

The Systems Theory Conceptualised And Pasted to Teaching and Learning

Dr Q.O. Khuzwayo

Principal of Hlalakahle Primary School, in KwaZulu-Natal Province, at Ilembe District, Ndwedwe CMC, Insuze Circuit.

Abstract

Though the Systems Theory had been successfully and variedly applied in different world settings, however, it is hardly conceptualised and related to the core bussiness of the schooling system: quality teaching and learning. In this article, I used it to adress such litrature gap and contribute some knowledge on its interactive components' functionalism in order to accelerate upwardly the learner results. Such knowledge was a culmination of the voices of those in the field of teaching. To make sense of how the systems as sub-systems and supra-systems are interconected in schools as organisational structures, I utilised the qualitative inquiry. Data generated and analysed, revealed that the Systems Theory survives in the schooling system through its key features namely interdependance, relationships and interactions among its components as well as feedback, adaptibility and flexibility to the environmental contexts where adaptation makes the school human structures to cope with the unexpected atrocities. The lesson learned is that each part affects the functioning of the whole. For example, if one grade educator is on leave, it takes time for learners to adapt to the teaching philosophy of the other one. Further, though the Systems Theory in this article appeared to be applied successfully with its voluminous enabling interconnected factors, however, it was discovered that it's not free from some systems' roadblocks. Through the principle of adaptibility, some systems' constraints had a strength to turn some teaching and learning threats into opportunities. At its finality, data also showed that to make Systems Theory a reality, its sub-systems in the school and supra-systems in the environment where the school is situated, are to function as collective twins for making the school a centre of excellence. So, in the South African school contexts, the Systems Theory links the schools' functioning to its interconnected parts.

Keyword: *systems theory; Remove systems theory; supra-systems; Remove supra-systems; systems dynamics; Remove systems dynamics; cybernetic systems Remove cybernetic systems viable systems*

Introduction

Although systems theory is successfully and variedly applied in most settings, namely industrial settings and social world, hardly any literature conceptualises and relates it to the quality teaching and learning. Focusing on such literature gap, the rationale on presenting what constitutes the systems theory nests on providing the light to those who enter the research room intending to test the credibility of their empirical work relating to school systems in particular. Further, though the systems theory emerged from biology (Boulding, 1956 & Von Bertalanffy, 1951); mechanical engineering (Ashby, 1954 & Wiener, 1948);

organisational communication (Parson, 1951 & Poole, 2014), in this paper, I use it to contribute some knowledge on its components' interactive processes to escalate learner results. Such knowledge may be useful to school managers under construction or those who aspire to be, as well as those in similar contexts of making sense of the curriculum. Thus, the primary objective is to nest the systems theory on the school where it is envisaged that the interaction or interdependence exists among the internal sub-systems themselves as well as the environmental systems.

Drawn from the above, the systems theory's historical background forms the point of departure. Next, to bring home its concept and enable the reader to make sense of it, I provide its conceptualisations of key terms namely systems theory and its other components as reflected in section that discusses the key concepts. Further, in making sense of the voices of those in the schooling system, emerged lessons displaying its significant to the school setting are discussed. At its final end, the key message it paints to the reader is presented.

Historical background

According to Lai and Lin (2017), the systems theory is as old as 1950s. These authors claim that in viewpoint of Von Bertalanffy (1951) and Boulding (1956), the systems theory was biologically constructed intending to bear a series of systematical theoretical tools to discuss the empirical world. In this manner, Boulding (1956) adds that it was necessary to have a science-bound skeleton aiming to provide a systematical structure to unpack the parts ensembled to make up a subject matter in particular. Hence the systems theory was born. Another second view revolves around systems theory being the brainchild of interrelated parts of mechanical engineering. In this regard, Ashby (1954) and Wiener (1948) assert that such mechanical engineering systems as they function to control the engine, they are cybernetic in make-up. More meaning on cybernetic existence is provided on a subheading that conceptualises cybernetic systems. Third, the systems theory originates from what systems perform as components that communicate in an organisation (Parsons, 1951). Parsons (1951) being responsive to the systems theory opines that the environmental demands play a major role regarding the functionality of the systems.

Regarding the environmental demands, Lawrence and Lorsch (1967) view systems shift from mechanical stance to human behaviours encapsulating organisational relationships. This connects systems to schools as learning organisations with a variety of human beings who must respond to ever-changing environmental and social demands. Whereas Lawrence and Lorsch (1967) view understanding the impact of responding to ever-changing environmental and social conditions, on the other side, Poole (2014) specifies communication in an organisation as one pivotal part of the systems. This systems idea may be true when considering that some school's inputs namely vision, mission statement, circulars, school allocation, policy documents etc. require to be communicated by school human beings to others. Having discussed the origins of the systems theory, it is crystal clear that its sources are multi-pronged as some are technical, organisational and disciplines-bound. Due to its ability to influence the school's processes, systems theory makes no learning organisation to function efficiently and effectively without it being the school's nucleus.

Key concepts

In this paper, systems theory is a salient concept, therefore, its relationship to teaching and learning is discussed throughout. The literature provided in the two sections above, signposted systems theory's influence as the functioning of the ever-changing organisation as well as its environmental relationships. Given Mele, Pels and Poleses' (2010) systemic approach outlining that systems do not exist in a vacuum but in an organisation in relation to its environment, the relationship between sub-systems and supra-systems emerged. In this regard, as parts or structures of a system also adopt communication and control while interacting, Ashby (1954) and Wiener (1948) maintain that they are cybernetic in nature. Further, when the sub-systems succeed in adapting to the context that is beyond the organisation context, they exert flexibility and viability (Mele, Pels & Polese, 2010). In this manner, it is worth conceptualising systems theory and its elements too namely supra-systems, systems dynamics, cybernetic systems and viable systems.

The systems theory

According to Lai and Lin (2017), the systems theory refers to the systems approach that is two-pronged. As such, it focuses largely on the organisation's (school's) relationships and interactions among its components. Since the learning organisation exists within a particular environment, this entails relaying a balance emerging from the interactions among internal and external components of the system. Department of Education (2008) asserts that systems theory is what in a school exists through its five components namely inputs, transformation, outputs, feedback and environment. In this regard, the inputs are underpinned by its components in the likes of finances; human factor; LTSM¹, other LTSM² and non-LTSM³ as well as other significant components in the society that are a must-be to provide basic education to all learners. Since systems are based on interdependence among their components, if one of the components does not perform, the whole system fails (Mele, Pels & Polese, 2010). In concurrence with the preceded argument, I argue that if during transformation process regarding planning, leading, organising and controlling, the same controlling part does not take place, the whole planning cannot bear quality outputs (results).

Conceptualising the systems theory may be confined to how the organisational branches or inputs perform. Like in a soccer game, a football club exists because of the healthy relationships as well as interactions among its players, captain, club caretakers, technical staff, head coach, managers, donors, support staff and other materialistic assets. The same attains with the school that exists due to its functioning through the available interrelationship among everybody, every physical matter within its strings and the energy derived from the external forces. However, remaining convincingly that there is an active interaction among the school components remains a theory until the voices of the school-based human inputs are researched and analysed as reflected in the sections that describe the enabling factors and constraints among the school systems in the schools studied.

¹ Learning and Teaching Support Material referring to principal educational material e.g. textbooks and learner stationery.

² Other educational materials not directly touched by learners but support their learning e.g. chalks, photocopiers etc.

³ Office equipments, consumable items, domestic services, school buildings and equipments.

Flowing from the above, the systems theory remains the system if its smaller components continue to maintain the process of interdependence in order to keep the whole school system accomplishing its set targets. Clearly, the systems theory in the school world-view sees it in terms of identifiable interdependence among its constituent parts that make it a whole. Further, it suggests that a system (school) is what it is because of its more than two parts interact with other parts in the same system to influence the behaviour of the whole system. At its final end, the systems theory apparently must be an entity with its properties to function interdependently and be adaptive to social disruptions in order to attract as well as retain more societal learners year after year.

Supra-systems

According to Golinelli (2000); Golinelli (2005) and Barile (2008), supra-systems refer to the interrelations that exist between the smaller properties and the larger significant others that have an impact on the functioning of the whole school system. For example, the direction which the whole system (school) takes, depends largely on the interaction among its internal sub-units and super-units which are sub-systems and supra-systems. To illuminate, developing the school financial system, requires the interaction of the educator, non-educator components with the supra-components (parent governors). This entails that if one of the school financial components in the finance committee that reports to the School Governing Body is malfunctioning, the whole financial system is crippled. In this manner, the intra- and interaction of sub-systems and supra-systems are the system's essential properties that define it. Thus, supra-systems entail the relativeness between internal living organisms and the other input energy from the outside school world that influences the process of working together.

Systems dynamics

Keyton (2017) refers to systems dynamics as a theoretical approach that focuses on matter with the ability to display constant changing, re-organising and adapting over time. Here, people involved in the system do a deep study of the factors that necessitated changes and do turnaround strategies to move forward. For example, if in the previous year, regarding learner performance, the school as the mother body system attained 95% pass rate but on the current year attains 72%, this reflects a result plummet change over time. However, the multistakeholders (the school interest sub-components) under the leadership of the school principal re-organise themselves, do the 'Strengths Weaknesses Opportunities and Threats (SWOT) analysis and come up with School Academic Performance Improvement Plan (SAPIP) to revert to beyond 95% in the ensuing year. Another example, as there is emergence of fourth industrial revolution⁴ (4IR) era, all staff personnel members need to redefine their technological roles and responsibilities in order meet the ICT⁵ demands over time. Further, to manage school working conditions according to Covid-19⁶ demands, its emergent (Covid-19 pandemic) brought in new school health and safety measures for school systems to be innovate, dynamic and adaptive (KwaZulu-Natal Department of Education, 2020). Thus, drawing from the above, systems dynamics relate to accepting that change is inevitable in a school set-up and be clear

⁴ refers to connected technology built on 3rd technological world with people fast digitally able to manage their lives using varied technologies.

⁵ refers to information communication technologies in the likes of [internet](#), wireless networks, cell phones, and other communication means.

⁶ an infectious Coronavirus disease emerged in 2019, commonly reached South Africa in 2020 and declared a global pandemic in 2020.

that it occurs as a direct results of school multi-levelled systems interactions. In this regard, all school participants constituting the whole school system need to work together continuously to achieve more and be adaptive to unforeseeable changes.

Cybernetic systems

Though historically, the cybernetic systems are mechanically intertwined to control the functionality of the engine, however, in this paper, they explicate the control and communication functionalism particularly in the school as the organisation (Mele, Pels & Polese, 2010 in Almaney, 1974). Regarding the control and communication, Mele, Pels and Polese (2010), argue that cybernetic systems depend on a myriad of feedback or control systems that have the ability to process information and lead to changes for better results. Novikov (2016) flocks together with Mele, Pels and Polese (2010) on mentioning that when systems are in control of planned activities, they lead to control theory whereas if information is processed, it becomes a communication theory. The implication is that the results out of the formal assessment tasks as parts of planned activities are processed or analysed, such result analysis may lead to improved changes in both teaching-learning processes and assessment task design (inputs). In a nutshell, the assessment outputs communicated turn communication theory into practice-control theory. Thus, I perceive cybernetic systems as the operational approach consisting of its frontline parts namely inputs (educators, learners, teaching and learning resources, time-use etc.) engaging on communicative processes (teaching, assessing, diagnosing and doing feedback for remediation purposes) for further accelerating outputs (results). Clearly, cybernetic systems tend to represent the available means of communicating what is best for achieving basic education in line with the set school goals and give birth to corrective stipulations on the basis of outputs and feedback.

Viable systems

Whereas Espejo (2003) suggests that the viable systems are powerful to respond to all emerging new social thought provoking and changing environments, however, they are linguistically, the systems illuminating the abstract noun 'viability' referring to fluidity, flexibility and adaptability to the unexpected distractions. In this manner, Mele, Pels and Polese (2010) and Espejo (2003) draw the same pattern on arguing that the viable systems are there with a capacity to produce responses to all the environmental disturbances. Fitting the aforesaid description to the work of Beer (1972) on systems theory cited by Hildbrand and Bodhanya (2015), the viable systems seem to allow for adaptability for the sake of surviving in the changing contexts. Concomitantly with its flexibility and adaptability features to the unexpected events, Espejo and Gill (2011) equate it with the flexible balancing entity between the internal and external systems to avoid recurring disorders in the environments. This suggests that the environments may be clouded with disruptive features that can affect negatively the learning outputs. Therefore, the school systems in place must be flexible enough to turnaround such may-be mushroomed events in their environment.

In inheriting the fundamental principles of viable systems (viability, fluidity, flexibility and adaptability), Espejo and Gill (2011) metaphorically cite the example of driver losing control of a car. To illustrate, as

the car wants to capsize, the driver responds to the unexpected occurrences by driving slowly, applying brakes and stop the car to diagnose the problem. This allows the driver to pay more attention to the car disturbances. Such scenario is pasted to the schools that planned in 2019 and in 2020 they are confronted with Covid-19 pandemic disturbances. For the schools to be adaptative and contingent, they need to be more spick and span than before, review their budget plans to buy some unbudgeted personal protective equipments (PPEs) not supplied by the Department of Education; they learn new adaptative teaching and learning methodology and adopt new protective measures like teaching and learning with masks on, monitor social distancing, deep disinfecting as well as hand sanitising etc; review their management plans to cover for the vacuums created by comorbidities and the likes. In this instance, sitting on laurels and waiting for the Department of Education may produce more harm than good.

Drawn from the above social and institutional scenarios, communicating available measures to control the unexpected dangers are nobody's choices. The two principles of communication and control that existed, put more meaning to the viable systems approach to be grounded in the cybernetic systems. Having highlighted the principles responding to the environmental events, it allows the viable systems to be adaptive and flexible system of responding to new conditions. Clearly, viability, fluidity, flexibility and adaptability, all describe the ability of a system to exist and survive despite the mishaps it faces. Therefore, the viable systems answer the question why institutions like schools in particular, whether non or Section 21 status, rural, semi-rural or urban exist and how systems foster their relations to ameliorate their social relationships for the success of major stakeholders⁷.

Another concluding idea deriving from framing the key concepts lies in the similarities and differences between the systems dynamics and the viable systems. Though the systems dynamic and the viable systems are identical through their umbilical cord of being adaptive to changes, however, the former is more of responding to familiar processes namely orders in the organisation whereas the latter (the viable systems) overtakes the former (systems dynamic) by being responsive to sudden disruptive adversities that occur as direct changes in the organisational environments. I, therefore, assert that the capacity to adapt to changes regarding usual events in the school and responding as quick as lightening to the new unexpected atrocities, points to the hallmarks of both systems dynamics as well as viable systems. For example, when the school engages on budgeting for the ensuing year, it relates to systems dynamism, however, when it deviates from the same budgeting to respond to the demands of Covid-19 global amenities, it has a potential of being a viable system.

Methodology

Since in viewpoint of Litchman (2006, p.8), a qualitative research concerns with providing an in-depth description and understanding of the lived experiences of human interaction, this paper took a qualitative inquiry route. However, the main focus of the paper was on understanding how humans interact as one component of the system with other systems which eventually result to quality teaching and learning. Further, whereas Hildbrand and Bodhanya (2015) contend that it is only through the richness of the

⁷ Out of education interest groups, learners constitute major stakeholders

qualitative data analysis and its reflective process that the researcher is able to detect shortcomings among several subsystems, similar qualitative research picked up the merits and demerits among sub-systems and supra-systems.

Befitting the purposive sampling, was Khuzwayo's (2015, pp.122-123) five principles of choosing information-rich sources namely knowledgeability about the phenomenon, manageability based on specific number of participants, willingness to participate, role function in the population and their relevance to research questions. To expand, the school-based participants were deliberately approached due to the aspects that they were most knowledgeable, had the best insight about interrelatedness among sub-systems and supra-systems and could answer the following two key questions:

1. *To what extent does the interaction among the school systems make better functionality in the South African Contexts?*
2. *What is the nature of interactive relationships among the school sub-systems and the supra-systems?*

For confidentiality and anonymity of participants' information, their schools' names were School A Participant, School B Participant, School C Participant and School D Participant. Regarding the data generation method, I utilised semi-structured interviews to examine how the inputs' school sub-units influence the outputs and provide the best insight about the systems interactive processes. While analysing the data, the emerging themes were the enabling factors among the school systems and the constraints inherited from the interactive processes among the school sub-systems and the supra-systems in the external environment. In this regard, in making sense of the participants' verbatim responses, I began with discussing the enabling factors among the school systems in the schools studied.

The enabling factors among the school systems in the schools studied

To draw closer to the key question that focuses on the extent of the interaction among the school systems that makes better the functionality in the South African schools' contexts, the following sub-themes emerged: human interaction as a feature of a system, effective time-use as a feature of a system, monitoring as a critical feature of a system, finance processing as a feature of a system and filing system as a feature of a system.

Human interaction as a feature of a system

Having analysed the data, I discovered that humans as parts of the school system function well when interacting with others in various structures. For example, according to School B Participant, those in the SGB⁸ interacting with others in various structures namely Finance committee, Building Maintenance committee, LTSM committee, Fundraising committee, Sports committee, carry and balance the functioning of the school. Apparently, at the helm of the functioning of the school, interaction among humans inside and the energy exerted by those coming from outside as parents' representatives work well. So, the

⁸ refers to School Governing Body members as policy makers who in terms of South African Schools Act No. 84 of 1996 as amended, are representatives of parents, educators, non-teaching staff and learners (from Grade 8 or higher).

interaction among non-professionals and professionals is fundamental to quality teaching and learning. The process of human interaction makes it part of the imperative features of the school system.

Specifically, according to School A, B and D Participants, communication, consultation and timeous feedback among the human structures glue the human interaction into schooling system. In this instance, in viewpoint of School B Participant, in a schooling system, the communication among human structures like LTSM committee with subject educators makes it possible for harnessing relevant teaching and learning tools. In this regard, the School B Participant voices that consultation between educators and LTSM Committee breeds procuring the relevant and usable learning and teaching needs. Otherwise, if this consultation is ignored, the purpose of learning using such material can be a fruitless expenditure and hits bad to money value. This illustrates that communication and consultation among the school human capital defeats the dearth of relevant teaching and learning support material. So, communication and consultation among the school systems become purposive in nature.

In advancing communication and consultation among the human structures, School A Participant views a strong relationship that exists among the principal, educators and SGB in communicating school vision and mission. It seems that the strong relationship among the human structures is the common denominator that signifies the tasks performed by systems' components for attaining vision and mission. As the output out of such system communication puts the school forward as achieving the school purpose, Lai and Lin (2017) regards the operation of such parts of the system as happening for goal attainment.

School D Participant revealed that in their school there is a good communicative relationship among educators, parents and learners. In support to this, she further said, 'sound communication relations are encouraged by a timeous feedback system on learners' learning and achievement progress'. Lai and Lin (2017) confirms that constructive interaction on the pedagogic outputs links the school with other stakeholders in the environment where the school exists. On the strength of the above, I, therefore, argue that central to achieving quality teaching and learning, a sound communicative relations and timeous feedback (reporting process) are some chief systems processes required.

Effective time-use as a feature of a system

School B Participant claims that all stakeholders succeed through sharing the allocated times. School C Participant claims that in their school, principal always motivate the whole nineteen staff personnel to continue being punctual at school, in the classroom and teach for setting the scene for excellence. School D Participant asserts that Departmental Heads submit on time to the principal, typed weekly written work reports as well as quarterly accountability learner performance data tool reports. In making sense on time-use processes, Department of Education (2011) asserts that it is all about using time as a transformation system factor in the school context to render teaching and learning service.

Based on the above claims, effective interactions among the systems components could lead to goal attainment on specified time allocated. In this way, I opine that if sharing the allocated times and performing tasks on time exist for the purpose of achieving the set target goals, this is a purposive

intervention among the school's systems. Effective time-use links School B Participant to Lai and Lin (2017) with symbolising such time with goal attainment emanating from using it as a resource to accomplish goals. This illuminates that the more the school's stakeholders can share allocated times using time-tables as well as period time-tables, the greater the chances that effective teaching and learning occurs. Thus, effective time-use relates to processing information, at a given time, that emerges from conscience collective work between individuals. Notably, effective time-use twins with effective supervisory control to sustain improvement continuity in teaching and learning processes. For example, lack of supervisory control could lead to educators prolonging their staffroom stay or even arriving at school as they wish at the expense of classroom engagements with learners.

Monitoring as a critical feature of a system

To actualise monitoring process as a system, School B Participant regards it as part of human interactive progress checking process among the principals, deputy principals, departmental heads, the full-time educators and parents in particular. In this regard, he stresses that the immediate supervisors must regularly monitor the relevance of the subject content, conducting the phase meetings to discuss the implementation of ATPs⁹ and CAPS¹⁰, drafting assessment plans and assessment time-tables, pre-moderating and post-moderating formal tasks, capturing data to the SA-SAMS¹¹, analysing learner results and doing subject improvement plans. Lai and Lin (2017) opines that while in Parsons (1951) this process is structural functionalism¹². It is specifically so, because of the human supervisory role to exchange thoughts with others in maintaining, developing and making the system works in a chain-ring shaped¹³. Therefore, to escalate systems outputs (learners' results), structural teaming system in a form of chain is a mother of success. Monitoring as the participants outlined, relates to supervisory control on checking progress relative to set targets and planned activities (Shapiro, 2007). This points out to monitoring as a systemic tool used by school managers particularly in schools to periodically check whether people under their care are working closer to achieve the operational plans.

Finance processing and filing system as features of a system

According to School B Participant, school financial structures chiefly school finance committee, finance officer, staff and other SGB components are critical features of the school system. They are there to receive school allocation funds, draft budgets and present to parents and keep proper recordings in filing system for auditing purposes. Regarding keeping proper recordings as part of filing system, School C Participant asserts that through safekeeping and SGB collective implementation of regular income and expenditure of funds, at their school, they are able to procure LTSM, budgeted educational equipments and pay for school domestic accounts on time. This is in line with SASA (1996) as amended, Sections 16A (1), (a), (v); 35; 38; 42 and 43 that determine the schools operational financial filing system. This points out that if one of the outlined finance sections has frozen, the school progressive system dwindles. Emerging factor is that

⁹ Annual Teaching Plans as curriculum schedules suggesting the exact topics to be taught on specific day-times throughout the school year.

¹⁰ Curriculum Assessment Policy Statement referring to current policy curriculum guidelines on imparting content knowledge and competencies in South African schools.

¹¹ South African School Administration and Management about all school subsystems.

¹² Functioning structure in an organisation

¹³ A chain comprises of its interconnected strong rings, suggesting a collective systems process.

the importance of safekeeping finance records and collective use, influence other parts to function well for keeping available some fundamental educational goods.

The constraints among the school systems in the schools studied

Having analysed the voices of the participants, emerged sub-themes showed that the interactive relationships within the school's systems, also have some shortcomings. They are, but not limited to, the shortage of staff to do work, post establishment and low learner enrolment, the emergence of unexpected events and the lack of training as a constraining systems factor.

The shortage of staff to do work as a constraining systems factor

While School A Participant emphasises the role function depicted by human strong relationships among the components of the system, however, in her school there are two unfilled vacancies namely the administration clerk and general assistant: cleaner. It puzzles how the other parts accomplish the teaching goals without the support of the other two. The unavailability of other parts in the midst of systems' functioning often produce peculiar results and de-accelerated performance (Espejo, 2003). This suggests that in school A, the dearth of the other two parts may fail the school functioning system and put it off balance to achieve optimally. Since the filling of vacancies explicates the functioning of the office system higher than the school one, it entails that the sub-systems need the live wire of the supra-systems to maintain equilibrium and to serve the major goal of the education system.

The above shows that, for schools to enhance teaching and learning, they sometimes depend on the Department of Education for employing human resources ahead of teaching process. This requires effective communicative relationships between the systems of the department. Otherwise, the school without sufficient staff members becomes a teaching and learning roadblock. Data findings also pointed out that though some schools having tasted the absence of the support staff, however, they are more adaptive to change. In this regard, the School A Participant reflected that they hired the local persons for cleaning and keeping the administrative work rolling up. This best fit the basic feature of viability and flexibility that calls for standing up against the odds. Being adaptive to sensitive environments seems to be the key factor to withstand the unbearable events.

Post establishment and low learner enrolment posing positive threats

The research interviews in both schools A and D, further revealed that though the post establishment as part of the working system poses some teaching and learning threats but it can be a positive re-enforcer. Participants claimed that since they are understaffed as a direct result of low learner enrolment, they are the victims of multi-grading system¹⁴. They said that although they are principals but they are full-time educators and this retards progress on their supervisory and management duties. On the other side, it seems they have begun to adore being the full-time educators. To them, though understaffed, interacting with all grades learners simultaneously do assist in knowing their (learners') learning shortcomings and have the implementation of ATPs at their (educators') fingertips. Inherited from their responses, the staff

¹⁴ Teaching and learning system relating to placing learners from different grades in the same class and taught using one time-table.

establishment and low learner enrolment as teaching threats are turned into teaching and learning opportunities. The emerging view is that while the unexpected atrocities may mushroom, however, they are wakeup calls to strategise and sometimes ameliorate the system to lessen the tension.

The emergence of unexpected events as a constraint systems factor

The participants felt that whilst finance system forms the baseline of achieving the end results, however, the emergence of the unexpected events at times forces some deviations from the planned activities. In support to this, School A participant voiced out that the planned school budget can become interim budget if the department fails to deposit school allocation monetary system in good time. School D participant confirmed that school burglaries like stealing smart tablets and laptops weaken the management of teaching and learning process that aims to brighten the future of all learners. According school C Participant, it is worse if the thieves are from the local community and the Department of Education does not replace on time the stolen educational materials. Further, to school B Participant, this suggests that when the unplanned events crops out, they have a potential to distabilise the teaching and learning inputs from functioning smoothly to attain the intended outputs (excelling learners). This depicts that while the unexpected events emerge, the gap between sub-systems and supra-systems grows to widen teaching and learning constraint systems factor.

The lack of training as a constraining systems factor

School B Participant laid a concern that knowledge dissemination from higher education structure is found wanting at the current Covid-19 scaring season. In this way, she said that Covid-19 revised ATPs were just left to schools without training educators on how to integrate such ATPs with the surge of Covid-19 straining processes. In the same vein, School C Participant complained that at their school, IDT¹⁵ officials drilled only Covid-19 handwash station stands and left no handwash containers that they eventually supplied back after a month. It was added that such handwash stations were still not in use because they were installed after working hours and no training provided on their usage. In addition, the cleaners were not trained for using hand, surface and deep disinfectants. This illustrates that the training system lacked special heed regarding the empowerment of educators, support staff and PPEs¹⁶ handlers on handling the Covid-19 new demands. This points to policy intentions disjuncture that may lead to poor curriculum implementation and overburdening health care system to respond as planned to the SOPs¹⁷ expectations. Notably, it left misdirection and confusion on the other parts of the system in implementing re-adjusted school-based teaching strategies and Covid-19 new health protocols.

Similarly, School D Participant as the novice principal seemed to be unhappy on being handed over with the bulky school thousands of rands without pre-financial management workshop. He added that some financial management workshops if organised, took a day, yet, they contain voluminous finance regulation systems. The consequence therefrom, led to poor handling of school funds. This signals two unhealthy finance system relationships namely human structure-school finance phobia as well as a broad line between

¹⁵ Independent Development Trust is a government agency for delivering social infrastructure. For this paper, it acts as SA government official resource provider during Covid-19.

¹⁶ Protective Personal Equipments refer to equipments worn to minimise exposure against Covid-19 hazards in particular that may cause injuries or diseases.

¹⁷ Standard Operating Procedures refer to a set of guidelines regulating in detail how to safely manage hazardous cases at workplace

the supra-system (financial service providers) and sub-system at schools. Flown from the lack of training alluded above, is the light that the systems function ineffectively if the right hand does not provide necessary support to its left hand or vice versa. Notwithstanding the shortcomings available above, the school systems have to work hands and gloves.

The emerging lessons out of the systems described

Drawing from the voices of the participants and literature studied, systems theory is the brainchild of the dynamic relationships and interdependence among the components of the system that forms the organisation. For the purpose of this paper, the organisation refers to a school. In the light of the preceding statement, Lai and Lin (2017) opine that a system stems from the nature and patterns of the relationships resulting from interactions among the components of the organisation. The lived experiences of the participants illuminated that keeping interactions alive, balanced and effective among components, requires monitoring, communication and consultation in order to adapt to the changing circumstances. Centrally to monitoring and maintaining a system's existence and effectiveness, sits the human structural behaviours as the systems' captains.

In placing emphasis on such pivotal human role function, Lai and Lin (2017) while citing Parsons (1951) assert that the systems theory in a school as an organisation where an interactive communication occurs, depends on the functioning of structures available. Data also showed that built-in the open systems theory, a school and its stakeholders are collective twins, that are linked through varied communication interrelationships. In this manner, communication interrelationships are espoused in a series of contacts created by the flow of messages among the staff personnel and others at specified times (Monge & Contractor, 2003). For example, it is evident in this research that a sound communicative interaction among the teaching staff and learners as well as a continuous feedback system in place, would enhance quality teaching and learning. The emerging knowledge revolves around understanding that the systems theory survives through how the schools as organisations function and how the human structures respond to the environmental adversities.

This empirical research outlines the key properties of the systems theory in the likes of interdependence, relationships and interactions among its components, feedback, adaptation and flexibility to its environment as well as communication, control, monitoring and maintaining the system's functionality. In a nutshell, the emerged key properties of the systems theory have a potential to provide meaning to quality teaching and learning. In addition, they make sense to all the education interest groups to understand the purpose of the school as an open system and functioning of its parts to form the chief whole. This entails that each part of the whole system needs the other one to function well and to cope with its environmental acrimonies.

To expand, out of the significance of systems theory as detailed above and below, a further research is required to understand how systems make all the schools functioning as arenas for achieving quality teaching and learning. Another emerged lesson found, is when the interdependent system parts are well oiled, a continuous learner performance becomes cyclical and likely to take upward trajectory. This implies that, at the peak of health interaction of school parts, there is an envisaged quality teaching and learning.

International Educative Research Foundation and Publisher © 2017

Regarding maintaining exorbitant continuous learner performance, data analysis revealed that functioning or interaction of the system depends on the context on which it has taken place or how other parts function for a particular purpose. This entails that various systems as they interrelate to one another, they also overlap for goal attainment (sustainable excellent learner results). Thus, the excellent high standards in a school as an open system is rooted in the way the systems function. As the car's turning systems keep it in motion, significantly so, with the school's interacting systems that shoot up its end-products.

Though the data revealed so much on enabling factors in the schooling systems studied, however, such schooling systems were found not free of shortcomings as discussed earlier on. Likewise, with the Department of South African Policing Services, as dearth of adequate policing infrastructure could lead to criminality pandemics, in the same vein with the Department of Education, understaffing and meagre infrastructure provision lead to malfunctioning of teaching and learning system. The shortcomings discussed, illuminate that the meagre ambition to interact among the systems hampers the accomplishment of the set goals and in a school context, high learner performance ceases to be practicable visible. This shows that if the system lacks a collective functioning, interrelationships between sub-systems and supra-systems are hardly smooth sailing. Despite the interaction among the components of the system, however, there are different relations.

Conclusion

The key message based on the systems theory portrayed in this paper illustrates that its conceptualisation is twofold. First, the frontline school managers must have an understanding that no school functions well without the set of its two or more parts interacting with one another. Such recurring interaction need to exist among humans (non-professionals and professionals), physical, financial and intellectual school capital. This entails that the work-alone person placed at the helm of managing teaching and learning cannot endure high learner performance. The required factor is to permit the interactive process among the school components (school capital) to meander among them. Thus, a chain of multi-components plus their sound relations in a school in particular works well. Laszlo and Krippner (1998) views such set of multi-components as a group of interrelated components that performs some identifiable functions with other systems. This further suggests that when the school components interact, they perform some visible functions on the eyes of the onlookers.

Second, inherited from the definitions of key concepts up to analysing the voices of the participants, the key common denominator has been the collective functioning of the school components. So, the second knowledge contributed is based on Laszlo and Krippners' (1998) thought as cited in Ackoff (1981, pp. 15-16) that school systems has two qualities. Such systems qualities are: each part has an effect on the functioning of the whole and it is affected by at least one other part in the system. For example, if the photocopying machine becomes out of order, it affects the whole process of teaching and learning. In this manner, the external people as well as the internal individuals requiring printed and photocopied materials are affected. Again, if one educator is absent, it takes time for learners in the school system to adapt to the other relief educator. Further, in performing learners' results systems analysis, the School Management

Teams¹⁸ (SMT) may start from inward analysis of the school sub-systems and outward to the external environment to put into barometer the participation of the supra-systems. In summing up, with the schooling systems, one must understand the purpose of the school functioning as a system within its boundary and outside with its tangible significant others.

Clearly, each line or sentence discussed in this paper, enabled systems theory to cross over into the mainland for school goal accomplishment (quality teaching and learning). Drawn from the interviewees' viewpoints, the school system theory has a potential to give the whole organisational structure, a dynamic functioning strength deriving from well interrelated parts. Thus, in the South African school contexts, the systems theory glues schools to their interconnected parts.

References

- Ackoff, R. L. (1981). *Creating the Corporate Future*. New York: John Wiley & Sons
- Almaney, A. (1974). Communication and The Systems Theory of Organization. *Journal of Business Communication*, 12(1), 35–43. doi:10.1177/002194367401200106
- Ashby, W. R. (1954). *Design for a Brain*. New York, NY: John Wiley & Sons, Inc.
- Barile, S. (2008), *L'impresa Come Sistema - Contributi Sull' Approccio Sismico Vitale, I Ed.* Torino: Giappichelli
- Beer, S. (1973). Designing Freedom. available at: <http://ada.evergreen.edu/~arunc/texts/cybernetics/beer/book.pdf> (accessed 24 January 2014)
- Boulding, K. E. (1956). General Systems Theory: The Skeleton of Science. *Management Science*, 2(3), 197–208. doi:10.1287/mnsc.2.3.197
- Espejo, R. (2003). The Viable System Model. A Briefing about Organisational Structure. Chichester: Syncho Limited. www.syncho.com
- Espejo, R., & Gill, A. (2011). The Viable System Model as a Framework for Understanding Organizations. <https://www.researchgate.net/publication/265740055>
- Golinelli, G.M. 2000. *L'approccio Sistemico Al Governo Dell 'impresa. L'impresa Sistema Vitale, I Ed.* Padova: CEDAM.
- Golinelli, G.M. 2005. *L'approccio Sistemico Al Governo Dell 'impresa. L'impresa Sistema Vitale, I Ed.* Padova: CEDAM.

¹⁸ chief management statutory body for schools as organisational systems (principal, deputy principal, departmental heads).

- Hildbrand, S., & Bodhanya, S. (2015). Guidance on Applying the Viable System Model. *Kybernetes*, 44(2), 186–201, Permanent link to this document: <http://dx.doi.org/10.1108/K-01-2014-0017>
- Keyton, J. (2017). Communication in Organizations. *The Annual Review of Organisational Psychology and Organisational Behavior* (4), 501–26
- Khuzwayo, Q.O. (2015). *Exploring What Sustainable School-Community Partnership Entails: A Case Study of Four Rural Primary Schools in Ndwedwe*. Doctoral Thesis. Durban: University of KwaZulu-Natal, (Edgewood Campus), South Africa.
- KwaZulu-Natal Department of Education (2008). Lead and Manage Organisational systems, Physical and Financial Resources. advanced Certificate: Education. School Management and Leadership. www.kzneducation.gov.za
- KwaZulu-Natal Department of Education (2020). KZN Circular No. 29 of 2020. Sourcing Services of Co-operatives/Recruitment of Suitable Individuals for Disinfecting Schools. Cleaning and Disinfecting Guidelines marked as Annexure A. Pietermaritzburg: www.kzneducation.gov.za
- Lai, C., & Lin, S. H. (2017). *Systems Theory in Craig R. Scott and Laurie Lewis (Editors-in-Chief), James R. Barker, Joann Keyton, Timothy Kuhn, and Paaige K. Turner (Associate Editors). The International Encyclopedia of Organisational Communication*. Singapore: John Wiley & Sons, Inc.
- Lawrence, P., & Lorsch, J. (1967). *Organisation and Environment*. Cambridge, MA: Harvard University
- Laszlo, A., & Krippner, S. (1998). *Systems Theories: Their Origins, Foundations, and Development in J.S. Jordan (Ed.). Systems Theories and A Priori Aspects of Perception*. Amsterdam: Elsevier Science, 1998. Ch. 3, pp. 47-74. <<not for other Quotation, Distribution, or Reproduction>> [Manuscript version: submitted for publication in 1997]
- Litchman, M. (2006). *Qualitative Research in Education*. London: Sage.
- Mele, C., Pels, J., & Polese, F. (2010). Communication and The Systems Theory of Organization in Almaney, A. (1974). A Brief Review Systems Theories and Their Managerial Applications. *Service Sciences* 2(1/2), 126-135
- Mele, C., Pels, J., & Polese, F. (2010). A Brief Review Systems Theories and Their Managerial Applications. *Service Sciences* 2(1/2), 126-135
- Monge, P. R., & Contractor, N. S. (2003). *Theories of communication networks*. Oxford, UK: Oxford University Press.
- Novikov, D. A. (2016). *Cybernetics. From Past to Future*. Heidelberg: Springer Publisher.

Parsons, T. (1951). *The Social System*. Glencoe, IL: Free Press.

Poole, M. S. (2014). *Systems theory in L. L. Putnam & D. K. Mumby (Eds.). The SAGE Handbook of Organizational Communication: Advances in Theory, Research, and Methods* (pp. 49–74). Thousand Oaks, CA: Sage. Rice, R. E., & Richards, W. D.

Shapiro, J. (2007). *Monitoring and Evaluation*. Johannesburg/Washington: Civicus. Available: <http://www.civicus.org>.

Von Bertalanffy, L. (1951). General System Theory; A New Approach to Unity of Science. Problems of General System Theory. *Human Biology*, 23(4), 302–312.

Wiener, N. (1948). *Cybernetics: On Control and Communication in The Animal and The Machine*. New York, NY: John Wiley & Sons, Inc.