Available online at www.sciencedirect.com
SCIENCE DIRECT®
Pergamon
Futures 35 (2003) 445–460
FUTURES
www.elsevier.com/locate/futures

The role of constructivist learning in scenario planning

T.J. Chermack [a,*], L. van der Merwe [b]

[a] *University of Minnesota, MN, USA*
[b] *Centre for Innovative Leadership, South Africa*

Abstract

While many writings in the scenario planning literature point to aspects of the constructivist learning perspective, few have made the links explicit. This manuscript intends to expose the links between the process of scenario planning and the constructivist approach to learning and teaching. Thus, the contribution of this manuscript is that it identifies constructivism as a core theoretical domain that informs the process of scenario planning, and describes the ways in which the principles of constructivist learning are found in the scenario planning process.

1. The role of constructivist learning in scenario planning

"A company's perception of its business environment is as important as its investment infrastructure because its strategy comes from this perception. I cannot overemphasize this point: unless the corporate microcosm changes, managerial behavior will not change; the internal compass must be recalibrated" [1].

"Good scenarios are not enough. To be effective, they must involve management, top and middle, in understanding and anticipating the unfolding business environment much more intimately than would be the case in the traditional planning

* Corresponding author. Fax: +1-612-387-1951.
E-mail address: tjcher@aol.com (T.J. Chermack).

0016-3287/03/$ - see front matter © 2003 Elsevier Science Ltd. All rights reserved.
doi:10.1016/S0016-3287(02)00091-5

process. Scenarios can be successful in structuring uncertainty only when (1) they are based on a sound analysis of reality, and (2) they change the decision maker's assumptions about how the world works and compel him to change his image of reality. A willingness to face uncertainty and understand the forces driving it requires an almost revolutionary transformation in a large organization. And this transformation process is as important as the development of the scenarios themselves" [1].

Wack used the words "corporate microcosm" to refer to the set of assumptions (mental models) in the minds of management that they used as the basis for decision-making. These perceptions were where strategy came from and therefore, influencing these assumptions in a constructed process of learning and adjusting these assumptions, was the site of highest leverage for dealing more effectively with uncertainty in the environment. Schwartz [2] stated: "Ultimately, the end result of scenario planning is not about a more accurate picture of tomorrow but better decisions about the future".

Given this thinking by pioneers of the scenario planning process, this manuscript is intended to outline scenario planning as a learning process, and to approach the process from a constructivist learning perspective. This perspective includes four critical components: 1) the individual construction of knowledge, 2) social influences on individual constructions, 3) the situatedness and contextual requirements of knowledge construction and 4) the social construction of reality [3]. A chief espoused goal of scenario planning is to change the mental models of key decision makers in the organization [4–6]. Piaget's learning theory is useful in describing the learning process, and transformations that take place as a result of participation in scenario planning [7]. Scenario planning is also heavily influenced by the social elements advocated by Vygotsky [8]. The most influential of these elements include organization history and culture. Scenario planning is also dependent upon the situation in which it is employed as a tool for learning and planning [4,9]. As advocated by Lave and Wenger [10], participants in scenario planning often "work toward the center" and engage in "legitimate peripheral participation" (p. 47). The final component argued in this manuscript is that these four elements of constructivist learning combine to form what van der Heijden [9] has termed the strategic conversation, which is a socially constructed reality. These complex and difficult concepts will be discussed and clarified herein.

2. Methodology

The methodology involved was a conceptual review, analysis, and synthesis of foundational constructivist and scenario planning literature. Foundational and seminal constructivist literature was taken from Bonham [3]. The purpose of this review was to show that constructivist principles of learning and teaching are linked to and can be used to inform the process of scenario planning. Thus, the contribution of

this conceptual review is that it outlines constructivism as a core theoretical domain that informs the scenario planning process.

3. What is scenario planning?

"Scenario planning is a process for rediscovering the original entrepreneurial power of creative foresight in contexts of accelerated change, greater complexity, and genuine uncertainty" [6]. "The single most important aim of scenario planning is to challenge the assumptions of decision makers about how the world works and compel them to change their image of reality—sometimes resulting in a revolutionary transformation" [1]. Scenario planning is a technique for raising decision makers' awareness of several plausible futures. The technique consists of developing internally consistent stories about the future. Scenarios are good if they are relevant to the concerns of the decision makers, if they challenge the existing assumptions and take them beyond what is currently believed to be plausible. Lastly they need to be able to withstand scrutiny and be based on deep analysis and an understanding of the forces that drive the future and the range of behavior these forces may display during the scenario period. When the scenario process is successfully implemented in an organization it provokes a strategic conversation that enables organizational learning, by shifting current assumptions in the minds of decision makers. This capacity to learn makes the organization more adaptable to change [11]. After a comprehensive review of scenario planning literature, Chermack and Lynham [12] offered the following inclusive definition of scenario planning:

> "Scenario planning is a process of positing several informed, plausible and imagined alternative future environments in which decisions about the future may be played out, for the purpose of changing current thinking, improving decision making, enhancing human and organization learning and improving performance".

4. Planning and learning

One critical component of scenario planning is that it is a tool for inspiring organizational learning. De Geus defined organizational learning as "the process whereby management teams change their shared mental models of their company, their markets, and their competitors" [13]. Although it was originally developed as a tool for strategic decision-making, scenario planning is increasingly noted as an important tool for learning [5,9,11]. Senge [14] identified three stages of an effective organizational learning process: 1) mapping mental models, 2) challenging mental models, and 3) improving mental models. Scenario planning has been shown to meet all three of these stages [15]. Scenario planning has also been titled a tool for inquiry, reflection, and construction of mental models [14].

5. The individual construction of meaning

Piaget [7] used examples of biological adaptation to illustrate his concepts of assimilation, accommodation, and equilibration. Piaget's fascination centered on the variability of a snail's adaptation to the surrounding environments [7]. Piaget adopted the view that new behavior changes the genes of the organism and thus results in new structures [16]. Piaget eventually arrived at the belief that behavior and the organism must be viewed as a whole system, and the goal is to achieve a balance between organism and environment [16]. Piaget defined this concept of equilibration as a dynamic process of self-regulated behavior that balances two intrinsic polar behaviors, assimilation and accommodation [7]. Equilibration must be thought of as a dynamic process, reached only occasionally as the learner is constantly taking in new information (assimilation), analyzing, and sometimes changing it (accommodation).

Similarly, De Geus viewed the organization as a living entity: "Like all organisms, the living company exists primarily for its own survival and improvement: to fulfill its own potential and to become as great as it can be" [5]. Of critical concern to De Geus is the balance between the organization and the external environment [13]. The organization is made up of individuals and the perceptions of the future are dependent upon the mental models and assumptions of key decision makers [4]. As a critical aim of scenario planning is to reveal these assumptions and mental models, individuals interpret and construct meaning, or more precisely, re-interpret and re-construct meaning once their assumptions have been revealed to them. This is a classic example of Piaget's assimilation and accommodation [17]. De Geus [5] stated, "Corporations also have a form of learning by accommodation…long-lived companies find ways to respond to signals of change in the business environment, by changing their own internal structure". Senge [18] argued, "Our mental models determine not only how we make sense of the world, but how we take action… It's therefore crucial to examine one's mental models before planning improvement actions" (p. 82).

Participants in scenario planning are constantly constructing individual meaning. Participants in the scenario planning process are constantly taking in new information (assimilation) and modifying or changing it (accommodation) in attempts to reach equilibration. As information is processed, the mental models of the individuals change, resulting in new structures for understanding the business environment and how to negotiate within it.

There are two major aspects of scenario planning that Wack [1] identified where construction of individual meaning takes place. The one is the analysis and research, which takes place during the development of scenario stories. Ranking driving forces in the environment in terms of relative impact on the future and level of uncertainty provokes a conversation during which the individuals, developing scenarios, adjust their assumptions as a result of this assimilation and accommodation process. The second example from Wack [1] is during the embedding of scenario thinking/assumptions in the organization decision-making. Scenarios have been developed. The set of scenarios are used to test decisions against the set of assump-

tions contained in the scenario stories. This process of testing decisions in different operating conditions is referred to as "wind tunneling", referring the testing of an aircraft design by building a model to the design specifications of the designer and then submitting this design to different operating conditions to test the robustness of the design. This process of wind tunneling is a device to compel individuals to assimilate the assumptions contained in the scenarios, modifying their assumptions in order to reach equilibration.

6. Social influences on construction

Vygotsky [8] introduced three key concepts, namely, the "zone of proximal development", the idea of "scaffolding", and the cultural-historical approach. Vygotsky [8] argued that problems in learning frequently result from a mismatch between psycho-physiological organization and cultural means. "Vygotsky reasoned that for the model child, development could be seen as a process of armament and rearmament. The child masters different cultural means (arms) only to discard them later on for the mastering of other, more powerful cultural instruments"[19]. Growing out of comparisons among different developmental areas (for example, psychological and biological), Vygotsky's cultural historical theory attempts to account for the development of mental processes of Western educated adults [19].

6.1. The zone of proximal development

The Zone of Proximal development is defined as "the distance between his actual development, determined with the help of independently solved tasks, and the level of the potential development of the child, determined with the help of tasks solved by the child under the guidance of adults and in cooperation with his more intelligent partners" [20]. Through intelligence testing, Vygotsky determined that there were "optimal" periods within which to teach children specific subjects. In brief, the zone of proximal development is the optimal period for almost any learning, that space between what we can accomplish on our own, and what we can accomplish with some guidance.

Scenario planning targets the zone of proximal development, and the zone is often perceived as the learning capacity of the client. "Vygotsky refers to the 'zone of proximal development', which is the place where the client's newly acquired, but as yet disorganized concepts 'meet' the logic of experienced reasoning" [9]. The meeting of experienced reasoning with the disorganized concepts of the client often produces a novel insight into the strategic positioning of the organization [9], what has been referred to as an "aha" experience [1].

Remarkable people [9] provide challenges to the existing assumptions that can radically shift the current set of assumptions and provide novel insights. These insights push the often taken for granted views and expand the zone of proximal development in practice. Briefly, the scenario developers are exposed to people who are known for their different ways of thinking and they are invited to comment on

their impressions about the way the current perceptions shape the scenario stories and the supporting sets of assumptions.

6.2. The concept of scaffolding

While Piaget sought to study the ever out-distancing goal of equilibrium in learning, Vygotsky studied dialogue [16]. Vygotsky proposed that as the child struggles to formulate concepts, there is an inner dialogue that occurs, and argued that the most effective learning occurs when the child and the adult jointly construct through dialogue, thus drawing the child out to the potential level of performance [16].

The notion of dialogue as a critical component of learning has been extended and developed into the concept of "scaffolding". The famous example of this involves studying children and their mothers engaging in dialogues [21]. Mothers would often imitate the babies, varying the response only slightly, but enough to provide an example for the child to imitate [21]. The mother and child are thought of as constructing meaning together, the mother providing the "scaffolding" or the upper limit of the "zone of proximal development".

The role of the scenario planner is to provide "scaffolding" for members of the organization [9]. "Scaffolds need to be erected around the existing knowledge structure to allow the client to relate new experiences to existing knowledge" [9]. Thus, the planners provide the necessary scaffolding to draw up clients' thought processing abilities to the limit of their zones of proximal development. Schwartz [11] also emphasizes the notion of drawing managers out to "think the unthinkable". Changing the mental models of managers is a necessary condition for successful scenario planning, and the scenario planner must be capable of providing the scaffolding required to do so.

In the scenario development process, sets of orthogonal axes are identified to provide two continua along which to segment the scenario space into four different worlds. In attempting to deal with the uncertainty of the "millennium bug", Wouters et al. [22] developed a set of axes which reflected the continuum; "Isolated technological failures–Strongly interlinked technological failures" and "Social coherence–Social incoherence" These two axes segmented the scenario space into four very different worlds of;

1. Isolated technological failures/Social incoherence, which was called "Business as usual".
2. Isolated technological failures/Social incoherence, which was called "Whiff of smoke".
3. Strongly interlinked technological failures/Social coherence, which was called "Human spirit".
4. Strongly interlinked technological failures/Social incoherence which was called "Apocalypse 2000".

This "scaffolding" was used to develop the scenarios so that they were widely spread apart covering the full range of plausibility. It provided a framework within which

new knowledge could be related to existing experiences. Once the storylines were developed and the scenario were built the "scaffolding" could be removed and the scenario would be able to stand on their own and be internally consistent, and distinctive from each other, without the support of the "scaffolding".

6.3. Kolb's learning loop

van der Heijden [9] supported a view of learning that is based on the idea of continuous development rather than the approach that there is one right answer. In so doing, he incorporates Kolb and Rubin's learning loop [23] into his description of effective strategic thinking. Kolb and Rubin's learning loop incorporates many of the ideas advocated by Piaget [7] and others. The learning loop is shown in Fig. 1.

The Learning Loop incorporates several distinguishing features according to van der Heijden [9]. Among these features are the notions that learning is a process that originates with a given experience, reflection upon the experience brings an awareness resulting in new patterns and trends that were not previously perceived, mental models are shifted through an internal process of incorporating new patterns into old models, new actions are taken to test the implications of our new models, and that all of this results in yet another new experience [9]. "The learning loop describes the strategy development process in its integration of experience, sense-making, and action into one holistic phenomenon"[9].

6.4. The cultural-historical approach

The origin of the cultural-historical theory compared: 1) the psychology of animals and humans, 2) the psychology of primitive and modern man, 3) the psychology of children and adults, and 4) the psychology of pathological and healthy subjects [19]. From these comparisons, Vygotsky posited that humans are rational beings who take control of their own destiny and seek emancipation from nature's boundaries [19].

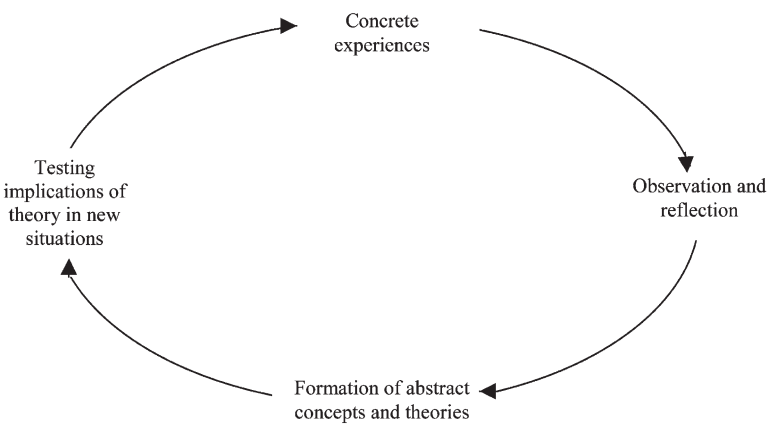

Fig. 1. Kolb and Rubin's Learning Loop (1991)

By combining Darwinian concepts of evolution and Marxist ideas of human history, Vygotsky [8] arrived at the conclusion that making use of cultural tools, norms, experiences and values, (for example, learning to function in a culture), is a key component to learning anything at all, and is separate from the psychological domain of learning and cognition. Learning, according to Vygotsky's theory, takes place in a cultural and historical context [8,19]. For example, the culture and history of a given individual must be considered when engaging in learning, as they will have a dramatic effect on how learning will work best for that individual. Put simply, elements of culture and history have a tremendous influence on the learning process and are specific to each individual [20].

6.5. The cultural element

Galer and van der Heijden [24] suggested that there are two critical factors in the approach to business planning: organizational culture, and the degree of internal goal alignment. Of most interest from the constructivist perspective is the cultural element. Organizational culture structures the norms, attitudes, and values expected of its members, and its members sustain the life of the organizational culture [25]. Like nations or ethnic groups, each organization can be thought of as having or being a culture: each organization has its own peculiar fundamental beliefs or basic assumptions (about the nature of work, of employees, of leadership, etc.), its own values (about how one should interact with colleagues, how one should conduct oneself in the particular business environment), its own norms (the manifestations of these values), and its own artifacts (furnishings, dress code, policies) [26].

According to Galer and van der Heijden [24] the cultural dimension runs from hierarchical mechanistic organizations on one hand to heterarchical network organizations on the other. Either of these can have a strong or weak goal orientation, according to the alignment of internal purposes.

Galer and van der Heijden [24] asserted that the approach to planning is dictated in part by the cultural structure of the organization. A functional, hierarchical organization [27] will tend to engage in planning in the traditional sense, namely in a centralized and bureaucratic way [24]. A network organization, with more divergence in its goals, will tend to approach planning with more emphasis on learning, because a dialogue is required to converge varying goals and purposes [25]. These two factors are charted in a planning matrix (See Table 1).

Table 1
Planning Matrix (Galer and van der Heijden, 1992)

	Goal orientation	
	Strong	Weak
Mechanistic/hierarchical culture	Predict/design/control	Emergent
Networked/heterarchical culture	Logical incrementalism	Planning as learning

This matrix can be a helpful tool in a snapshot diagnosis of the culture's orientation to planning and clearly shows the importance of culture in strategic orientation. Galer and van der Heijden [24] suggested that according to the culture orientation to planning, different methods and practices are used.

6.6. The historical element

In describing three competing paradigms in strategic management, van der Heijden [9] outlined the basic assumptions of each. These three paradigms are titled the rationalistic, evolutionary, and processural. The rationalistic approach assumes that there is one best answer to the strategy question, people think and act rationally, and implementation follows the discovery of the strategy [9]. The evolutionary approach emphasizes the complex nature of organizational behavior. According to this paradigm strategy is emergent, relies heavily on past decisions for informational input to current ones, and focuses on filtering out the unsuccessful attempts of the past. The processural view holds that both of these views can be combined to inform a middle position. The processural paradigm suggests that "while it is not possible to work out optimal strategies through a rational thinking process alone, managers can create processes in organizations that will make it more flexible and adaptable, and capable of learning from its mistakes"[9].

Of particular interest here is the consideration given to the past in the evolutionary perspective. That a thorough analysis of previous action is considered an input to current decision-making processes clearly outlines the importance of the historical perspective. The evolutionary perspective arose out of the questioning of rational decision-making, arguing that humans do not always act rationally. At the core of van der Heijden's [9] argument is that the three approaches must be combined in order to achieve a holistic and inclusive picture of organizational strategy. Thus, organizational strategists must consider the history of the organization, and how similar decisions around similar variables have played out in the past [11].

The scenario planning process includes a stage of historical study. According to van der Heijden [9], "This stage should include analysis of the historical behavior of important variables that the knowledge development stage has provided". Historical research looks for prior interpretations of variables that may again present themselves as key forces [11].

6.7. Situated learning

In their view of learning as a situated activity, Lave and Wenger [10], defined a process of legitimate peripheral participation. Lave and Wenger [10] pointed out that situated learning and learning in context refer to the same phenomenon. Legitimate peripheral participation argues "learners participate in communities of practice and that the mastery of knowledge and skill requires newcomers to move toward full participation in the sociocultural practices of a community" [10]. For example, Lave cites Liberian tailor apprentices who first participate in shortening pant legs, before cutting the fabric. This allows the participant to contribute (legitimately) without the

dire consequences of a major mistake. The apprentice continues to engage in gradually more complex and contributive tasks. At the core of their theory Lave and Wenger argue that learning is a process of participation in communities of practice, participation that is, at first, legitimately peripheral but that increases in complexity as the participant "moves toward the center" of the socio-culture.

The situatedness of scenario planning is explicit in the nature of its process. Scenarios can only be formulated according to particular situations that align to the conditions of the organization [18,28]. These conditions are never the same. Scenario planning takes into careful consideration the specific conditions of the current sociological, technological, economic, environmental, political, and competitive environments [9,18,24,29].

Lave and Wenger [10] also introduced the idea of communities of practice. A community of practice is defined as "a set of relations among persons, activity, and world, over time and in relation with other tangential and overlapping communities of practice…an intrinsic condition for the existence of knowledge, not least because it provides the interpretive support necessary for making sense of its heritage" [10]. Communities of practice consist of cultural practices, social structures, power relations, and conditions for legitimacy, among other characteristics.

Scenario planning also deals heavily with differing communities of practice. The process of scenario planning creates categories for stakeholders, competitors, and in order to accomplish the task of shifting mental models, must frequently consider the perspectives of these difference communities of practice [18,24,29]. Furthermore, scenario planning is often a process that includes joining several communities of practice through the telling of plausible stories of the future [9]. According to Senge, shared mental models incorporate the views of multiple communities of practice, and scenario planning is a process that can be helpful in joining the voices of several communities [18,30].

In selecting candidates to interview to ground the scenarios in the relevant concerns of the leadership a common practice is to select the interviewees on a hierarchical basis to engage the dominant coalition or core group of the organization. A second tier of interviewees is identified and then drawn from the informal leadership of the organization. By engaging in the activities of developing and embedding the scenarios in the organization, shared mental models develop which provide the capacity to act rapidly and in alignment across these communities.

7. The concept of the social construction of reality

The basic tenet of the social construction of reality is that which is implied by the title: that reality is constructed by society, and it is constructed socially. The basic proposition set forth by the concept of the sociology of knowledge is from Marx—that human consciousness is determined by social being [31]. Social constructionism also draws from Marx' concepts of ideology and false consciousness. The task for Berger and Luckmann was that the sociology of knowledge must be concerned with what passes for knowledge in society [32]. In an effort to examine

this, Berger and Luckmann [32] approached reality from two perspectives, namely: 1) objective; and 2) subjective.

7.1. Objective reality

In an examination of society as an objective reality, Berger and Luckmann posit that being fully human requires social interaction "the process of becoming human takes place in an interrelationship with an environment…the developing human interrelates with a given natural environment and also with a specific cultural and social environment" [32]. Thus, social order is a product of human interactions and cannot be "derived from the laws of nature" [32].

One critical element in formulating a social order is the natural tendency for humans to habitualize [32]. As human beings we tend to form habits to reduce options so that we don't have to think about EVERY thing we do. Institutionalization occurs when there is a reciprocation of habitualization, for example, family roles are established through the reciprocal habitualization that a person will do x [32]. Institutionalization implies control, and these reciprocal actions are built up "in the course of a shared history" [32]. Institutions become integrated through socially articulated and shared meanings established between individuals [32]. The shared meanings that are stored in the human consciousness are referred to as sedimented. Intersedimentation takes place when several individuals share common experiences that are incorporated into the system of society [32].

The concept of legitimation refers to the "second-order objectivation of meaning" [32], or the building from simple to complex social structures. Legitimation explains and justifies the institutional order by ascribing validity to meanings and designating normative characteristics to the meanings themselves [32]. Legtimation occurs at several levels, namely, incipient (signaled by the presence of linguistics), theoretical propositions (folk sayings, proverbs) explicit theories (the purpose of a department within an organization), and symbols (theories that connect the theoretical propositions, for example, the purpose of the entire organization).

7.2. Subjective reality

The individual is not a born member of society; rather there is a process by which the individual is inducted into society [32]. This process is called internalization. Berger and Luckmann [32] refer to primary socialization as "the first socialization an individual undergoes in childhood, through which he becomes a member of society" [32]. Through this process, objective reality becomes available, and then is internalized into the individual consciousness. Secondary socialization is taken to mean the internalization of institutional sub-worlds. "Secondary socialization requires the acquisition of role-specific knowledge" [32]. Secondary socialization refers to the process by which an individual is inducted into a further sub-group of a society. A ritual often signifies this process.

The maintenance of subjective reality is held within primary and secondary socialization. Socialization is an ongoing event and although there are different levels of

socialization, primary socialization is inevitable. Through each successive secondary socialization, reality becomes further and further from the consciousness of the individual, as the meaning of reality is placed further into the social domain [32]. "The most important vehicle of reality-maintenance is conversation" [32]. Speech takes place as the background of a world as it is taken for granted. It is through communicative interaction with other members of a society that meaning is derived and negotiated within a social structure.

7.3. The importance of language

Language can be defined as "a system of vocal signs" [32], and has been called the most important sign system in society. Language is a means to communicate and negotiate the meanings of specific symbols and gestures. Of course, non-verbal communication speaks volumes of human subjective intentions, but we are often unclear about exactly what they might be. Language allows us to make explicit these subjective intentions, or how we can make things objective. Language is the medium through which objective reality is negotiated and constructed by individuals in a society [32]. Because of its "capacity to transcend the here and now, language bridges different zones within the reality of everyday life and integrates them into a meaningful whole" [32].

7.4. The strategic conversation

Van der Heijden [9] also identifies the "strategic conversation" as an effective means for transmitting organizational learning and negotiating meaning about the reality of the organization. Most organizations have formal processes for the exchange of ideas and views; and these processes often become events such as meetings, budget systems, strategy reviews, cost-cutting exercises and marketing decision points [9]. "These processes are less effective than informal conversations because they have less relevance for the participants" [9]. Van der Heijden [9] suggested that the strategic conversation happens when people meet by chance outside of scheduled events, in corridors or lunchrooms. Because this conversation happens spontaneously and takes place in the zone of proximal development [9,32], it affects how individuals make sense of events and trends in the strategic situation.

It is through this informal conversation that learning about the strategic situation takes place [9]. Scenarios are particularly effective in transmitting strategic options within this conversation. However, the scenarios filtered into the conversation must meet the following criteria: simplicity and evocativeness, a short name, plausibility, and relevance [9,18]. The strategic conversation allows the members of the organization to construct several alternatives for the future of the reality of the organization [9,18].

While the majority of scenario planning projects occur in formal settings and it is rare that these kinds of informal "strategic" conversations take place, the goal, or intent behind much of scenario planning is to help client organizations to construct unifying mental models. Wack asserts in, van der Merwe [33]: "That the most

important purpose of the scenario building (and embedding) process is to shift the thinking of the leadership inside the organization about what might happen, in the future, in the external environment" [33]. This has mainly to do with shifting assumptions, mental models, about how specific dynamics in the external environment work. This conversation is sustainable if the leadership of the organization builds an "infrastructure for learning" [33]. The strategic conversation is not only contained in the formal scenario building and embedding process but in many other planning and organization processes which can also be referred to as components of the strategic conversation itself. These processes include, significantly, the Management of Accountability and Performance processes [33].

8. Creating memory of the future

An interesting phenomenon occurs with the use of scenario planning called "future memory". As Schwartz [11] noted in the final step of his methodology, the selection of leading indicators and signposts, is critical to the realization that a given scenario may be unfolding. Sometimes the direction is obvious, but can also be very subtle. Indicators and signposts are selected to monitor, in an ongoing sense, the development of the environment along the lines of a given scenario [11]. As in the study conducted by De Geus [5,13], having considered the $15 barrel of oil, and what the company would do in such a situation, Shell was prepared to act based on stories that had circulated throughout the organization. The trigger that seems to activate the memory of the future is contained in the windtunneling process used in testing strategies for robustness in the various scenarios. It is essential that the "what will we do if" question is raised while placing the decision/strategy to be tested for robustness in the scenario. Time paths into the future are traced in our minds as we pose this question. These time paths are then stored as memory and provide the capability of selective observation and rapid recognition of the unfolding of specific dynamics in the external environment. This is future memory—the advantage created by having previously considered critical circumstances when they actually present themselves [11].

In essence, individuals create future memory constantly. It unfolds along the lines of logic, for example, if X happens, then I will do Y. When this concept is applied to an entire organization, the implications become very powerful. Coupled with the idea that the only competitive advantage of organizations of the future will be the ability of its managers' to learn faster than their competitors [5,13], future memory can decrease the response time of an organization to external changes in the environment because the dynamics contained in a specific scenario have been considered during the embedding process and stored as memory [9,13].

8.1. An example of future memory

De Geus [13], as the head of planning at Shell, conducted a study on the average lifespan of several fortune 500 companies. His findings showed that one-third of

those listed in 1970 had vanished by 1983. His findings also suggest that companies die because their managers focus on economic activities, and forget that they are a community of humans [5]. The oldest companies all had a striking capacity to institutionalize change and recognized that they had internal strengths that could be used and developed as organizational conditions changed [5].

With a focus on institutional learning, De Gues has shifted the goal of planning at Shell. In studying how companies learn and adapt to environmental changes, Shell began changing the rules that managers had always known. For example, scenarios were developed that examined the implications of oil prices falling to $15 a barrel in 1985. (At the time, the price was $28 a barrel and $15 was regarded as the end of the oil industry). At first, managers were reluctant to consider such a serious problem, but they were asked to respond to these three questions: What do you think the government will do? What do you think your competition will do? And what, if anything will you do? The actual price of oil was rising at the time of the exercise, but on April 1, 1987, the actual price fell to $10 a barrel. The fact that Shell had "already visited the world of the $15 barrel helped a great deal" [5,13].

Out of this process, De Geus noted the development of shared language that makes the implicit knowledge of the learner explicit. Advocating that institutional learning begins with the calibration of existing mental models, De Geus believes that "the only competitive advantage the company of the future will have is its managers' ability to learn faster than their competitors" [13]. Future memory such as has been described allows organization decision-makers to cut down the time required for them to react to changes in the environment. Because scenarios expose these decision-makers to relevant, plausible, yet challenging situations, they are ideal tools for generating future memory.

9. Implications and conclusions

While it is clear that there are links between the perspective of the social constructivist and the process of scenario planning, the application of these links may still be unclear. The task of this manuscript has been to make explicit these links in the hope of informing the approach to the process of scenario planning and providing insight into a potential theoretical foundation of the process. What is particularly interesting about the nature of these links is that traditional efforts for anticipating future events have been strictly positivistic in their assumptions (for example, strategic planning), suggesting that the true future of the organization is "out there" and the job of the planner is to find it. Some scenario planning professionals have taken an ecological view [5], or a systems view [9,34] of planning and the organization itself. The constructivist approach to learning and teaching seems to heavily inform the views of these professionals.

The scenario planning process can be approached from a constructivist perspective and still maintain business results. The addition of the constructivist learning and teaching perspective to the theory body that informs scenario planning could prove to enhance the process itself. This paper has intended to clarify the relationship

between constructivist learning and teaching theory and describe its theoretical link to the process of scenario planning. While this link is evident in theory, the application of such theory to scenario planning practice will reveal the practicality of such theory and thus, if it can inform and enhance scenario planning practice.

References

[1] Wack P. Scenarios: The gentle art of re-perceiving. Unpublished manuscript, Harvard Business School.
[2] Schwartz P. Using Scenarios to navigate the future. Internal document Global Business Network, (1999).
[3] Bonham A. Personal communication, January 16, 2001.
[4] T.J. Chermack, S.A. Lynham, W.E.A. Ruona, A review of scenario planning literature, Futures Research Quarterly 17 (2) (2001) 9–31.
[5] A.P. De Geus, The living company, Harvard University Press, Boston, MA, 1997.
[6] P. Wack, Scenarios: Shooting the rapids, Harvard Business Review 63 (6) (1985) 139–150.
[7] J. Piaget, Equilibration of cognitive structures, Viking Publishers, New York, 1977.
[8] L.S. Vygotsky, Mind in society: The development of higher psychological processes, Harvard University Press, Boston, MA, 1978.
[9] K. van der Heijden, Scenarios: The art of strategic conversation, John Wiley Publishers, New York, 1997.
[10] J. Lave, E. Wenger, Situated learning: Legitimate peripheral participation, Cambridge University Press, New York, 1991.
[11] P. Schwartz, The art of the long view, Doubleday, New York, 1991.
[12] T.J. Chermack, S.A. Lynham, Definitions and outcome variables of scenario planning, Human Resource Development Review 1 (3) (2002) 366–383.
[13] A.P. De Geus, Planning as learning, Harvard Business Review 66 (2) (1989) 70–74.
[14] P. Senge, A. Kleiner, C. Roberts, R. Ross, G. Roth, B. Smith, The dance of change: The challenges to sustaining momentum in learning organizations, Doubleday, New York, 1999.
[15] N.C. Georgantzas, W. Acar, Scenario driven planning: Learning to manage strategic uncertainty, Quorum Publishers, Westport, CT, 1995.
[16] C.T. Fosnot, A psychological theory of learning, in: C.T. Fosnot (Ed.), Constructivism: Theory, perspectives and practice, Teachers College Press, New York, 1996, pp. 31–49.
[17] C.T. Fosnot, Enquiring teachers, Teachers College Press, enquiring learners. New York, 1989.
[18] P. Senge, A. Kleiner, C. Roberts, R. Ross, B. Smith, The fifth discipline fieldbook: Strategies and tools for building a learning organization, Doubleday, New York, 1994.
[19] R. van der Veer, J. Valsiner, Understanding Vygostky: A quest for synthesis, Cambridge University Press;, New York, 1991.
[20] L.S. Vygotsky, Thought and language, MIT Press;, Cambridge, MA, 1986 (Original work published 1962).
[21] J. Bruner, N. Ratner, Games, social exchange and the acquisition of language, Journal of Child Language 5 (1) (1978) 391–401.
[22] Wouters A. The Millenium Bug: The year 2000 computer problems, structure denial and actions. IDS, 2002.
[23] D. Kolb, I.M. Rubin, Organizational behavior: An experimental approach, Prentice Hall Publishers;, Englewood Cliffs, NJ, 1991.
[24] G. Galer, K. van der Heijden, The learning organization: How planners create organizational learning, Marketing Intelligence and Planning 10 (6) (1992) 5–12.
[25] G. Hofstede, Culture's consequences, Sage Publishers, Newbury Park, 1984.
[26] E. Schein, Process consultation volume 1: Its roles in organization development, Addison-Wesley, Reading, 1988.

[27] T.G. Cummings, C.G. Worley, Organization development and change, 6th ed., South-Western College Publishing, Cincinnati, OH, 2001.
[28] P. Wack, Scenarios: Uncharted waters ahead, Harvard Business Review 63 (5) (1985) 73–89.
[29] G. Ringland, Scenario planning: Managing for the future, John Wiley, New York, 1998.
[30] P. Senge, The fifth discipline, Doubleday, New York, 1990.
[31] K. Marx, Karl Marx and Frederick Engels on Britain, Foreign Languages Publication House, Moscow, 1953.
[32] P.L. Berger, T. Luckman, The social construction of reality: A treatise in the sociology of knowledge, Doubleday, New York, 1966.
[33] van der Merwe L. Utilizing scenarios for sustainable organizational renewal and transformation, in: Corporate Sustainability 2002, Rotterdam School of Management. The Netherlands: Erasmus University; June 6-7, 2002.
[34] L. van der Merwe, Bringing diverse people to common purpose, in: P. Senge, A. Kleiner, C. Roberts, R. Ross, B. Smith (Eds.), The fifth discipline fieldbook: Strategies and tools for building a learning organization, Doubleday, New York, 1994.