully, they may exacerbate the conflict and create further tension. Based on the analysis at the previous levels, the leader could therefore develop a strategy to defuse the situation by de-escalating the dispute and mediating to find the best solution for both parties. In addition, the leader could anticipate the need for additional professional development to help staff improve their skills, or anticipate conflicts and identify ways to manage them in order to prepare for potential challenges and opportunities for their staff.

Implications of SA in decision making for educational leaders in the VUCA environment

Situational awareness is the basis for good decision-making. In a turbulent and uncertain VUCA environment, leaders must act decisively and sometimes make rapid-fire decisions without always having clear direction and certainty (Deaton, 2018). In a complex educational context, the ability to grasp, analyze and assess the current situation is crucial to ensure that decisions made are based on relevant key information about the environment. Integrating all the important information that comes from situational awareness forms the basis for subsequent decision-making (Laurila-Pant et al., 2023). Without good assessments, the

impact of misinformed decisions could affect relationships among the school community, the daily operations and, in the long term, on the positive climate in educational institutions. The key takeaways of how SA can influence educational leaders' decision-making are as follows

i. Identifying relevant information: SA helps educational leaders to identify the relevant and most important information about a situation. The process of being aware of a situation helps leaders focus on the most important information and filter out irrelevant details. This can help leaders make informed decisions based on a clear understanding of the situation. In addition, informed decisions allow leaders to anticipate potential changes and adjust their plans accordingly. For example, a school leader who knows that consistent rise of temperatures due to climate change can affect the comfort and have the potential for unsafe learning environments for students and teachers. Leaders who have SA begins with gathering information about the temperature patterns, climate projections and the impact of extreme heat on the students and staff's health and well-being. They can gather information from the weather reports, reports from experts and studies to gain a comprehensive understanding of the current and future environment.
ii. Anticipating outcomes: SA allows education leaders to anticipate a range of possible outcomes based on the different choices, which helps them weigh the pros and cons of the different options. Based on this information, these leaders can make the best decision that is most likely to lead to the desired outcome. With the information gathered, leaders can assess their financial budgets, look at the school's infrastructures, ventilation systems, cooling equipment and any guidelines related to temperature control. For example, leaders in school can adjust their spending plans and look for strategies to improve the facilities in the school, e.g. fixing the broken fans in the classrooms or ensure that the air-conditioner are serviced regularly or ensuring that the drinking facilities in the school are well maintained instead of waiting until unfortunate events occur that affect the school community and especially the students.
iii. Responding to changes: SA helps education leaders adapt and change quickly to the current situation by monitoring and evaluating the strategies taken. In addition, change often requires leaders to adapt their strategies and approaches. SA helps leaders monitor the effectiveness of their strategies and adjust them as needed. An example of continuous monitoring is staff and student feedback and analysis of all relevant data such as academic performance and well-being during school hours. In this way, leaders can assess whether their strategies are effective or identify other areas that need further improvement. Based on the monitoring, leaders can also address unforeseen and emerging needs that can help improve the situation, such as providing shade outside classrooms and access to cool water and hydration stations throughout the school area. With SA, these leaders can interpret and evaluate new information, recognise its relevance to the school context and be prepared to adapt to the new changes by making appropriately informed decisions. By keeping a close eye on evolving situations, they can identify when adjustments are needed and make timely changes to ensure that their response is in line with changing circumstances

In short, by using SA to identify relevant information, anticipate outcomes and respond to change, education leaders can make informed decisions that are consistent with their goals and the needs of the school community, including students, faculty and staff. By applying SA

in this way, education leaders can make decisions based on relevant information that takes into account the dynamic and complex nature of their educational environment, ultimately leading to better outcomes for students and overall school success.

Conclusion

Situational awareness plays a crucial role in the decision-making process of educational leaders, especially in the context of a VUCA environment. It involves the ability to gather timely and accurate information, analyze the details of a situation and make informed decisions based on evolving circumstances. Educational leaders who have the ability to 'read the situation' are better equipped to manage the complexity and uncertainty of the education landscape. It is important to recognize that leading in a VUCA environment, especially in the aftermath of a global crisis, requires a special kind of leader in education. These leaders must not only have technical expertise and a deep understanding of educational principles, but also the ability to deal with ambiguity, make informed decisions and demonstrate resilience. By embracing the concept SA, leaders can improve decision-making skills and lead school with confidence and effectiveness in an uncertain and ever-changing educational landscape.

Study Implications

This paper contributes to the theoretical understanding of situational awareness in educational leadership. By extending the framework to education, it emphasises the importance of situational awareness to effectively manage the complexities of the educational landscape. Furthermore, it highlights situational awareness as a critical factor in decision making, particularly its role in navigating the complex educational landscape, especially in a VUCA environment. Due to ever-changing circumstances, educational leaders need to consider getting the facts right before taking actions that may have an impact on affected stakeholders. The article provides practical guidance for education leaders, highlighting the need to recognise that they are facing unprecedented challenges and to be able to recognise the need to adapt and be flexible in their approaches. It takes a special kind of leadership who can deal with the turbulent and uncertain environment effectively. Overall, this paper promotes the importance of continuous learning and adaptation of leadership approaches and insights for addressing contemporary challenges in educational leadership.

References

Aagaard, E. M., & Earnest, M. (2020). Educational leadership in the time of a pandemic: Lessons from two institutions. *FASEB bioAdvances, 3*(3), 182–188. https://doi.org/10.1096/fba.2020- 00113

Adams, M. J., Tenney, Y. J., & Pew, R. W. (1995). Situation awareness and the cognitive management of complex systems. *Human Factors, 37*(1), 85-104. https://doi.org/10.1518/001872095779049462

Alkhaldi, MD, K. H., Austin, MSPH, MA, M. L., Cura, MS, HSE, B. A., Dantzler, PhD, D., Holland, MS, L., Maples, MBA, D. L., Quarrelles, MPA, CEM, J. C., Weinkle Jr, MS, ACC, R. K.,& Marcus, PhD, L. J. (2017). Are you ready? Crisis leadership in a hyper-VUCA environment (Part 1of 2). *Journal of Emergency Management, 15*(2), 117–132. https://doi.org/10.5055/jem.2017.0320

Bennett, N., & Lemoine, G. J. (2014). What a difference a word makes: Understanding threats to performance in a VUCA world. *Business Horizons, 57*(3), 311–317. https://doi.org/10.1016/j.bushor.2014.01.001

Browne, L. (2020). *Effective school leadership in challenging times*. Routledge. https://doi.org/10.4324/9780429197154

Bush, T. (2007). Educational leadership and management: Theory, policy, and practice. *South African Journal of Education, 27*(3), 391–40643. https://doi.org/10.24234/miopap.v3i3.255

Bush, T., Creighton, T., Dembowski, F., Echols, C., Glass, T., Hoyle, J., & Kelehear, Z. (2012). *Educational administration: The roles of leadership and management.* The Open University of Hong Kong.

Bush, T., & Glover, D. (2014). School leadership models: What do we know? *School Leadership and Management, 34*(5), 553–571. https://doi.org/10.1080/13632434.2014.928680

Codreanu, A. (2016). A VUCA action framework for a VUCA environment. Leadership challenges and solutions. *Journal of Defense Resources Management, 7*(2), 31–38.

Day, C., Sammons, P., & Gorgen, K. (2016). Successful school leadership. In Education Development Trust. https://doi.org/10.5040/9781474270984

Deaton, A. V. (2018). *VUCA tools for a VUCA World: developing leaders and teams for sustainable results*. Davinci Resources.

Endsley, M. R. (1988). Design and evaluation for situational awareness enhancement. *Proceedings of the Human Factors Society Annual Meeting, 32(2),* 97–101. https://doi.org/10.1177/154193128803200221

Endsley, M. R. (1995). Toward a theory of situation awareness in dynamic systems. *Human Factors*, 37(1), 32–64. https://doi.org/10.1518/001872095779049543

Endsley, M. R. (2015). Situation awareness misconceptions and misunderstandings. *Journal of Cognitive Engineering and Decision Making, 9*(1), 4–32. https://doi.org/10.1177/1555343415572631

Endsley, M. R., & Garland, D. J. (Eds) (2000). *Situation awareness analysis and measurement*. Lawrence Erlbaum Associates Publishers.

Ernst, S., & Fothergill, W. (2021). How can leaders develop and maintain high achieving elementary schools? A single case study exploring collective teacher efficacy and principal leadership. *Education Leadership Review of Doctoral Research, 9*, 2021.

Espiritu, M. L. (2021). New normal leadership competencies of school heads and its influence on their decision-making style and organizational trust. *International Journal of Academic Multidisciplinary Research, 5*(11), 101–105. https://doi.org/10.13140/RG.2.2.26365.90087

Harris, A. (2020). COVID-19 – school leadership in crisis? *Journal of Professional Capital and Community, 5*(3–4), 321–326. https://doi.org/10.1108/JPCC-06-2020-0045

Harris, A., & Jones, M. (2020). COVID 19 – School leadership in disruptive times. *School Leadership and Management, 40*(4), 243–247. https://doi.org/10.1080/13632434.2020.1811479

Harris, A., & Jones, M. (2022). Leading during a pandemic–what the evidence tells us. *School Leadership and Management, 42*(2), 105–109. https://doi.org/10.1080/13632434.2022.2064626

Johansen, R. (2012). *Leaders make the future: Tten new leadership skills for an uncertain world*. Berrett-Koehler; London.

Johansen, B., & Euchner, J. (2013). Navigating the VUCA world. *Research Technology Management, 56*(1), 10–15. https://doi.org/10.5437/08956308X5601003

Kruse, S. D., Hackmann, D. G., & Lindle, J. C. (2020). Academic leadership during a pandemic: Department heads leading with a focus on equity. *Frontiers in Education, 5*. https://doi.org/10.3389/feduc.2020.614641

Laurila-Pant, M., Pihlajamäki, M., Lanki, A., & Lehikoinen, A. (2023). A protocol for analysing the role of shared situational awareness and decision-making in cooperative disaster simulations. *International Journal of Disaster Risk Reduction,* 103544. https://doi.org/10.1016/J.IJDRR.2023.103544

Leithwood, K. (2008). Should educational leadership focus on best practices or next practices? *Journal of Educational Change, 9*(1), 71–75. https://doi.org/10.1007/s10833-007-9045-7

Leithwood, K., Harris, A., & Hopkins, D. (2008). Seven strong claims about successful school leadership. *School Leadership and Management, 28*(1), 27–42. https://doi.org/10.1080/13632430701800060

Marcus, L. J., Dorn, B. C., & Henderson, J. M. (2006). Meta-leadership and national emergency preparedness: A model to build government Connectivity. *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science, 4*(2), 128–134. https://doi.org/10.1089/bsp.2006.4.128

Marcus, L. J., McNulty, E. J., Flynn, L. B., Henderson, J. M., Neffenger, P. V., Serino, R., & Trenholm, J. (2020). The POP-DOC Loop: A continuous process for situational awareness and situational action. *Industrial Marketing Management, 88*, 272–277. https://doi.org/10.1016/j.indmarman.2020.05.019

Marlia Jamail et al. (2020). The battle of generations in educational leadership in a VUCA world. In *International Conference on Leadership & Management* (pp. 66–91).

Marzano, R. J., Carbaugh, B., Grego, M., & Toth, M. (2012). Marzano School Leadership Evaluation Model, Learning Sciences Marzano Center for Teachers and Leadership Evaluation, Palm Beach Gardens, FL.

Marzano, R. J., Waters, T., & McNulty, B. A. (2005). *School leadership that works: From research to results*. Alexandria, Va. Association for Supervision and Curriculum Development.

McLeod, S., & Dulsky, S. (2021). Resilience, Reorientation, and Reinvention: School leadership During the Early Months of the COVID-19 pandemic. *Frontiers in Education, 6*, 1–13. https://doi.org/10.3389/feduc.2021.637075

Millar, C. C. J. M., Groth, O., & Mahon, J. F. (2018). Management innovation in a VUCA world: Challenges and Recommendations. *California Management Review, 61*(1), 5–14. https://doi.org/10.1177/0008125618805111

Netolicky, D. M. (2020). School leadership during a pandemic: Navigating tensions. *Journal of Professional Capital and Community, 5*(3–4), 391–395. https://doi.org/10.1108/JPCC-05-2020- 0017

Organization for Economic Co-operation and Development (OECD). (2018). The future of education and skills: Education 2030. *OECD education working papers*.

OECD Skills Strategy 2019. (2019). *OECD.* https://doi.org/10.1787/9789264313835-en

Education at a Glance (2020) *The SAGE encyclopedia of higher education*. https://doi.org/10.4135/9781529714395.n163

OECD. (2021). *Building the future of education*. https://www.oecd.org/education/future-of-education- brochure.pdf

Parse, R. R. (2018). Situational awareness: A leadership phenomenon. *Nursing Science Quarterly*, *31*(4), 317–318. https://doi.org/10.1177/0894318418792888

Parveen, K., Tran, P. Q. B., Alghamdi, A. A., Namaziandost, E., Aslam, S., & Xiaowei, T. (2022). Identifying the leadership challenges of k-12 public schools during COVID-19 disruption: A systematic literature review. *Frontiers in Psychology, 13*. https://doi.org/10.3389/fpsyg.2022.875646

Rimita, K., Hoon, S. N., & Levasseur, R. (2020). Leader readiness in a volatile, uncertain, complex, and ambiguous business environment. *Journal of Social Change, 12*(1), 10–18. https://doi.org/10.5590/josc.2020.12.1.02

Spyropoulou, E., & Koutroukis, T. (2021). Managing open school units amid COVID-19 pandemic through the experiences of greek principals. Implications for current and future policies in public education. *Administrative Sciences, 11*(3), 70. https://doi.org/10.3390/admsci11030070

Stanton, N. A., Chambers, P. R. G., & Piggott, J. (2001). Situational awareness and safety. *Safety Science*, 39 (3), 189-204. https://doi.org/10.1016/s0925-7535(01)00010-8

Stone-Johnson, C., & Miles Weiner, J. (2020). Principal professionalism in the time of COVID-19. *Journal of Professional Capital and Community, 5*(3–4), 367–374. https://doi.org/10.1108/JPCC-05-2020-0020

Thompson, S. A., & Miller, K. L. (2018). Disruptive trends in higher education: Leadership skills for successful leaders. *Journal of Professional Nursing, 34*(2), 92–96. https://doi.org/10.1016/j.profnurs.2017.11.008

UNESCO. (2014). *UNESCO education strategy 2014-2021*. https://unesdoc.unesco.org/ark:/48223/pf0000231288

Urick, A., Carpenter, B. W., & Eckert, J. (2021). Confronting COVID: Crisis leadership, turbulence, and self-care. *Frontiers in Education, 6*(March), 1–11. https://doi.org/10.3389/feduc.2021.642861

Weiner, J., Francois, C., Stone-Johnson, C., & Childs, J. (2021). Keep safe, keep learning: Principals' role in creating psychological safety and organizational learning during the COVID-19 pandemic. *Frontiers in Education, 5*, 1–17. https://doi.org/10.3389/feduc.2020.618483