The Senge's fifth discipline in schools. A literature review

La quinta disciplina di Peter Senge nelle scuole. Una revisione della letteratura

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The Fifth Discipline (FD) is an advanced leadership and management system ideated in 1990's, it is a widely used system in the management of business companies and it is object of continuous improvement. The literature about FD is manifold, but in the education field it is very poor. This paper aims to provide an overview and to report data of a review carried out on the ERIC search engine. We have found 73 articles, 40 did not talk about school or higher education; 31 focused only on the 4 disciplines (personal mastery, mental models, shared vision and team learning). But they assume that the fulfillment of the 4 disciplines transforms an organization into a learning organization. Only 2 papers took into account the FD in its 7 learning disabilities; 5 Rules and 9 system archetypes.

Keywords: Fifth Discipline; school system; management; learning organization; teamworking

La Quinta Disciplina è un sistema avanzato di management ideato da Senge negli anni '90. Da allora è diventato un sistema molto diffuso nel settore del business ed è oggetto di continue ricerche. Abbiamo fatto una ricerca della letteratura sul motore di ricerca pedagogico ERIC. È emerso che più di 40 articoli su 73 non riguardavano l'ambito della scuola o dell'università; 31 riguardavano le 4 discipline (maestria personale, modelli mentali, visione condivisa e apprendimento di gruppo) presupponendo che il loro adempimento trasformi automaticamente la scuola in una learning organization. Solo 2 articoli prendevano in considerazione gli aspetti più peculiari (7 incapacità di apprendere; 5 Regole, 9 archetipi sistemici). 71 articoli si focalizzano sulle applicazioni organizzative mentre potrebbe essere applicato come un sistema in grado di sviluppare il fattore umano come chiave di crescita organizzativa.

Parole chiave: Quinta Disciplina; sistema scolastico; management; organizzazioni che apprendono; lavorare in gruppo

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1. Introduction

We believe that schools have an intrinsic desire to improve outcomes for students and that improved practices and improved outcomes will be achieved through collaborative, systematic, school-wide efforts to learn how to improve.

In other words, the school functions as a learning community underpinned by a belief that, no matter how well or how poorly the school is performing, improvement is always possible.

We think that at the center of every educator's professional work should be a commitment to ongoing student growth and development – a belief that every student is capable of successful learning if they can be engaged, motivated to make the required effort and provided with well targeted teaching and learning opportunities.

This belief in the possibility of continuous improvement is sometimes referred to as a 'growth' mindset and can be contrasted with the more pessimistic 'fixed' belief. The fixed beliefs underline that there are natural limits to many students' capacities (but also teachers' and schools' limits) for learning and eventual achieving a high goal (Geoff and Masters, 2016).

2. Learning organization

'Learning organization' is one of the inspiring concepts in the "Evolution management" and it spreads in the business field since the early 90s. It is claimed to be able to promote continuous improvement and make organizations more competitive, flexible and responsive. One of the champions of learning organization is Peter Senge who wrote the most celebrated book in the field, The Fifth Discipline (Senge, 1990).

Peter Senge follows the tradition of learning organization (from 1970s) through the research of Chris Argyris and Donald Schon and the practice in Royal Dutch/Shell of Arie de Geus (Flood, 1998). It is Senge, however, who leveraged the concepts and methods of the learning organization into popular currency through his now widely known book, *Fifth Discipline* and then specialized in *Schools that Learn* (Senge, 2000).

In his book *Schools that Learn* Senge offers practical advice for overcoming the many challenges that face US' communities and educational systems. He shows teachers, administrators, students, parents and community members how to successfully use principles of organizational learning, including systems thinking and shared vision, to address the challenges that face US' nation's schools. In a fast-changing world, children live in an ever more complex social and media environments, standardized tests are applied as overly simplistic "quick fixes," and advances in science and technology continue to accelerate, the pressures on US educational system are inescapable. *Schools That Learn* offers a good way to open dialogue about these problems – and provides pragmatic opportunities to transform school systems into learning organizations.

Senge describes a learning organization as consisting of five disciplines: personal mastery, mental models, shared vision, team learning, and systems thinking.

His definition of learning organization is "where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together" (Ahmad, Burgoyne, 2013, p. 1).

The FD is a kind of management that is studied also in the Islamic business world.

In an Islamic business organization for example a leader answered to an interviewer (about a V Discipline's research in the Islamic organizations): "Like myself, I went to a leadership program, it's a must for each officer who went to seminar, when they come back, they must present. Normally after 2 days, they will present to their subordinates. That is the process of learning. Everybody share the knowledge. That is time when they want to brainstorm or whatever" (Ahmad, Burgoyne, 2013, p. 6).

In an article of the *Harvard Business Review* David Garvin (1993) defined a "learning organization" as "an organization skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights" (Garvin, 1993, p. 79).

As Garvin argued, the definition requires two essential conditions: first, for organizational learning in order to take place new ideas; second, these ideas must be a trigger for organizational improvement – new ideas must lead to accompanying changes in the way the organization's work is accomplished.

Literature about learning organization is characterized by the Senge's attempts (Senge, 1990; Senge, 1990b) to define and create an ideal type of organization in which learning is maximized.

The literature has an action orientation, in which there is a close association between generating organizational change and studying the consequences of these changes.

As a result, the learning organization literature is often eclectic, evaluating ideas and concepts according to their applicability rather than through theoretically rigorous and grounded research studies (Dill, 1999).

But literature argues that the competitive success of an organization is influenced by how it configures and manages its resources (first of all: human resources) (Dill, 1999).

Kools (2016) says that we can consider a School "as a learning organization if it is an integrated model in which the collective endeavour is focused on:

- developing and sharing a vision centred on the learning of all students;
- creating and supporting continuous learning opportunities for all staff;
- promoting team learning and collaboration among all staff;
- establishing a culture of inquiry, innovation and exploration;
- embedding systems for collecting and exchanging knowledge and learning;
- learning with and from the external environment and larger learning system;
- modelling and growing learning leadership".

A school as a learning organization has the capacity to change and adapt routinely to new environments and circumstances as its members, together and individually, learn their way to realize their vision.

The ET 2020 Working Group on Schools[1] says that: "learning is a pre-requisite for growth and development. Improving the experiences and outcomes of all learners are consequently the central of concern in pursuit of quality in school education. Vision at the level of national and regional policy should value and respect the role of teachers and school leaders in the education system.

It is recognized that teachers and school leaders ultimately work in

1 The ET 2020 Working Group on Schools was launched in February 2016 and runs until June 2018. It builds on the achievements of the 2014-2015 Working Group on Schools. Key messages from the 2014-2015 group can be found in the Highlights from the Working Groupslink to another EC website.

their local context, albeit set in a national or regional framework of governance for the education system. Teachers and school leaders have a real and immediate setting for their work. The concept of the school as learning organisation is considered helpful, not least because the actors identified extend beyond school staff into the local community, including parents and employers, as well as networks of schools. All stakeholders are by definition important to the success of a school and should be enabled to share and implement progressive measures" (European Commission, 2018).

3. Hypothesis

The "now" and "a hurry" culture, plus the fact that companies turned into complicated (from complex), makes it difficult to manage the unintended consequences and to give meaning to a new situation and economic organization (Pensieri, Pennacchini, 2013).

Flood (1998, p. 13) says that: "Systemic thinking explores things as wholes and is highly relevant because the world exhibits qualities of wholeness. These qualities relate to every aspect of our lives - at work and at home. Events are distinct in space and time, but they are all interconnected".

These events can be understood only by contemplating the whole.

In our life, these events can be made sense of in a meaningful way only in the knowledge that our actions contribute to patterns of interrelated actions.

"The world is whole and the whole is complex. It is increasingly complex, with more and more information, intense interdependency, and relentless change" (Flood, 1998, p. 13).

The reflexivity and reflective thinking of Dewey's education is very useful because, the effects and right uses of reflexivity are tracked at both individual and systemic level, fostering learning, change, innovation and creativity.

Dewey (1933) and later Schön (1983) have provided a foundation for currently understanding the notion of reflection. Dewey (1933, p. 9) defined reflective practice as an action that involves 'active, persistent, and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it and the further consequences to which it leads'. Schön (1983) made the distinction between reflection 'in action' – kind of reflection that occurs whilst a problem is being addressed, and 'on action' -– that takes place after the event, it's consciously undertaken and documented (Stîngu, 2012).

So, our hypothesis is that the FD can be a useful tool in order to

transform schools (and Universities) into learning organizations.

In order to know if it could be a good field of research we started a literature review on ERIC. We want only to know how many articles were about FD and in which aspects they describe it.

We aim to know if someone has studied the complete application of FD in a school/university empowering potential of the learning organization.

4. The fifth discipline

In order to introduce the systemic and reflexive thinking we must briefly present the 4 disciplines prior to the 5th discipline and then we will explain other aspects of FD (7 disabilities, 9 archetypes, 5 rules).

4.1 *Personal Mastery*

Personal Mastery centers on developing one's own proficiency (Flood, 1998). The aim is continually to clarify and deepen personal vision (Park, Rojewski, 2006) extended into shared vision in the learning organization.

Personal vision means keying into what you want while resisting occupation with what you do not want. When fully honed it is an ability to converge on ultimate intrinsic desires and to do positive things toward achieving them.

A gap will exist between reality and personal vision that causes tension. Creative tension can nourish personal vision and needs feeding. Emotional tension can erode personal vision and requires dampening.

Personal mastery may empower people by helping them to clarify and deepen personal vision and come to grips with intrinsic desires.

4.2 *Mental models*

Mental models are "deeply ingrained assumptions, generations, or even pictures and images that influence how we understand the world and how we take action" (Senge, p. 8).

When establishing mental models, Senge highlights that people need to maintain a balance between inquiry and advocacy (Park and Rojewski, 2006), "where people expose their own thinking effectively and make that thinking open to the influence of others" (p. 9).

Mental Models are conceptual structures held in each person's mind

that shape the way each person perceives the world and as a result acts in it. Mental models therefore define for all individuals their relationship with the world in which they find themselves.

"Our mental models determine what we see. In any new experience, most people are drawn to take in and remember only the information that reinforces their existing mental models" (Senge, 2000, p. 67).

Mental models are most often invisible in the routines they discharge. The discipline of mental models encourages individuals to recognize mental models they use in their minds.

This kind of research helps people to appreciate limits that mental models impose on personal vision (and shared vision in the learning organization). Challenging mental models expands individuals' as well as teams' capacity to learn and to create their own future.

"Working with mental models can also help you more clearly and honestly define current reality.

Since most mental models in education are often "undiscussable" and hidden from view, one of the critical acts for a learning school is to develop the capability to talk safety and productively about dangerous and discomfiting subjects" (Senge, 2000, p. 7).

Mental models may empower people by educating them about the way their cognitive processes shape what they see and define their relationship with other people and the world (Flood, 1998).

Within a classroom, each student also works to create his mental model.

Students work to describe and live within their own world view or paradigm. They come to see that they view the world through a particular set of values (e.g. materialism, religion, etc.) and that, to some extent, they can make a conscious choice about this world view. When students understand that others also work from mental models, and that these mental models also provide a guide to their actions as well, there is a comfort zone in the classroom. Students of differing perspectives are more able to see where others are coming from, and can better share without the feeling that they are being manipulated (Fenwick, Parsons, 1995, p. 36).

"Mental models thus limit people's ability to change. A group of superintendents and school board members may tacitly believe that the only way to improve the schools is to invest more money; therefore, they don't recognize other possible approaches. A teacher may assume that students from the "wrong side of the tracks" don t care about school, so he subtly dismisses them out of hand. An administrator may assume that the local teachers' union will block all innovation, so she approaches the unions defensively, holding back as much information

as possible – which in turn makes the union leaders more defensive.

The leaders of a school reform effort may assume, without even being fully aware of it, that parents don't really know much about their children's needs. Therefore, they inadvertently alienate parent groups, without even understanding why" (Senge, 2000, p. 67).

4.3 *Shared vision*

Shared vision means that individual visions or goals are integrated into a shared organizational vision.

Shared vision is a vision to which many people are committed since it comes out of and so is created some each one's personal vision.

"Unfortunately, many people still think that "vision" is the top leader's job. In schools, the vision task generally falls to the superintendent, the principal, and the school board.

Within a classroom, it may fall to a teacher. But visions based on authority are not sustainable. They may succeed in carrying a school or a school system through a crisis – the superintendent wants us all to pull together to get through this budget crunch. But when the crisis is over, people will fall apart, back to their fractionalized and disparate hopes and dreams. Catalyzing people' s aspirations doesn't happen by accident, it requires time, care, and strategy. To support this creative process, people need to know that they have real freedom to say what they want about purpose, meaning, and vision with no limits, encumbrances, or reprisals" (Senge, 2000, p. 72).

Shared vision refers to shared operating values, a common sense of purpose, indeed, a basic level of mutuality. It extends insights and principles from personal mastery into a world of collective aspiration and shared commitment. For this reason, multiple visions are encouraged to coexist in a course of action that at once transcends and unifies personal visions. Managing each individual's vision and extending them into shared vision helps expand an organization's capacity to create its future. Systemic thinking explains the spread of shared vision in generative learning as a reinforcing process where communication of the ideas gathers pace and the vision becomes increasingly clear, leading to rising enthusiasm. As any process of growth, system dynamics encourages us to look for limiting factors.

Shared vision may empower people by generating a common sense of purpose on which they focus energy in a meaningful way (Flood, 1998).

Students within the classroom that works as a learning organization

work together to form the shared vision based on a meaning of what can be done. This shared vision helps shape the questions that become the natural organizing center of the discussion of a public issue: Can this problem be solved? If so, how can it be solved? What impact will attempts at the solution have on those who are close to the problem? (Fenwick, Parsons, 1995, p. 34)

4.4 *Team learning*

Team learning needs to be developed to create a learning organization. According to Senge's argument, "unless teams can learn, the organization cannot learn" (Senge, p.10).

In spite of increased attention on the necessity and advantages of applying the learning organization concept to schools, empirical investigations to assess this phenomenon have been relatively rare (Griego, Gerory, 1999; Silins, Mulford, 1998; Zederayko, 2000).

The Team learning aims to align people's efforts by directing their energies, creating synergy.

"It harnesses the potential of many minds but requires mastering practices of discussion and dialogue.

Discussion is where different views are presented and defended in search of a view to support decisions that must be made.

Dialogue involves suspending one's own views, exploring issues from many points of view, and visiting the mental models and personal visions of others.

Discussion and dialogue need to be balanced. Also, team members must learn how to cope with forces that break down meaningful discussion and dialogue by developing skills in inquiry and reflection.

A learning organization manifesting teams equipped with competencies in inquiry and reflection will be better prepared continually to expand its capacity to create its future.

Discussion and dialogue are necessary counterparts in the quest for consensus.

However, there may be forces at work that prevent productive discussion and dialogue.

Team learning may empower people by aligning their thoughts and energies, which triggers resonance and synergy in learning" (Flood, 1998).

"Team Learning can be fostered inside classrooms, between parents and teachers, among members of the community, and in the 'pilot groups' that pursue successful school change" (Senge, 2000, p. 8).

"In a classroom Team learning is not teambuilding; team building

is seen as a sort of 'rah rah, all for one and one for all' feeling. Instead, team learning allows that different perspectives can exist so that dialogue can emerge. Dialogue means that people share ideas and that ideas can change shape. Part of team learning is the development of a shared intention, being safe and adventure some at the same time, being individual and collective together. The steps of team learning include invitation, generative listening, observation, and the suspending of assumptions again meaning the display of the assumptions as opposed to holding them back" (Fenwick, Parsons, 1995, p. 38).

4.5 *Fifth Discipline or Systemic Thinking*

Systemic Thinking may empower people by enabling them to begin to appreciate rather than be confused by the interrelated nature of the world and how this might explain their experiences.

Senge argues that it is systemic thinking that integrates all five disciplines and brings about the empowering potential of the learning organization.

FD is based on (Pensieri, 2016):

7 learning disabilities: 1. I am my position; 2. The enemy is out there; 3. The illusion of taking charge; 4. The fixation on events; 5. The parable of the boiled frog; 6. The delusion of learning from experience; 7. The myth of the management team;

5 Rules: 1. To look at the system, not at the individual parts; 2. To look at the interrelations, not at the cause and effect's chains; 3. To look at the processes, not at the single snapshots and consider the long time, as well as the short; 4. To consider the leverage effect; 5. To know the system archetypes;

9 system archetypes: 1. Balancing process with delay; 2. Limits to growth; 3. Shifting the burden; 4. Eroding goals; 5. Escalation; 6. Success to the successful; 7. Tragedy of the commons; 8. Fixes that fail; 9. Growth and underinvestment.

5.7 Learning disabilities

In "The Fifth Discipline", Senge identifies seven learning disabilities which exist in all organizations to varying degrees and which can prevent them from becoming successful learning organizations.

These are:

1. I am my position
2. The enemy is out there
3. The illusion of taking charge
4. The fixation on events
5. The parable of the boiled frog
6. The delusion of learning from experience
7. The myth of the management team

One of Senge's major points is the need to be aware of structures which hold us prisoner, such as organizational learning disabilities (Harriett, 1998).

5.1 *I am my position*

This disability indicates the confusion of one's role (assignment) with one's being (identity).

"I'm my position" is when a man identifies with the actions he daily performs in his work, rather than with his own aspirations, personal values, origins, etc. (Bonocore, 2013).

An example of how this inability sets in to a limit is this: an Italian airline company in the 90s was the subject of this interesting fact.

As soon as the fusion between ATI (Aereotrasporti Italiani) and another big company, the role of the "flight technicians"[2] was no longer accepted in the organization chart.

The company gave its employees (who had that role) the possibility to convert their skills in other positions (in order to not to be fired).

Some of them became stewards/hostess, few flight technicians took the pilot course.

Many of these employees had enormous imbalances.

Some of them decided not to train their skills because they didn't want to lose the epaulettes on the uniform (and therefore not "appear" without the degrees on the jacket).

Some of them were taken care by psychologists and psychiatrists because they did not accept the change, they identify themselves with their role (and not with their ability to perform an action or another), they had "identity crises" and various diseases related to non-predisposition to the change.

Those who became stewards decided to continue working (with one

2 They are the aeronautical specialists who controlled the efficiency of the airplane and that can declare its navigability on every flight.

lower qualification but with the same salary) renouncing grades on the uniform.

As well as being "one's own position" and continuing to "appear" to the public, some of these employees were coming into the airport with the old uniform (with the epaulettes) and then changed the jacket on board. They were their position…

This incapacity, in fact, greatly limits the individual in the attitude towards what is new.

When you are in this disability you are afraid of the new, you are afraid of change, even when this implies an improvement for you (Bonocore, 2013).

When you are in this inability you become jealous of one's position, of one's own things and, therefore, you are no longer open to dialogue with others and with colleagues.

You think only of your own profit and hardly the whole, that is, the common good, the group.

When in a school there is growth, evolution of skills, continuous learning, there is also a growth of professionalism and quality offered to students.

Pushing employees to acquire or improve their skills is certainly a winning choice of Top Management.

So even the "fear of being supplanted" if it is "well addressed" can become a strong way to train people. That "professor", or that "teacher" who - for years - has done the same job in the same way, can be driven to acquire new skills or to improve what he already has (learning a new technique, learning to use a new tool or technology, etc.).

In a school predisposed to change everyone is important and unique, but none is irreplaceable.

5.2 *The enemy is out there*

Senge says: "the 'enemy is out there' syndrome is actually a by-product of 'I am my position' and the non-systemic ways of looking at the world that it fosters" (Senge, 1990, p. 19).

Whoever does not solve the first disability (I am my position) is led to seek a guilty "outside".

In fact, anyone who comes into conflict with our ideas become our enemy.

Even if the arguments are logical and incontestable.

This gives rise to the dualism of an "out there" full of enemies cre-

ating huge problems that inevitably fall on himself.

On the other side there is also an "in here", that is "its position" where we find ourselves more and more isolated, intent only to find new enemies and focuses to curb more than we can.

"For California community colleges, there is one principal enemy with many tentacles: the state" (Harriett, 1998).

Colleges cannot implement a policy or procedure unless the code specifically permits it.

"In the California Education Code alone, there are currently over 1,200 statues that directly regulate and affect the affairs of community colleges. This ponderous code doesn't even include the 640 regulations adopted by the board of governors, and the hundred and hundreds of federal statutes and regulations that govern the specific activities of colleges... The California Community Colleges are micro-managed as much or more than any other higher education institutions in the country" (O'Banion, 1997, p. 13).

Such micro-managing has deleterious effects on the system's perception that it can exert some control over its destiny as well as on its ability to make creative and substantive systemic changes.

Senge points out, however, that "out there and in here are usually part of a singles system. The learning disability makes it almost impossible to detect the leverage which we can use in here on problems that straddle the boundary between us and out there" (Senge, 1990, p. 20). For traditional, organizationally fragmented colleges, their leverage lies in their ability to control their own allocation systems and their relative freedom to seek alternative sources of funding. It is very difficult to create systems which help members learn how to look at the bigger picture, much less educate faculty and staff as to the means by which they can exert more control over a system they perceive to be completely "out there."

When we focus only on our position, we do not see how our actions extend beyond the boundary of that position. We are "*disperceptive*" towards these problems.

5.3 *The illusion of taking charge*

We fall into the third disability every time we fight the "enemy" we have found with the second disability, the enemy out there. We hope to solve the problems with our fight but it is just an illusion.

We are fighting and thinking of being proactive but we are simply

reacting.

Being proactive comes from seeing how we can help ourselves in order to solve our problems, usually "before" that become "problems".

In fact, too often, in the school environment "proactivity" is a disguised reactivity.

You become proactive to solve a problem when it is already revealed as a "problem", or when it has already created damage to the institution or students.

We start to cut squanders in a school when the Ministry has decided to cut money funds.

The purchase trends of devices and educational technologies are reshaped only after we realize that they are no longer sustainable, etc.

If we are merely aggressive in fighting the "enemy out there", we are simply reacting.

True proactivity comes from seeing how everyone contributes to solve a problem.

It is a product of the way of thinking and the way of doing, such as: dealing with difficult issues, stopping to wait for someone else to do something and solve problems before they result in a crisis.

In particular, being proactive is often seen as an antidote to being "reactive".

You are waiting (before taking a step) until the situation is out of hand.

Another example of "Illusion of taking charge" is when people say "I will work more".

This means that they are deluding themselves to solve a problem (they are implementing a compensatory and "reactive" strategy). But even solving the problem on a structural level is always a form of reactivity. To get out of this incapacity it would have been necessary to foresee and prevent the emergence of that problem.

Proactive action is defined by people daring to face the results of their own behavior and the willingness to change it to prevent problems from reoccurring in the future.

5.4 *The fixation on events*

"Two children get into a scrap on the playground and you come over to untangle them. Lucy says, 'I hit him because he took my ball'. Tommy says, 'I took her ball because she won't let me play with her airplane'. Lucy says, 'He can't play with my airplane because he broke the propeller'. Wise adults that we are, we say - Now, now, children - just get along with each other. But are we really any different in the way we explain the entanglements we find ourselves caught in?

We are conditioned to see life as a series of events, and for every

event, we think there is one obvious cause" (Senge, 1997, p. 4).

The more we are aggressive towards the enemy out there, the more we are focusing only on short-term events.

When we make the mistake of not evaluating the consequences of events (thinking about the long time) we push ourselves towards the fourth disability. We are looking only at the "effects" we cannot see the cause and find ourselves without a way out.

Most managers used to think that for every event (number of members, funding received, etc.) there is an obvious and closely related cause.

They often see life as a series of events (cause-effect).

When we look for explanations in a cause-effect relationships (even when they are true), we distract ourselves from seeing long-term change structures (from which derive true threats and scholastic or academic opportunities).

If you focus on events, the best you can do is to predict an event before it occurs.

Creative learning cannot be achieved if executive thinking is dominated by short-term events.

Bonocore says: "I project, a today's action, into the future from here to... a hundred years and then I wonder what results it will bring" (Bonocore, 2013, p. 144).

An example is a small school in Lazio: in one sector of the school it was broken central air conditioning and they estimated that making a new air conditioning system would cost about 15,000 euros.

The management decided to buy a new air conditioner for each of the 4 classrooms of the school for a total of around 7,000 euros.

In the first year everything goes well. But over the next five years between filter sanitation, assistance and replacement of broken parts, the school had to invest much more than it would have invested in adjusting central air conditioning four years earlier.

5.5 *The parable of the boiled frog*

If you put a frog in a pot of boiling water, it will immediately try to scramble out. But if you put the frog in a room temperature water, and don't scare him, he'll lie down. Now, if the pot sits on a heat source, and if you gradually turn up the temperature, something very interesting happens.

As the temperature rises from 22 to 27 Celsius degrees, the frog will do nothing. In fact, he will show every sign of enjoying himself. As the temperature gradually increases, the frog will become groggier and

groggier, until he is unable to climb out of the pot. Though there is nothing restraining him, the frog will sit there and boil. Why? Because the frog's internal apparatus for sensing threats to survival is geared to sudden changes in his environment, not to slow, gradual changes.

To prevent this from happening to organizations in changing environments, changes of processes should be measured and evaluated.

Sometimes happen that the University's Dean, the head teacher, managers or professors – fully involved in the current management – cannot see of the consequences that their daily choices are able to exercise over a longer period of time. It also happens that they cannot immediately perceive the symptomatic faint signs of dysfunctions that will eventually result in a crisis.

5.6 *The delusion of learning from experience*

The most powerful learning comes from direct experience. Indeed, we learn eating, crawling, walking and communicating through direct trial and error-through taking an action and seeing the consequences of that action; then taking a new and different action. But what happens when we can no longer observe the consequences of our actions? What happens if the primary consequences of our actions are in the distant future or in a distant part of the larger system within which we operate? We each have a "learning horizon" a breadth of vision in time and space within which we assess our effectiveness. When our actions have consequences beyond our learning horizon, it becomes impossible to learn from direct experience.

One of the challenges of teaching is that teachers do not often see the end results of their efforts. The effects of the interaction between the instructor and students may not be manifested for weeks, months, or years afterward.

Likewise, administrative decisions within academia can have far-reaching effects which occur long after the decision has been made and the administrator has moved on. That time delay plus the fact that institutional memory is usually short means that we don't always experience the consequences of our decisions. Therefore, we do not really have an opportunity to learn from them.

This disability described because people seldom really know the outcome of their actions on the long term, while we tend to believe that we can know the long term outcome by looking at the short term outcome.

5.7 *The myth of the management team*

The last disability is the myth of the management team in which people truly believe that management can solve all problems.

When one thinks about it, it is obviously impossible that one manager knows everything about all processes and has all the capabilities needed to solve each problem.

The management team is the collection of savvy, experienced managers who represent the organization's different functions and areas of expertise. Together, they are supposed to sort out the complex cross-functional issues that are critical to the organization.

What confidence do we have, indeed, that the management team can surmount these learning disabilities?

Teams in schools tend to spend their time fighting for turf, avoiding anything that will make them looking bad, and pretending that everyone is behind the team's collective strategy – maintaining the appearance of a cohesive team.

To keep up this image, they seek to squelch disagreement; people with serious reservations avoid stating them publicly, and joint decisions are a watered-down compromise reflecting what everyone can live with, or else reflecting one person's view foisted on the group.

If there is a disagreement, it's usually expressed in a manner that lays blame, polarizes opinion, and fails to reveal the underlying differences in assumptions and experience in a way that the team (as a whole) could learn.

School trains us never to admit that we do not know the answer, and most corporations reinforce that lesson by rewarding the people who excel in advocating their views, not inquiring into complex issues.

Even if we feel uncertain or ignorant, we learn to protect ourselves from the pain of appearing uncertain or ignorant. That very process blocks out any new understandings which might threaten us. The consequence is what Argyris calls "skilled incompetence" - teams full of people who are incredibly proficient at keeping themselves from learning.

6. 5 Rules

It would be longer to explain here the Rules of FD., so we only cite them: 1. To look at the system, not at the individual parts; 2. To look at the interrelations, not at the cause and effect's chains; 3. To look at the processes, not at the single snapshots and consider the long time, as well as the short; 4. To consider the leverage effect; 5. To know the

system archetypes.

7. 9 System archetypes

Knowing learning disabilities itself is not sufficient. "It [awareness] may lead to solving a problem, but it will not change the thinking that produced the problem in the first place" (Senge, 1990, pp. 94-95). In order to change thinking managers need to think in terms of system archetypes (SA). Dynamic complexity may be understood in terms of the relatively small number of SA as they are shown to explain each unique situation. One SA, or several interconnected SA, may capture observable patterns of behavior and explain why a complex of events occurs. Using archetypes will "recondition our perceptions, so as to be more able to see structures at play, and to see the leverage in those structures" (Senge, 1990, p.95).

Senge notes that researchers have identified about a dozen SA, all of which are made up the basic building blocks of systems: reinforcing processes, balancing process, and delays. These SA (or behavior patterns which deserve management's attention) include (Flood, 1998):

1. Corrective Action with Delay (Balancing Process with Delay);
2. Limits to growth;
3. Shifting the burden;
4. Eroding goals;
5. Escalation;
6. Success to the successful;
7. Tragedy of the commons;
8. Fixes that fail;
9. Growth and underinvestment.

7.1 *Corrective Action with Delay (Balancing Process with Delay)*

There is a difference between actual condition and a desired goal. There is a gap between how things are and the way we want them to be. Corrective action is taken to close the gap. However, the impact of the corrective action is delayed. The gap does not appear to be closing and so further corrective action is considered necessary.

The impact of the initial corrective action then closes the gap as desired. Later, the second corrective action has an impact, leading to a gap in the other direction.

Further corrective action in ignorance of the delay leads to an os-

cillation in the actual condition.

7.2 *Limits to Growth*

A condition feeds on itself through a growing action to produce a period of accelerating growth. Growth approaches a limiting condition and experiences a slowing action. Growth eventually comes to a halt. However, if delays occur in the slowing action, the growth action may overshoot the limiting condition and will later contract to the limiting condition.
Limits to Growth is the result of focusing on improving activities which focus on improving growth accelerating factors instead of reducing growth limiting factors.

7.3 *Shifting the Burden (Treating Symptoms, Not Fundamental Causes)*

A problem condition arises. A strategy is worked out to treat the fundamental causes and is implemented, but experiences delay. The symptoms of the problem condition, however, can be and indeed are treated with immediate results. An increasing reliance on treating symptoms leads to the side effect that fundamental causes are treated less and less until eventually the strategy to treat the fundamental causes becomes disabled. This means that we are moving the problem instead of solving it.

This is what happens when only symptoms of the problem are addressed and not the root cause. The problem can than re-occur, in the same form but also in another department[3].

7.4 *Eroding Goals*

Rather than take further corrective action when the impact of the initial corrective action is delayed, a strategy is adopted to close the gap by eroding the desired condition/goal.

This then perpetuates, with an erosion of the desired condition/goal

3 A special case of the "Shifting the Burden" systems archetype is when an intervenor is brought in to help solving an ongoing problem. Over time, as the intervenor successfully handles the problem, the people within the system become less capable of solving the problem themselves. They become even more dependent on the intervenor, it is called: Shifting the burden to the intervenor.

limiting condition and will later contract to the limiting condition. This means that when situations get tuff the goals are set aside.

7.5 *Escalation*

A and B find themselves in competition. Whatever improvement in condition that either A or B achieves for himself/herself, the other one responds, leading to an improvement in his/her own condition.

This cycle repeats itself in an ever-escalating fashion. However, escalation may slow or even stop due to lack of sustainability or delayed side effects. The "Escalation" is a loop in which actors influence one another with a lose-lose situation as outcome. An example is a price-war between supermarkets, where multiple competitors eventually fight one another on being the cheapest, and none of them ends up with profit in the end. According to Senge, one should only encourage a culture in which win-win situations are created (ex. students-teachers; Dean-teachers; MIUR-schools; etc.).

7.6 *Success to the Successful*

A resource allocation procedure allocates limited resources according to a criterion of success. At a certain allocation point, A is considered more successful than B and so A received much more resources than B. This fact increases A's chances of success and diminishes B's chances of success for the next round of resource allocation. This also happens when a teacher think that a student is better than another and you will give him better votes also if he does not study very well.

It is a reverse Pigmalion effect.

Psychologist Robert Merton first identified this phenomenon as the "self-fulfilling prophecy". It is also known as the "Pygmalion effect," after the famous George Bernard Shaw play (later to become My Fair Lady).

Shaw had taken his title from Pygmalion, a character in Greek and Roman mythology, who believed so strongly in the beauty of the statue he had carved that it came to life.

Pygmalion effects have been shown to operate in countless situations.

An example occurs in schools, where a teacher's opinion of a student influences the behavior of that student. "Jane is shy and does particularly poorly in her first semester at a new school (because her parents were fighting constantly). This leads her teacher to form an opinion

that she is unmotivated. Next semester, the teacher pays less attention to Jane and she does poorly again, withdrawing further. Over time, Jane gets caught in an ever-worsening spiral of withdrawal, poor performance, "labeling" by her teachers, inattention, and further withdrawing. Thus, students are unintentionally "tracked" into a high self-image of their abilities, where they get personal attention, or a low self-image, where their poor class work is reinforced in an ever-worsening spiral" (Senge, 1990).

Success to the successful is the archetype in which resources are allocated to the most successful activity which makes the unsuccessful ones even more unsuccessful because they receive fewer resources. This is not necessarily the best policy for the long term.

7.7 *Tragedy of the Commons*

This is a story showing that rational local decision may sum to irrational decision for the whole. There are a common resource and two individuals/groups/schools drawing on it (there may be many more).

Each one maximizes its gain and increases activity and hence demand on the resources.

The common resource sustains growth, but in due course a resource limit is encountered.

This thing impacts negatively on the gains for A's and B's activities and depletes resources, which becomes a cycle with the tragic consequence that resources as well as A's and B's activities wither away - unless A and B are able to make decisions about the whole that are mutually beneficial and sustainable.

7.8 *Fixes that Fail*

A problem is encountered and a corrective action is worked out (it is considered to be a good solution). However, the corrective action leads to unthought and unseen consequences that feed back into the problem. Since these consequences are also unseen, the reaction is to administer more of the same corrective action, but this leads to more of the same consequences. So we are generating solutions which do not solve. It is a situation where short terms positive results lead to long term losses. For instance reducing preventative maintenance on building or devices in a school.

7.9 *Growth and Underinvestment*

A school demand and supply increase for a product or service, leading to a growing action.

This improves performance in terms of number of students' inscription.

Existing capacity for the product or service is met and so performance in this respect reaches its limit.

However, the performance standards for the sales of the product or service are raised and a perceived need to invest surfaces. Investment experiences delay in realisation.

Meanwhile, demand continues to rise, but performance in terms of ability to deliver what is promised severely falls, leading to a slump in demand.

The performance standards of sales (and indeed quality) are then lowered to justify the slump and the perceived need to invest drops away, limiting demand that can be met. Investment should have gone ahead in capacity and future investments made that stay ahead of demand.

Growth and underinvestment is the trap where investing does not seem necessary because all is well at the moment. Not investing today, however, might lead to a lost opportunity for growth in the future because of a lack of skills or capacity.

System archetypes (SA) may be employed to describe, predict, and explain patterns of behavior (Flood, 1998).

8. Methods

We have chosen the ERIC online library for this review[4].

From July 17 to August 28, 2018, we used 2 key terms for our research: "Peter Senge" and "Fifth Discipline".

We decided not to use the key term "School" or "education" because we supposed that ERIC is a pedagogical database that cites only pedagogy related articles.

We decided to use some inclusion and exclusion criteria in order to make our review more focused on the school filed.

Exclusion criteria:

4 ERIC (education resources information center) is an online library of education research and information, sponsored by the Institute of Education Sciences (IES) of the U.S. Department of Education.

If it was an interview to Senge, or if it does not talk about Management and FD in school system.

Inclusion criteria:

If the article was about: school, University, college and if it was about FD.

We have read articles and, after the inclusion/exclusion criteria, classified them in two categories: 1) About 4 discipline: if the article was about the application of one or more of the 4 disciplines; 2) About 7 Disabilities; about 9 Archetypes and about 5 Rules: if the article was about one or more, of these features of the FD.

9. Results

We have analyzed 73 articles and books.
For the 1st key terms "Peter Senge" we found 53 results (tab.1).
For the 2nd key terms "Fifth Discipline" we found 20 results (tab.2).

We found that most of the articles and books surveyed on ERIC (n.40) didn't talk about school or higher education (or was an interview to the author); 31 focused only on the 4 disciplines (personal mastery, mental models, shared vision and team learning) assuming that the fulfillment of the 4 disciplines transforms an organization into a "learning organization".

Tab.1: Results for key term: "Peter Senge"

Key Terms: "Peter Senge": 53 results (25 about 4 disciplines; 1 about Disabilities and Archetypes)					
Authors + Year	Title	Journal; Book; Etc.	Abstract	About 4 disciplines	About disabilites, archetypes rules.
Senge P.; Lannon K.; 1991	Recapturing the Spirit of Learning through a Systems Approach	*School Administrator*, v.48 n.9 p.8-13 Nov 1991	Orange Grove Middle School in Tucson, Arizona, is part of a movement to transform schools into learning organizations. Systems thinking, combined with the related disciplines of building a shared vision, working with mental models, team learning, and personal mastery, is the essential component. The key to effective leadership is harnessing the…	X	
Isaacson N.; Bamburg J. 1992	Can Schools Become Learning Organizations?	Educational Leadership	In "The Fifth Discipline: The Art and Practice of the Learning Organization" (1990), Peter Senge shows how educators can achieve meaningful change and transform schools into self-renewing learning organizations. Organizations must develop five disciplines: personal mastery, mental models, shared vision, team learning, and systems…	X	

National Educational Service, Bloomington, IN. 1992	Shaping America's Future III: Proceedings of the National Forum on Transforming Our System of Educating Youth with W. Edwards Deming (June 8, 1992)	Proceedings - American Federation of Teachers, Washington, DC.; National Education Association, Washington, DC.; City Univ. of New York, NY.	On June 8, 1992, the presidents of the nation's two largest teachers unions joined the directors and presidents of virtually every educational organization, as well as political leaders and executives from Ford, General Motors, and Chrysler in an effort to redesign U.S. schools using the quality principles of W. Edwards Deming. Panelists spent the morning focusing on creating a new paradigm for education. Deming and Peter Senge spoke on "The Foundations for Transformation." This presentation was followed by questions and two school simulations in which all panelists became students.	X	
Wonser R.L.; Damme S.R. 1993	A Review of Peter Senge's Examination of Learning Organizations: Implications for Vocational Special Needs Programs	Journal for Vocational Special Needs Education – v.15 n.3 p.53-56 Spr 1993	Total quality management fits naturally with service to vocational-technical special needs students. Conception of the institution as a learning organization requires core competencies: shared vision, personal mastery, mental models, team learning, and systems thinking. (JOW)	X	

Barron D.D. 1994	Learning Communities and School Library Information Professionals	School Library Media Activities Monthly	Discusses the concept of the learning organization contained in Peter Senge's text, "The Fifth Discipline: The Art and Practice of the Learning Organization," and how it applies to schools. The school library information professional's potential role as a practitioner of systems thinking, which Senge defines as the fifth discipline, is…	X	
Fenwick T.; Parsons J. 1995	Transformational Action as the Goal of Teaching Public Issues: Creating a Classroom Environment Where Social Action Can Flourish	Conference on Citizenship Education: Canadian and International Dimensions (Fredericton, New Brunswick, Canada, April 5-7,1995).	This paper renews the case for social action as a necessary and exciting part of the social studies curriculum and suggests that the social study of public issues should have a central place within this vision. The document focuses more on practical ideas that social studies teachers who have chosen to work in the area of social action, or those…	X	
Dever J.T. 1997	Reconciling Educational Leadership and the Learning Organization.	Community College Review	Describes Peter Senge's learning organization model for creating effective organizational structures and its applicability to leadership in higher education institutions. By examining Senge's views on the ideal leader, the author concludes that the model disregards two important aspects of educational leadership: political adeptness and a strong…	X	

Gervais D.; Baker M. 1997	Soon To Become Reality: High Standards for All Students	Paper presented at the Annual Meeting of the American Educational Research Association (Chicago, IL, March 24-28,	In May 1997, the Maine Legislature passed a comprehensive document that delineated expected educational outcomes for students, known as the Learning Results. This paper describes the components and philosophy of Maine's standards-development process. The Learning Results are based on Peter Senge's system model, which asserts that adoption of a new method necessitates a change in the infrastructure. Because each student is recognized as an individual system, a collaborative team structure is used to meet each student's needs and develop a personalized learning plan. The paper explains how individual student profiles are mapped and personal learning plans developed. It also outlines objectives for the student-centered system of 2002 and the expectations for the student, educator, community, and the state.	x	
Wallace R.C. Jr.; Engel D.E.; Mooney J.E. 1997	The Learning School: A Guide to Vision-Based Leadership	Book - Corwin Press, Inc., 2455 Teller Road, Thousand Oaks, CA 91320-2218 ISBN-0-8039-6508-0	Leading with vision is critical to the success of schools. The purpose of this book is to define and describe vision-based educational leadership. The book proposes the model of a learning school in which everyone is a learner. Chapter 1 discusses the ways in which vision drives educational leadership, the organization of the schools, and learning…	x	

Robles H.J. 1998	Community Colleges as Learning Organizations	US Department of Education (ED 426 743; JC 990 074) Reports Descriptive (141)	This paper reviews two of the major issues affecting community colleges, funding and governance, examining them from a systems perspective specifically in relation to selected theories of organizational learning disabilities and systems archetypes. The first section of the paper provides background on funding and governance issues as they relate…	x	X
Hadley T.D. 1999	Student Affairs Researcher: Information Broker	New Directions for Student Services	Examines the skills and research tools necessary for the student affairs researcher to become an agent for organizational learning within the student affairs division and the institution. Draws upon Peter Senge's theory of "The Learning Organization" and discusses the resulting implications for student affairs researchers	X	
Reed H.A.; Kinzie M.B.; Ross M.V. 2001	Organizational Learning and the Concept of Learning Schools	Planning and Changing	Reviews organizational learning and learning organizations literature, especially the work of Peter Senge. Discusses requirements to transform schools into learning organizations (learning schools)…	X	

Hohn M.D. 2001	Organizational Development and Its Implications for Adult Basic Education Programs	Office of Educational Research and Improvement	In this chapter, Marcia Drew Hohn provides an overview of organizational development theory for adult educators interested in applying the lessons of such theory to the strengthening of ABE programs and systems. She begins the chapter with a brief history of the development of organizational theory, noting the progression from a mechanistic…	X	
Thomas R.S. 2002	Getting to the Root of the Gap	School Administrator	Describes how school-improvement teams can employ organizational and systems-analysis techniques to determine the root causes of low achievement. Cites Peter Senge's "Schools That Learn"	X	
O'-Callaghan W.G. Jr. 2004	Think Like Peter Senge: Applying His Laws of Systems Thinking to Identify Patterns That Shape Behavior	School Administrator	Realizing how difficult it is to pass tax issues today, many school boards with all good intentions place them on the ballot before the money is really needed. They do this so if the tax issues are not approved, they have another chance to get them passed before serious educational cuts have to be made. In states where school districts must rely…	X	

Oh E.; Goh T.; Tam K.Y.; Heng M.A. 2005	The Captains of Lives: Kaki Bukit Centre Prison School in Singapore	Journal of Correctional Education	Kaki Bukit Centre Prison School (KBC) in Singapore is a bold and innovative initiative which brings together in a centralized location in one institution, different categories of inmates from both penal and drug institutions who attend academic and vocational classes. The creation of a learning environment within a prison setting is derived from…	X	
Fluellen J. E. Jr. 2005	Creating a Culture of Thinking in DCPS: A Generic Proposal for the District of Columbia Public Schools Board of Education	Online Submission[5]	Preparing students for college and work in the Knowledge Age. That is the mission of this generic proposal. A counterpoint to Industrial Age mindsets marking most initiatives in the District of Columbia Public schools and described in the "fifth discipline" works of Peter Senge, Creating a Culture of Thinking in DCPS proposes a project…	X	
Reynolds T.; Murrill L.D.; Whitt G. L. 2006	Learning from Organizations: Mobilizing and Sustaining Teacher Change	The Educational Forum	Peter Senge's (1990) theory of organizational change includes teams that perceive the whole of the organization; grow professionally; navigate short- and long-term organizational experiences through exposed mental models; share a vision; and hear each voice in an ongoing communal learning process. The Margaret Sue Copenhaver Institute for Teaching…	X	

5 https://files.eric.ed.gov/fulltext/ED490752.pdf

Fleischer B.J. 2006	The Ministering Community as Context for Religious Education: A Case Study of St. Gabriel's Catholic Parish	Religious Education	Based on interviews and surveys of two groups of lay pastoral leaders at one predominantly African-American Catholic Parish, this qualitative study explores the "learning organization" dynamics of the congregation based Peter Senge's (1990) description of the five disciplines of learning organizations (personal mastery, shared vision,…	X	
Wheeler K.A. 2007	Learning for Deep Change	Journal of Education for Sustainable Development	Education for Sustainable Development (ESD) practitioners could benefit from recent innovations in the field of organizational development, particularly those of Peter Senge, that outline how institutions can become "learning organizations," which are responsive to change to meet the needs of their members. These techniques could be used to help…	X	
Doblar D.D. 2009	Ten Schools and School Districts to Get Excited About	Educational Horizons	Calls for schools to "improve" are everywhere, but recently calls for schools to "transform" have proliferated, based on the idea that schools are not simply underperforming but outdated if not obsolete. Most prominently, scholars and authors such as Phillip Schlechty, Peter Senge, and Francis Duffy have targeted school and…	X	

Jarman G.; Kimball T.; Lorenz K. 2009	The Relationship of the School Board to the Academic Program in Public School Districts	ProQuest LLC	Due to the increasing accountability associated with the No Child Left Behind legislation and the new board governance policy of the fifth cycle of the Missouri School Improvement Program, the issue of school board accountability has emerged as an important topic. At this point, the issue of school reform has reached the school board level. In…	X	
Davis J.L.; Davis H. 2009	The Learning Organization Implemented in Education through Advisory Committees	Education	Advisory committees have an established history as effective leadership components to assist in planning and evaluating vocational programs and in establishing communication links between institutions and communities. Authorities in the concepts of learning teams, such as Massachusetts Institute of Technology's Peter Senge, Harvard Business…	X	
Gregory R.A. 2009	Leading Change through Cultural Competence	AASA Journal of Scholarship & Practice	Peter Senge's message during the 2005 American Association of School Administrators (AASA) conference reminded people that they live not only in a school system, but also within a highly diverse, global community. Their individual and organizational policies, practices, and behaviors, can and do impact the learning experience for those…	X	

Berndt R. 2012	Early Childhood Education: A Model for 21st Century Secondary Education	Educational Facility Planner	As the designer of primary and secondary educational facilities, the author has become familiar with educational thinkers such as Sir Kenneth Robinson, Peter Senge, Ewan McIntosh, Daniel Pink and Howard Gardner-each promoting an approach based on system-thinking, self-directed exploration and multidimensional, interactive learning…	X	
Lawler A., Sillitoe J. 2013	Facilitating "Organisational Learning" in a "Learning Institution"	Journal of Higher Education Policy and Management	The term "organisational learning" was popularised by Peter Senge in "The Fifth Discipline", his seminal book from 1990. Since then, the term has become widely accepted among those interested in organisational learning and change management. However, partly due to the somewhat ambiguous situation which arises in a university…	X	

Tab.2: Results for key term: "Fifth Discipline"

Key Terms: "Fifth Discipline": 20 results (**6 about 4 disciplines, 1 about Rules**)					
Authors + Year	Title	Journal; Book; Etc.	Abstract	About 4 disciplines	About disabilites, archetypes rules.
Isaacson N.; Bamburg J. 1992	Can Schools Become Learning Organizations?	Educational Leadership	In "The Fifth Discipline: The Art and Practice of the Learning Organization" (1990), Peter Senge shows how educators can achieve meaningful change and transform schools into self-renewing learning organizations. Organizations must develop five disciplines: personal mastery, mental models, shared vision, team learning, and systems…	X	
Barron D.D. 1994	Learning Communities and School Library Information Professionals.	School Library Media Activities Monthly	Discusses the concept of the learning organization contained in Peter Senge's text, "The Fifth Discipline: The Art and Practice of the Learning Organization," and how it applies to schools. The school library information professional's potential role as a practitioner of systems thinking, which Senge defines as the fifth discipline, is…	X	
Fluellen J. E. Jr. 2005	Creating a Culture of Thinking in DCPS: A Generic Proposal for the District of Columbia Public Schools Board of Education	Online Submission[6]	Preparing students for college and work in the Knowledge Age. That is the mission of this generic proposal. A counterpoint to Industrial Age mindsets marking most initiatives in the District of Columbia Public schools and described in the "fifth discipline" works of Peter Senge, Creating a Culture of Thinking in DCPS proposes a project…	X	

Yeung See-Wai A.; Lee Y.; Yue K.W.R. 2006	Multicultural Leadership, Sustainable Total School Environment	Educational Research for Policy and Practice	Banks (2002) stated that to implement multicultural education successfully, we must think of the school as a social system. Therefore, if educational equity and excellence are to be provided to all students, a systemic Total School Environment [Banks (2001) "Cultural diversity and education: Foundations curriculum and teaching, 4th ed." Allyn and…	X	
Wells C.; Keane W.G. 2008	Building Capacity for Professional Learning Communities through a Systems Approach: A Toolbox for Superintendents	AASA Journal of Scholarship & Practice	Professional Learning Communities (PLCs) are places where teachers work with intentionality to improve their own craft for the benefit of students. Teachers and administrators study collaboratively and analyze student learning results to improve academic achievement for all students. Administrators working to implement PLCs seek to expand…	X	X
Park J.H., 2008	Validation of Senge's Learning Organization Model with Teachers of Vocational High Schools at the Seoul Megalopolis	Asia Pacific Education Review	This study measured and applied Senge's (1990) fifth discipline model of learning organizations in a culturally distinct population, namely teachers in 17 vocational high schools located in the Seoul megalopolis. The participants were 976 full-time vocational and academic teachers in public trade/industry-technical and business high schools in the…	X	

6 https://files.eric.ed.gov/fulltext/ED490752.pdf

Lawler A.; Sillitoe J. 2013	Facilitating "Organisational Learning" in a "Learning Institution"	Journal of Higher Education Policy and Management	The term "organisational learning" was popularised by Peter Senge in "The Fifth Discipline", his seminal book from 1990. Since then, the term has become widely accepted among those interested in organisational learning and change management. However, partly due to the somewhat ambiguous situation which arises in a university…	X	

10. Discussion

Only two papers took into account FD in its features.

Those 2 papers contain important definitions of the Senge's FD that all the other papers didn't had.

The first (Robles, 1998) includes notions about "7 disabilities to learn" and "9 archetypes".

The second one (Wells, Keane, 2008) includes notions about "Rules" of the FD.

None of them were about Italian school system.

We think that application of FD should be studied in all of it's features, including disabilities, rules and archetypes. Articles we have reviewed focused only on the "organizational" application of the first 4 disciplines (and 2 about other features). So it could be interesting to study and research the application of FD in all of it's features in a school or university.

11. Conclusion

The FD provide "important insight into how educators can achieve meaningful change and transform schools into learning organization that renew themselves" (Isaacon, Bamburg, 1992, p. 42).

There are not organizations, companies, universities, etc. but there are "human beings" that work into them. The FD helps the human being to better understand what hinders him to learn something new and to transact effectively in a changing environment like himself (Pensieri et al., 2016).

Managers guide a group of "human beings" according to the rules

and archetypes of the FD considering the 7 learning disabilities of the people living in those groups because the competitive success of an organization is influenced by how it configures and manages its resources, especially human resource.

It is a discipline that, not only because is useful for business company, can give new thoughts in the actual way of thinking the Italian School System.

We have also found that none of the articles analyzed were about Italian school system.

So, it could be a new important field to study, research and eventually apply in the Italian context.

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