

"Islands of Innovation" or "Comprehensive Innovation." Assimilating Educational Technology in Teaching, Learning, and Management: A Case Study of School Networks in Israel

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Abstract

Introducing educational technology platforms for teaching, learning, and school management is one kind of technological innovation. There are two patterns of adopting innovation: "comprehensive innovation" – encompassing most of the organization – and "islands of innovation" – limited to certain groups within it. The aim of this research is to examine the features of organizational culture in a school network regarding the implementation of educational technology and whether this pattern of change reflects "islands of innovation" or "comprehensive innovation."

Seven schools were studied through qualitative research: semi-structured in-depth interviews with key figures and content analysis of the network's vision.

The findings reveal a gap between the values of the management and those of the teachers and forces encouraging the adoption of new teaching methods reinforcing the belief that educational technologies can help improve existing teaching and develop alternative pedagogies. However, these forces only manage to create islands of innovation that do not expand into comprehensive innovation. The gap in values creates ineffectiveness that prevents expansion. The "islands" turn out to be disrupters of innovation that do not allow the first degree change to turn into a second degree change or for this latter to turn into comprehensive innovation throughout the organization.

Keywords: implementation of innovation, change in school, educational technologies, organizational culture, islands of innovation, comprehensive innovation

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Introduction

In recent years, many education systems have introduced educational technology into the schools for teaching, learning, and management purposes (Cunningham, 2009; De Freitas & Oliver, 2005; Fullan & Smith, 1999; Halverson & Smith, 2010; Selwyn, 2010). Despite the great potential of these technologies to

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improve teaching, learning, and management processes, their implementation encounters resistance and many obstacles both in Israel and elsewhere in the world (Salmon, 2005). This has led to partial implementation that has not met everyone's high initial expectations (Fullan & Smith, 1999; Mioduser, Nachmias, Tubin, & Forkosh, 2006). The partial implementation is usually the result of the gap between policy makers and those putting the policy into practice - principals and teachers - who have a different view of the implementation of innovation (Fullan, 2006). The obstacles are usually fear of the unknown and of the possible consequences of the change for position holders, particularly the teachers (Levin & Fullan, 2008)

Educational organizations tend to implement innovation through pilot programs or by creating "islands of innovation," which are usually characterized as local innovation that does not encompass the whole organization. The implications of this innovation are local and do not modify the organizations values or basic assumptions.

The hope is that these "islands of innovation" will radiate out to their surroundings and lead to comprehensive innovation (Levin & Fullan, 2008; Mioduser, Nachmias, Tubin, & Forkosh, 2006).

This study examines and characterizes the essence of the gap between the innate potential of implementing innovative educational technologies and the reality in which implementation is partial and does not meet the high expectations originally set. In this context, this research will examine the features of the process in an attempt to distinguish between the effectiveness of innovation implementation through islands of innovation as opposed to the comprehensive innovation approach.

This is a case study research on a chain of seven post elementary schools in Israel. Based on the case study, the research will provide new information in the context of the effectiveness of the "islands of innovation" approach as a strategy for leading and implementing educational technology innovation and will point out its risk as an impeding factor for the spread of the innovation throughout the school system.

Theoretical Background

From research on technology innovation implementation within the educational system (both elementary and post elementary schools), it emerges that innovation is usually the result of a top-down policy imposed without the cooperation of the teachers (Levin & Fullan, 2008; Tyack & Cuban, 1995) and without taking into account that the change "lands" in an environment that already has its own well-defined practices and norms in addition to built-in resistance based on previous failures to implement innovation (Levin & Fullan, 2008; Ogobonna & Harris, 2003; Vaillant, 2005; Zimmerman, 2006). Many factors are involved in the successful implementation of learning management technology in schools (Hargreaves & Goodson, 2006). These might include bodies outside the school, such as the local authority, technology providers, instructors, policy makers, and inspectors, as well as factors within the organization whose involvement is linked to essential organizational change that also includes cultural change (Sarason, 1995; White, 2007) requiring change at all levels of the organization, in its basic assumptions, its values and not just in its external characteristics (Fullan, 2006; Goldhaber & Eide, 2002; Schein, 1990). There are three levels of organizational culture: (a) external - characteristics that include everything that is seen, heard, and felt, (b) values - the collection of accepted perceptions within the organization regarding desired behaviors, and (c) basic assumptions - the basic values that dictate the dominant worldview of the organization. According to Raz (2002, 2006), an organizational culture consists of three distinct but overlapping circles: management culture, workplace culture, and surrounding culture. These circles interact in a reciprocally dynamic relationship of dependence. The accepted claim in research is that the difficulties of implementation and application of educational innova-

tion derive from inappropriate application of the change at all levels of the organizational culture (Kozma, 2003; Morrison, 1998; Salmon, 2005; Tyack & Cuban, 1995). The difficulties in successful implementation of educational technology for teaching, learning, and school management have led many researchers to examine the factors influencing this process (Fullan, 2001, 2006; Kozma, 2003; Mioduser et al., 2006). The phenomenon has still not been fully explained and so further research studies are important for the understanding of the difficulties in implementation and for creating leverage and pedagogical and organizational innovation within the education system in the schools.

Since this kind of implementation involves innovation, my research is based on several implementation studies on the model of how innovation spreads within organizations (Rogers, 2003). According to this model, effective spreading of innovation is a process through which new ideas are circulated among members of an organizational system, and their implementation leads to significant change and improvement in that system. According to the Rogers (2003) model, in most systems there is a small nucleus of adopters who will implement the innovation effectively, and the big challenge is to expand on that beyond the nucleus to the system as a whole (Dodgson & Bessant, 1996; White, 2007). In order for the change to take place, a critical mass of the organization's members has to adopt and internalize it as an essential part of the organizational culture. This stage is known as the 'tipping point' – the point of no-return (Cook, Holley, & Andrew, 2007; Nichols, 2008) – a stage in which the change is implemented at all levels of the organization, from characteristics through to values and basic assumptions (Morrison, 1998). Mioduser, Nachmias, Tubin, and Forkosh (2006) claim that there are two patterns of adoption in schools: "islands of innovation" and "comprehensive innovation". In the islands of innovation pattern, the innovation only involves a small number of those who teach and learn, the innovation is focused on a particular discipline or a particular task, and does not significantly affect the other layers of the organizational culture. This innovation leads to changes that are defined as first degree changes in which there is an operational change of a certain parameter in the organizational system, with no change in its definitions, a change that usually affects only the level of characteristics and behaviors (Argyris & Schon, 1978; Raz, 2002, 2006). In contrast, in the comprehensive innovation pattern, the innovation will encompass at least half of those learning and teaching in the organization and will reach all layers of the organization and affect the entire organizational culture (Mioduser et al., 2006). This innovation leads to a second degree change in which there is a change in the features and definitions of the system so that it becomes value-laden and significant, directly affecting the organization's values and basic assumptions (Argyris & Schon, 1978; Raz, 2002, 2006).

Schools facing the difficulties of implementing innovative education technology have adopted different approaches in the attempt to make innovation an integral part of the organizational culture (Morrison, 1998; White, 2007). For example, one such approach involves running a pilot program or trying to implement the innovation in a sub-system or in part of the organization (Carter, 2008; Fullan, 2000). These approaches create islands of innovation within the organization, and the hope is that they will, in turn, create a ripple effect leading to comprehensive innovation throughout the organization that becomes an integral part of its culture (Carter, 2008; Day & Lindsey, 2009; Del Val & Fuentes, 2003). Successful innovation implementation requires a fundamental change in the values and basic assumptions about the teaching-learning paradigm, and when an organization continues to conduct itself along traditional lines, the innovative implementation process will not succeed (Koter & Cohen, 2002; Pfeifer, Schmitt & Voigt, 2005).

This study aims to expose the features of the process of implementing educational technology for teaching, learning, and school management and the influence of the process on the features of cultural organization while attempting to distinguish between the effectiveness of islands of innovation as opposed to the comprehensive innovation approach.

Method

In order to describe the abovementioned implementation process and to relate to the “voices” and experiences of those position holders involved in leading the change implementation, this research was conducted using a qualitative research paradigm case study (Stake, 1988, 2000). It attempted to interpret the actions and events that principals, position holders, and teachers underwent during the process of implementing educational technology for teaching, learning, and school management (Lincoln & Guba, 2000; Maykut & Morehouse, 1994). The study examined the organization as an open system influenced by the surrounding organizational culture seeking to identify the features of change in the organization’s sub-systems (Raz, 2002, 2006). The decision to conduct a qualitative study using semi-structured in-depth interviews derives from the accepted perceptions in the study of innovation implementation which stress the centrality of semi-structured in-depth interviews with the leaders and partners to the change who help create a true picture of the nature of the changes and their meaning (Butt & Reynolds, 1989; Butt, Reynolds, McCue & Jamagishi, 1994; Raymond & Surrenant, 1988). The research question was: *What are the features of the organizational culture regarding the implementation of educational technology for teaching learning and school management according to the three circles of organizational culture* (Raz, 2002, 2006)? Hence, what are the implications of the implementation of educational technology innovation for the features of organizational culture when the pattern of change is islands of innovation and when it is comprehensive innovation?

Population

The education system studied, one of the large public education networks in Israel, consists of seven schools spread around the country, each of which functions as an autonomous unit in terms of budget and management. These seven schools belong to a network of post-elementary schools that prepare students for the matriculation exams in all subjects needed for university admission.

Each school has both morning and evening studies preparing for the matriculation exams. Each school also has preparatory studies for the psychometric tests for university admission. Each school is headed by a principal, and, together, the seven schools constitute a network overseen by a CEO and her deputy. The teachers who teach in the morning are the organic staff of the school, and they are joined by other teachers and psychometric test instructors who teach in the evenings. Besides the principal, each school has other position holders such as subject coordinators and grade level coordinators. Each school has a computer coordinator who is responsible for implementing teaching and learning technologies.

Sample

Twenty four semi-structured in-depth interviews were conducted with key position holders in one of the large public education networks in Israel: the director, her deputy, seven principals, five computer-related position holders (each one from a different school) and ten teachers, six of whom teach in the mornings and four in the evenings. All the schools in the network were represented in the study.

Research Tools

The research tools include the semi-structured in-depth interviews detailed above. This interview contained a series of pre-prepared questions prepared with the option of adding and changing the questions during the interview (Fontana & Frey, 2000). The interviews were documented by a continuous, full, and exact transcription of what was said; the interviewees had plenty of room to react and could respond to new points that arose during the interview (Fontana & Frey, 2000; Riessman, 1993). The interview contained questions about the process of change the organization

had undergone, perceptions of the implementation of teaching, learning, and management technologies, how these perceptions were expressed in management and teaching and learning, and to what extent they reflect personal perceptions. In addition, a content analysis of the network's vision was conducted from the interviews in order to identify the basic assumptions and the values underlying the organizational culture.

Procedure

The qualitative data collected from the interviews underwent content analysis to facilitate the drawing of conclusions about the behavior of the position holders and to identify meanings and hidden attitudes attributed to the change implementation process the interviewees had experienced (Lincoln & Guba, 2000). The content analysis of the findings uses a conceptual perspective of the features of the organizational culture which was constantly tested by the analyzed data (Lincoln & Guba, 2000; Miles & Huberman, 1994). The conceptual perspective presented by Raz (2006) for the features of the organizational culture provided the conceptual framework for the data analysis. The "voices" of the interviewees were analyzed on three levels: (1) The cultural characteristics of the management, (2) The cultural characteristics of the workplace, (3) The cultural characteristics of the environment. For each of these levels, the meaning of the statements and "voices" of those interviewed were examined as components of the levels of the organizational culture (Raz, 2006) as a description of the characteristics and behaviors, norms, and values or as basic assumptions.

Findings:

The Features of Organizational Culture in Relation to the Implementation of Educational Technology for Teaching Learning and School Management

The features of the organizational culture of the network of schools as they emerge from the analysis of the interviews will be presented below according to its three circles (Raz, 2002, 2006): (a) the management culture, (b) the workplace culture, and (c) the surrounding culture. The features of organizational culture in each of these three circles will be described for the three layers of characteristics and behaviors, norms and values, and basic assumptions (Schein, 1990).

(A) The Management Culture

The management culture for the characteristics and behaviors, norms and values, and basic assumptions are described in Figure 1.

Characteristics and behaviors

The management culture is shaped to a great extent by the network's director and her deputy, who claim that they are pushing for change in the education system. The director says:

"I believe in change that is an integral part of how the whole system is managed. The change must be imposed, and this is a process that takes time. Today a branch manager knows that if he sends a fax no one will read it, and if he does not update the status of a student's studies at the branch no one will know what happened. That is the ABC of managing an organization and preserving knowledge and documentation."

The interviews showed that the management even takes sanctions against those who don't succeed in internalizing the new work methods, and the director goes on to say: "There were people

who were very significant but who could not make the change, and they are not part of the system.”

The technological changes in the organization are perceived as a means rather than an end or a value in and of themselves. The deputy director says: “... in the first year it was very difficult, a disaster! But now, the use of emails, for example, is standard.”

The deputy also describes this change thus: “The change is still going on; now I need the position holders to know EXCEL, so I created an EXCEL course for the network.”

The director adds that a large part of the changes depends on her personally, and that it is she who solves problems that stem, usually, from the match of the technology to the tasks required by the network. There is no doubt that the main belief reflected as a result of the changes instigated by the director is that the computer contributes to the efficiency and convenience of the work. From her point of view, the simplest way to perform the job of managing is through the use of the various tools the computer provides.

One value reflected in the director’s practices is organizational transparency and the assessment of management and documentation in order improve individual and organizational performance. She says: “Knowledge is managed so that information cannot be hidden, everything is documented.”

Regarding the use of computers and computerized systems for pedagogical purposes, it is evident from the interviews that the management has played a central role in the very limited integration of the internet into the curriculum. The director openly declared that the implementation of the new platforms had only “marginal pedagogical value” and that their purpose was mainly for marketing, to resemble what is going on in similar organizations. The director describes it thus: “The internet does not succeed in strengthening our teaching processes in the morning studies. I do not see that it is worth our while to make an effort in this direction.”

The deputy director supports this view:

“It seemed important to implement the technology in the evening courses, where the network has competition from other schools dealing with matriculation completion, but there was no need to implement it in the morning studies in the high school, since these kinds of technologies have not yet been implemented in most high schools in the formal education system in Israel. Why make the effort? What’s in it for us?”

The interviews express a strategic decision by the management not to expand the implementation of the technological change beyond the evening studies. This stems from the values and the commercial worldview of those heading the organization’s management. On this matter the director says: “If we do benchmarking, we discover that there is no choice but to operate a system like this ... people think it looks advanced and modern and it helps us keep abreast of our competitors.”

In contrast, the director has this to say about her pedagogical concept:

“Nothing will replace the connection between the teacher and the student in the classroom. The mood, the atmosphere, the reality of the teacher are irreplaceable... the internet neutralizes the interpersonal interaction and the socialization process that underlies the learning process.”

The deputy director adds:

“The internet is an excellent tool, but we don’t know how to use it. Today we cannot conduct a lesson where the students at home see the teacher and the teacher can see and

hear all the students. It is technically impossible and most of the new tools do not support Hebrew, which means that it costs a lot of money to develop every little thing.”

The analysis of the interviews reveals that marketing is more dominant in the organization than pedagogy, as described clearly by the director:

“Everybody just copies everybody else. They take a new technology and insert old content into it. The purpose of the website I am building is to make the organization dialogic, this has marketing implications and economic significance. The pedagogical effect is marginal.”

Norms and values

The values reflected in the interviews are the stated belief that learning technologies not only do not benefit the learning process and the educational process, but that they are sometimes even harmful. The network’s management believes that the proper way to learn is through face-to-face interaction between teacher and student. The management says that the use of computers has advantages, but these are limited to the administrative aspects of work (emails, managing students) and are not for pedagogy. In other words, not only is computer-aided instruction not perceived as an important value, but the management even sees it as having negative connotations. The interviews also reveal the perception that it is impossible to insert into the technology tools new pedagogies that differ from the currently accepted ones. These norms and values lead to a situation in which technological changes are not translated into changes in ways of thinking or teaching methods. Surprisingly, the interviews show that the main barrier to change is not the teachers, but rather the beliefs and policies dictated by the management, which does not initiate, lead, or encourage the implementation of technology in the organization’s pedagogical domain.

From the interviews with the director and her deputy we see the great importance they attribute to maintaining contact with their environment and to conducting a dialogue with partners and potential customers. The management sees the organization as open, affected by the world around it, hence the need to adopt technology platforms like other similar organizations, even though the management does not believe in any pedagogical need for such tools. For them, the computer-based tools, and particularly the internet, are very important to create dialogue, the goals of which are marketing and economics. In other words, the management sees the organization primarily as a commercial enterprise, and new pedagogical tools are adopted because there is no choice, but pedagogical innovation does not seem to be an important value for them.

Basic assumptions

An analysis of how the management sees itself shows that it has values of ongoing change, openness, acceptance, and innovation. It sees itself, to a great extent, as being able to integrate commercial and educational values in a manner that serves both the organization as a whole and its customers well. However, a deeper look reveals that there is a certain tension between the educational and commercial aspects of the organization. On the commercial side, the view is that innovation and progress are good for the organization and promote it in terms of the efficiency it demonstrates to its customers. Here we can recognize a “strong” organizational culture expressed in a match between what is declared and what actually happens (Raz, 2006). On the other hand, as far as pedagogical innovation is concerned, the interviews reveal a different set of values and a different perspective. In this context, the management is very conservative about any change in educational goals or teaching methods or in the introduction of educational technology in ongoing work. This split perception, expressed in the gap between the written vision and the visible vision creates tension between the desire to appear innovative and the rigid conservatism in terms of the pedagogical and educational values (Carter, 2008).

The features of the management culture at the three levels of the organizational culture as described above are summed up in Figure 1.

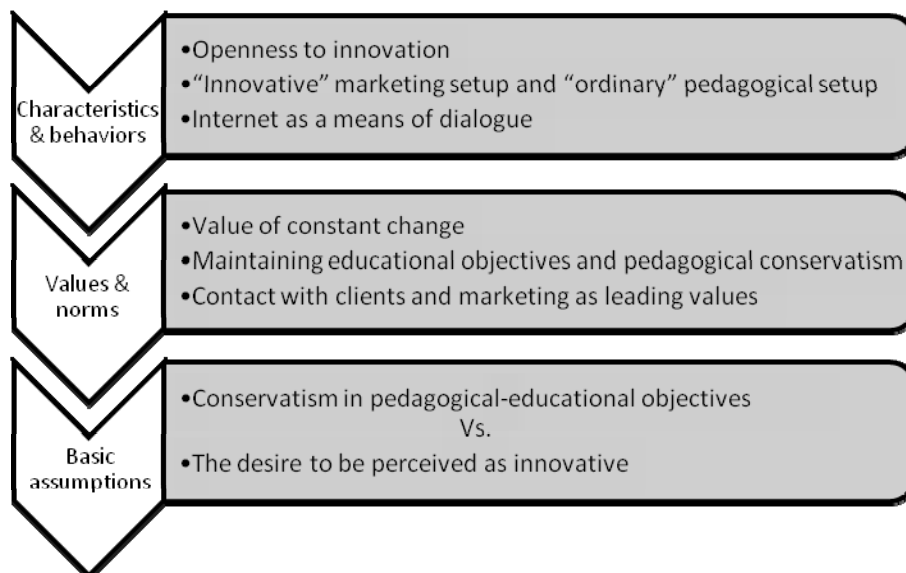


Figure 1: Features of the of the school network's management culture

(B) The Workplace Culture

The workplace culture at the three levels of organizational culture are described below in Figure 2.

The workplace culture is shaped by the attitudes of the management and is clearly reflected in the interviews with the principals, computer coordinators, and teachers, which express the views of the management regarding the marginal pedagogical value of technology.

Characteristics and behaviors

From the interviews we learn about the attempt to implement educational technology in teaching and learning. Most of the implementation occurred through a bottom-up approach – individual and school initiatives to integrate educational technologies into the teaching-learning processes.

Despite these attempts, the introduction of technology platforms into the lessons has not proven itself. One of the teachers says:

“Our students are not top quality, and the class is very heterogeneous. There are excellent students, and there are others who are not. Nevertheless I try to do the best for everyone, even after the lesson is over, I sit with students and explain issues that are not clear.”

One position holder describes the attempts to use innovative technology thus: “I initiated the use of technology in math teaching, but it remained only in 10th grade. It was not implemented as an essential part of our teaching method. It was very localized and not systemic.”

A principal tries to describe the efforts he and the staff at school make in order to “innovate”:

“We are always trying to change and innovate. I can say that we have a winning team here and our materials are updated according to the latest matriculation exam sessions... but none of that is real, it is not a real change.”

We see that at the level of behaviors there are some attempts to use educational technology in teaching and learning, but they are localized and have no impact on the general teaching and learning patterns within the network. Regarding the perception of computers, the principals say that their use in teaching does not make any real difference.

For example, a principal and an evening teacher respectively say:

“The construction of the online system resulted from necessity, the needs of the teachers in the field who wanted to have control over their students and enable them to come to class better prepared... many students really go into the system which means that it works successfully... and there was a lot of feedback from the field – teachers and students – who heard about what was happening with the competition. But for us it did not create a significant change in our teaching methods.” (Principal)

“It is an excellent tool that solves a lot of problems in the field for me, and some of the students are really enthusiastic and say that it really helps them. It is just a pity that not everyone opens up the presentations and solves the problems, and it is actually the weaker students who practice the least online.” (Evening teacher)

Regarding the technological changes in organization-management taking place in the network, it was evident that the teachers were not fully involved in these changes, and the amount of information they had about what was going on in other departments (mainly administrative and management) was limited. The teaching and learning management technologies have become part of the work setup in and organizational procedure, but they have not penetrated the teaching discourse and have not become a significant part of the teachers work setup, nor have they managed to blur the boundaries between the school and the various position holders within the organization.

From the interviews it is not clear whether this disconnect between the different parts of the organization stems from the policy of the network’s management or from a lack of desire on the part of position holders to be partners. As far as some of the teachers are concerned, it seems that there is a lack of desire or lack of ability to change how they work. One of the teachers says the following: “I have a fear of computers, even though I want to cope with it. I know that computers are important in the world we live in, even though I don’t really need them in my daily work.”

Another teacher says:

“I’m actually connected to computers. I have an I-Phone, at home I download films... Right now I’m trying to be accepted for my doctorate and I am sending emails all over the place... the problem with integrating computers into teaching is this: the teachers will have to invest many more hours from home and obviously they won’t get any additional pay for this. I try to finish work at school and not to take work home, and it is clear to me that I will not sit at home and go into the students’ forum or prepare additional materials...”

The interviews with the teachers revealed great differences as to how they perceive computer technologies, from a belief in the computer as a useful teaching and learning tool, through a separation between the use of the computer in one’s personal and professional life, and up to integrating the two.

In addition, some teachers expressed criticism of the management, which to a certain extent reflects the difference between the perceptions of the teachers and those of the management.

Thus for example, one of the teachers told us:

“The network’s vision talks about integrating technology into teaching and learning. In practice, I’m not sure how important this is to the management. As a teacher, I firmly be-

lieve in integrating computers into teaching. I think that it can help students succeed, but alone it won't work."

Even if the teachers believe in the importance of adopting teaching practices that use educational technology, a large number of them won't do it because they don't know how, or because they are not ready to invest the necessary effort.

Norms and values

The interviews revealed that the teachers' predominant norms and values are expressed in the belief in personal freedom as a basis for professional work, love and acceptance of the students with all their differences and idiosyncrasies. These values are common to all the teachers interviewed in this study, but these "voices" appeared at different levels and at varying intensities, while the picture that emerges is not perfect, and the interests of personal convenience and considerations of cost benefit constitute the main basis for work-related values.

The interviews also revealed the tension between the norms and values of the management and those of the teachers. One of the teachers describes the following:

"There's a difference between the goals of the management and those of the teachers... the network is an organization that wants to make money. If a teacher asks for a raise in salary he won't get it. What happens is that they will start looking for another teacher to replace him... We the teachers, our goal is to teach and educate the students as best we can... I am not a telemarketer and I don't intend to deal with marketing, and often that's what the management through the school principal asks of me..."

Regarding the integration of technologies into teaching and learning, one of the teachers says:

"... the marketing emails... It seems that they are trying to connect everyone to the same language, to the same kind of thinking and it's quite ridiculous sometimes and doesn't really work... The management and we do not share a common belief why it's important."

Here we can see the perception according to which the teachers believe that through the implementation of technologies the management is trying to impose a new culture on the organization, something that they feel cannot give rise to significant changes. This is what one of the morning teachers says:

"... first of all there aren't enough computers in the school, neither for the students nor for the teachers, which makes notions such as computerization or learning technologies a bit ridiculous. It's a pity that the management does not invest more in equipment... I think they should explain to the teachers how to harness the computer to their benefit and then various teachers from different branches will be able to join forces in teaching and in preparing shared materials..."

The interviews reveal a gap between different groups of teachers regarding their knowledge about trends and developments in teaching and learning management technologies. Among the morning teachers there is practically no knowledge at all, while the evening teachers have a much greater awareness of the issue, but in terms of applying the use of the new technologies this is very limited. This emerged from an interview with one of the evening teachers who said:

"A large part of them [morning teachers] have not heard about the developments in teaching technologies in other parts of the network. Besides the teacher who joined the technology forum, the rest of the teachers are completely uninvolved in the launch of the on-line platforms for psychometric and math studies. This is proof of an innovation that did not succeed in breaking boundaries. Within the organization there are innovative subsys-

tems and the changes they have undergone do not penetrate beyond these subsystems to the rest of the employees within the organization.”

In general, unlike the manner in which the educational technology platforms are perceived by the management, the various technology platforms launched within the organization for the support of teaching and learning processes are perceived by the teachers as a value and not as a tool. Nevertheless, in order to attain the objectives, i.e., high scores in the matriculation and psychometric tests, classroom practices have not changed and remain based on the traditional concepts of teaching and learning processes. Most teachers believe that they should receive more resources, both personally (appropriate compensation) and organizationally in order to implement the technology platforms into the teaching and learning processes they offer the students. One teacher says:

“First of all I uploaded all the history materials I had prepared over the years in WORD documents and PowerPoint presentations. It organizes the material both for me and for the students. For example if a student wasn’t in class, I can photocopy the material for him. I also opened up a gmail account for the students. They know its password and they can get in there and download tests, papers, presentations and they can even ask questions. It acts a little bit like a forum for the students and a database of materials... I did it and other teachers can also do something like it. It depends mainly on individual initiative... As far as the management is concerned not enough has been done in this area.”

Basic assumptions

Despite the social and educational values shared by the teachers and the management, the commercial perspective is not part of the teachers’ basic assumptions. The management takes very seriously the commercial performance and profitability of the network, which often contradicts educational considerations and values. On the other hand, the teachers place greater emphasis on the pedagogical objectives, while the commercial objectives are not at the forefront of their attention.

Furthermore, the interviews show that some of the teachers feel they are not sufficiently compensated for the effort they put into their work and that they are not being given the tools they need to provide their students with optimal education.

The different set of values between teachers and management is obvious from the language they use in the interviews. For example, in the interview with the director, there were frequent references to economics, management, and marketing, concepts that were almost entirely absent from the interviews with the teachers. Where the teachers did use such terms, they did so with cynicism, suggesting a negative connotation. For the most part, the teachers’ language related to their main role as teachers, and as such, they frequently referred to concepts from the domain of pedagogy, teaching, and learning.

Regarding the implementation of learning technologies, the interviews revealed a world view and basic assumptions that were quite different for the teachers and for the management. In the interview with the network’s director, certain basic assumptions were obvious: the best way to teach is through face to face interaction; there is no added value in distance learning which cannot achieve new pedagogical objectives; the tools available today for e-learning via the Internet are not good enough; it is important to employ asynchronous tools in order to create a dialogue with customers (the marketing aspect); it is important to be seen to resemble similar organizations on the market (in terms of implementing teaching and learning technologies). In contrast, in the interviews with the teachers, other basic assumptions were prominent: we are educators, it is important to us that our students succeed, technology should be used for teaching and learning processes, the use of technology requires an investment of resources.

We can sum up the features in of the workplace culture at the three layers of organizational culture through the descriptions in Figure 2.

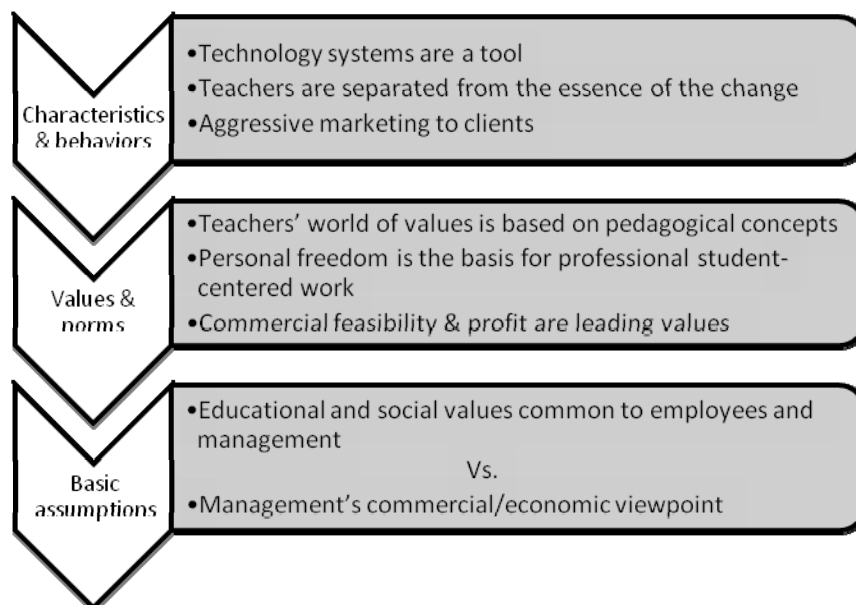


Figure 2: Features of the workplace culture

(C) The Surrounding Culture

The surrounding culture at the three layers of organizational culture are described below and presented in Figure 3.

Analysis of the interviews shows that the quality of the implementation of educational technologies in teaching, learning, and school management are highly influenced by the fluctuations in the culture surrounding the organization. The platforms implemented in the organization do not reflect a new pedagogical world of concepts, but rather are motivated by the need to be like similar organizational systems. The organization implements educational technologies, even though its management does not believe that they can truly make a contribution to the pedagogical aspect. In fact, this is an innovation motivated by external forces, and it is not accompanied by a change in the values and basic assumptions of this school network (Sarason, 1995).

Characteristics and behaviors

In addition to the use of the technologies for internal organizational needs, the management uses them as leverage for marketing and as a platform to create and maintain contact and provide information to those interested on the outside. As we have already described, the interviews reveal the great importance that the management attributes to maintaining contact with the environment and managing a dialogue with partners and with potential clients. The organization is perceived as open to the environment, and, in the eyes of the administration, the surrounding environment and how the organization is perceived within that environment is highly important, hence the need to adopt technology systems, like other organizations, even though the management does not sincerely believe in the need for these tools besides their marketing and image usefulness.

Norms and values

As presented earlier, it is the management's belief that computer technologies have advantages that are expressed mainly in the organization of work (emails, student management) rather than for pedagogical purposes. Another of their beliefs is that you cannot infuse these tools with a new kind of pedagogy that differs from what is accepted today. For this reason, technological changes are not translated into any change in modes of thinking or methods of teaching in the network's schools. Surprisingly, it seems that what blocks change is actually the policies of the management and not the perceptions of the teachers. The teachers implement technology innovations mainly through individual initiatives in certain subjects, all through the use of new teaching pedagogies, such as e-learning or using a forum for educational dialogue. Since the management neither initiates nor encourages pedagogical innovation, even though spontaneous changes are coming from the teachers in the field as islands of innovation, they dwindle away fairly quickly and do not spill over into the organization and do not become a part of the policy or its overall concept.

Basic assumptions

The interviews reveal a gap within the organizational culture between the level of the statements made by the management and the teachers. Another gap is between the computer coordinators and school principals. We found that, in general, the organizational culture is split or non-contiguous (Martin, 2002), and it is hard to point to any values that are common to all members of the organization. Each group has a different set of values, and even within each group there is no consensus regarding worldviews or how they perceive the organization. Nevertheless, as we have already described, in all the interviews the message came across that it is the student who lies at the heart of the learning process, and the organization's objective is to offer the student a supportive learning framework. The interviews with both the teachers and the management revealed the important values of inclusion and setting for the students and their parents. With regard to the implementation of learning technologies, we found different basic assumptions for the teachers and for the management. Despite the director's negative view of the use of educational technologies to manage teaching and learning, she did introduce a number of steps to implement these technologies, mainly as part of the evening studies, especially in the psychometric courses and mathematics studies. These procedures turned into islands of innovation within the network, but they did not succeed in radiating out to the other pedagogical frameworks, especially not to the morning studies which serve more than half the students in the network. According to the director, the pedagogical investment in evening studies derived mainly from marketing-oriented values and goals, in order to be like other similar organizations. In contrast, from the interviews with the position holders and the teachers it emerges that the set of beliefs of the pedagogical level in the organization differ from that of the management. The employees who were interviewed do believe that there is no substitute for face-to-face learning, but they also think that an educational technology platform for managing teaching and learning has pedagogical advantages, and that it does indeed support the students' learning process and enables them to tailor the e-learning to their specific needs. This belief is expressed only in islands of innovation arising from pedagogical initiatives of the teachers or position holders themselves in some of the network's schools. Furthermore, as part of the islands of innovation that developed bottom-up as part of the morning high school studies, the educational technologies were used with no organized training and despite the fact that those innovative teachers received no directive from above to use them. These teachers truly believe that the integration of educational technologies into teaching and learning leads to better results. One of the teachers interviewed uses the sharing technology, and one of the school principals interviewed encourages the teaching staff to develop e-learning materials on the web and trains them individually to do so. The basic assumption of these innovators is that an important part of their educational role is to introduce the students to the hidden potential of the online world of educational technologies. Thus, apart from the ardent fans, most of the

teachers and, apparently, the principals are satisfied with or resigned to the existing situation and the result is that most of the teaching and learning procedures remain traditional. Even where we found the islands of innovation integrating educational technologies, on the one hand the innovators claim that this integration takes up too much of their time and that there is no way for them to receive any compensation for this, and on the other, they understand that in today's world of technology one must teach in a manner that makes intelligent use of the potential of these educational technologies for teaching and learning. In other words, while there is a certain resistance to changing teaching methods, there is also an openness to a hypothetical change like this, which stems from the desire to be part of the progress that teachers apparently feel has passed them by. We can sum up the features of the surrounding culture at the three layers of the organizational culture as described in Figure 3.

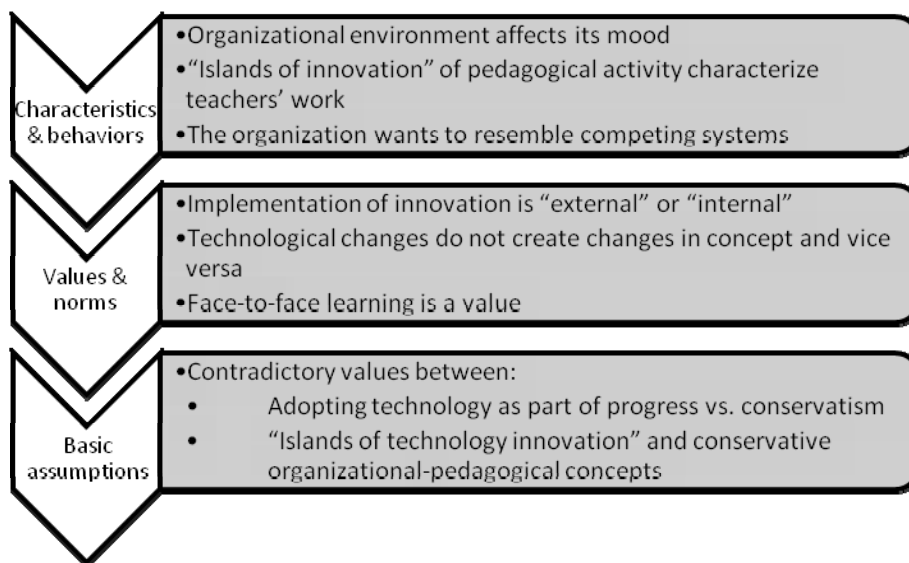


Figure 3: Feature of the surrounding culture

To sum up, from an analysis of the interviews with the management, it is clear that, at least in its own eyes, its culture is characterized by values of ongoing change, openness, acceptance, and innovation. The management perceives itself as successfully integrating commercial and educational values in a way that serves both the organization as a whole and its customers. However, a deeper look reveals that there is tension between the educational and the commercial aspects. On the commercial side, it is obvious that the management believes in innovation and progress and this is expressed, among other things, in the adoption of technologies as the organization's main administrative tools. In contrast, the interviews with teachers, position holders, and principals reveal a different set of values and beliefs regarding pedagogical innovation. The management is very conservative regarding any change in educational goals, teaching methods, and computer-based technologies in ongoing work, while at least some of the teachers believe that educational technology should be introduced into the teaching and learning processes. This split perception creates tension in other parts of the organization as well. To a great extent, the teachers are shielded from the administrative changes taking place within the organization. As a result, although this chain of schools is very sophisticated in its management and marketing methods, most of its teaching remains unchanged and innovation is passing it by, apart from a few fanatics – teachers, position holders, and principals who choose to find pedagogical applications for the educational technologies. They create islands of pedagogical innovation that do not manage to

radiate out onto the organizational culture as a whole. These changes remain localized. This process leads to the development of two organizational cultures which are quite alienated from each other: the culture of the teachers who emphasize pedagogical values and the culture of the management that emphasizes commercial values.

Discussion and Conclusions

The question underlying this research was: what are the implications of the implementation of an educational technological innovation on the organizational culture of a network of schools, either as islands of innovation or as comprehensive innovation? The findings reveal a complex picture in which the organizational culture is composed of different subcultures, each of which has different basic assumptions and between which tensions exist. By analyzing the similarities and differences between these subcultures, we can gain an in-depth understanding of the organizational culture of this particular school network and the meanings and reciprocal influences of these subcultures on the patterns of implementation of educational technology innovation within it.

In the following paragraphs, we will discuss the impact of organizational culture on the creation of islands of innovation and the spread of comprehensive innovation within the network of schools studied.

There is a gap between the overt layer of the organizational culture (the characteristics) and the hidden layer (values and basic assumptions). The interviews revealed that commercial values and educational values within the organization create a constant tension between management and teachers. Many studies report that where there is a gap between ideology and practice, it is very hard to create second degree change that also involves a change of values and basic assumptions and not just a change in characteristics and behaviors (Argyris & Schon, 1978).

The management and the teachers have different perspectives regarding the integration of the educational technology platforms for teaching, learning, and management. The technology platforms which support the learning process are perceived by the management as a tool and not as a value. In the interviews we hardly ever heard statements stressing the importance of technology innovation as essential. Here too, it seems that the aspiration to progress is perceived as the aspiration to resemble competing organizations. However, we must stress that many interviewees believe that the educational technology platforms that were implemented are very important and that they contribute to the quality of teaching and learning. In other words, the innovation of the platform is real and not just a façade. What is reflected here is the gap in how the teachers perceive the organization and how the management sees it. The management sees it first and foremost as a commercial enterprise, the aim of which is to be profitable (at least that is how the teachers see things), and thus it tries to create an organizational culture that will legitimize this way of thinking and acting that derive naturally from it. In contrast, the teachers perceive the organization as an educational framework and they are critical of the management's perspective. On the surface it seems that there is a mismatch of values. Innovation per se in this case becomes disruptive innovation which does not manage to penetrate all layers of the organization (Christensen, Aaron, & Clark, 2003; Christensen, Baumann, Ruggles, & Sadtler, 2006).

Neither the pedagogical nor the organizational management islands of innovation managed to lead to comprehensive innovation within the organization as a whole in a manner that creates new work patterns. It is thus only various subsystems within the organization that adopt the innovative technology as an integral part of their work. These systems are autonomous and do not affect the overall system. In order to turn successful islands of pedagogical and administrative innovation into comprehensive innovation that will affect other subsystems it would be necessary to make the appropriate strategic decisions and to allocate necessary resources to promote these islands of

innovation into comprehensive innovation (Finley & Hartman, 2004), which we did not find in the school network we studied.

The forces encouraging the adoption of new teaching methods only create spontaneous islands of innovation. The belief that educational technologies for managing teaching and learning can help improve the existing teaching setups and develop alternative pedagogies exists in certain sub-systems within the organization. However, these forces only managed to create spontaneous islands of innovation that do not expand beyond that. Most of the islands of innovation in this school network are a result of the work of individuals – teachers or position holders. We know that successful implementation of educational technologies usually involves several factors (Ben Peretz, 2009; White, 2007). The mode of thinking and management practices in the school network studied did not take into account the great importance of changing the organizational culture in order to ensure the implementation of technological innovation in a top-down process which includes policy guidelines containing the definition of key values, alongside the bottom-up process (Ben Peretz, 2009; Cook et al., 2007; Darling-Hammond, 2000; De Freitas & Oliver, 2005; The change in the organization was motivated mainly by marketing concerns represented by the management and not by pedagogical concerns represented mainly by the position holders and teachers. Consequently, islands of innovation sprung up that were mainly administration-oriented with a few pedagogical initiatives as well. The schools comprise an educational network, and so the islands of innovation expressed the gap between the contradictory values of different layers of the organization (Kotter & Cohen, 2002). Research shows that where the values of innovation of the management and the staff are not the same, the chances that the innovation will spread and become comprehensive are low (Luo, Hitly, Worelt, & Yanger, 2006). Moreover, prior to being a technological change, it is actually a change in values, perspectives, and pedagogy of how one should teach and learn. A change like this does not take place all at once but rather through a slow and ongoing process (Cook et al., 2007).

The desire to be like other organizations and to be part of the environment where progress is dominant creates a gap between the overall vision of the organization and that of the teachers. Organizations functioning in a strong institutional environment are subject to internal and external pressures to adapt to the external environment: on the one hand they must adapt themselves to the local functional requirements which demand that they aspire to reach their goals, and on the other hand they must act in accordance with the norms dictated by the institutional factors, which often contradict the functional requirements of the organization's employees (Koberg, Detienne & Heppard, 2003). According to the institutional theory, in this process known as isomorphism, the organization begins to resemble and adapt to its surroundings and to adopt the cultural expectations of society (DiMaggio & Powell, 1983).

To summarize, from the above description we learn that islands of innovation do not succeed in turning educational technology innovation for teaching, learning, and school management into comprehensive innovation within the network of schools because:

There's a gap between the overt layer of the organizational culture (characteristics) and the covert layer of values and basic assumptions.

The management and the teachers have different perspectives regarding the integration of educational technology innovation for teaching, learning and school management.

The islands of innovation – both pedagogical and administrative (for marketing purposes) - do not manage to expand and impact on the organization as a whole leading to comprehensive innovation in which the organization becomes characterized by innovation that creates new work patterns.

The forces encouraging the adoption of new teaching methods create only spontaneous islands of innovation.

The change in the organization is mainly driven by the marketing concerns of the management and not by pedagogical ones represented mainly by the position holders and teachers. The desire to resemble other organizations and be part of an environment dominated by progress creates a gap between the overall vision of the organization and that of the teachers.

Hence, as described in Figure 4, it emerges that the islands of innovation created within the organization reflect processes of buffering between the different layers within the organization and between the organization and the environment in which it functions. In this manner, the organization confronts the expectations of the environment to computerize education and puts the spotlight on pedagogical islands of innovation for the benefit of potential customers and elements in the education system, but then continues to manage everything else as before. In other words, innovation serves the organization in terms of prestige and publicity, but does not create a real cultural organizational change that also includes a change of perspective and basic assumptions (Hanson, 2001; Scott, 2003). The phenomenon of innovation without change that we see here was seen by the researchers as one of the characteristics of how schools cope with innovation and with handling organizational change (Sarason, 1990, Tyack & Cuban, 1995). Based on the institutional approach (DiMaggio & Powell, 1983), one could expect that the network of schools would adopt an institutional view of the environment relating mainly to norms, rules, and procedures that are customary in the field of organization, rather than relating to the economic and competitive aspects typical of a commercial environment (Fullan, 2001; Koberg et al., 2003). However, the findings of this study indicate that the management of this school network has a perception of the environment that is influenced mainly by pressures of other factors outside the organization.

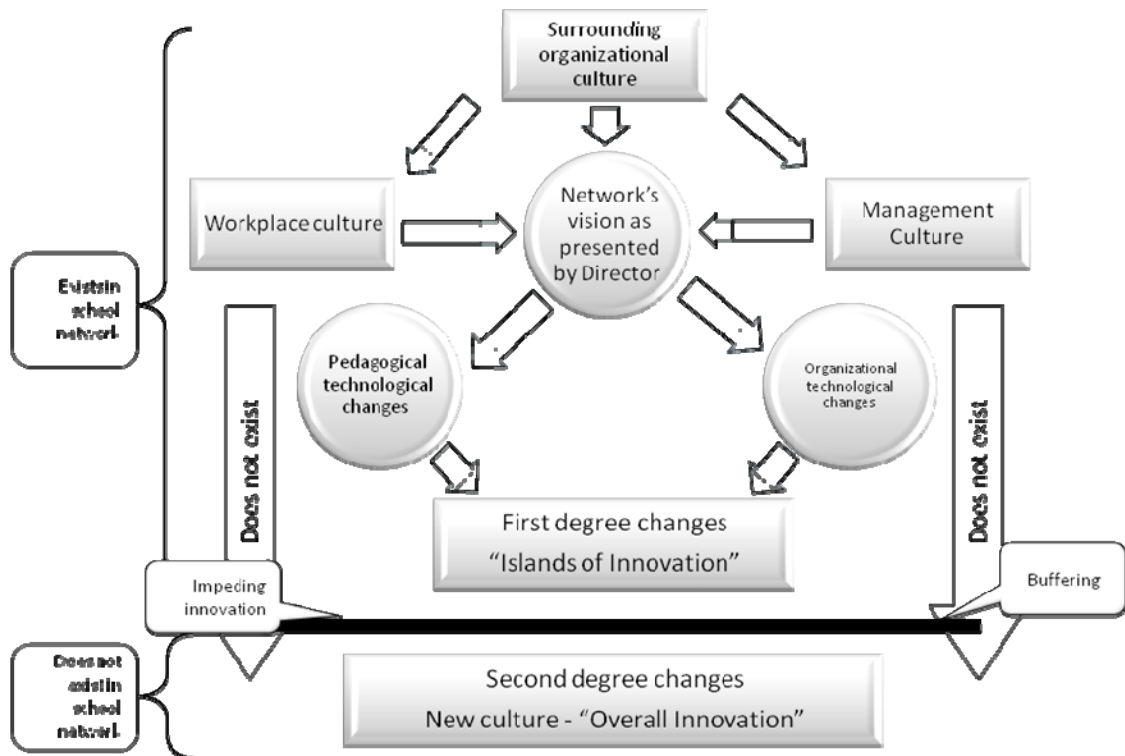


Figure 4: Characteristics of the organizational culture and patterns of change created within the organization as islands of innovation and not as comprehensive innovation

Islands of innovation do not constitute part of the vision or overall perception of the management, they do not expand and do not radiate out onto the organization as a whole, and thus they do not gain traction at all levels of the organization. Islands of innovation become a force that blocks the expansion of the change, because outwardly it would seem that the organization is realizing its declared innovation, whereas in fact this is not the case (Meyer & Scott, 1983). The islands of innovation unintentionally create a kind of blindness for the management which does not notice that the islands of innovation create a buffer and tensions that prevent the innovation from becoming comprehensive (Christensen, Aaron, et al., 2003; Christensen, Baumann, et al., 2006). In practice, the management of the network is the force blocking the expansion of the existing pedagogical changes. In other words, the islands of innovation serve the organization in terms of image and the potential to recruit customers but do not create an organizational or cultural change in terms of comprehensive innovation (Hanson, 2001; Scott, 2003).

As described in Figure 4, the link between the characteristics of the organizational culture which includes the management culture, the workplace culture, and the surrounding culture, and the nature of the organizational-technological and pedagogical-technological changes create a first degree pattern of change in which there are also islands of innovation in the implementation of educational technologies for teaching e-learning and school management. The existing assumption in educational organizations that the implementation of the innovative technologies is effective through a pilot program or through islands of innovation (Koberg et al., 2003; McDermott & O'Connor, 2002) has been found in this study to be neither true nor effective.

The figure also shows that the surrounding organizational culture in which technology is a decisive factor and has an impact as the dominant fashion, affects the management culture and the workplace culture (staff and resources). The change in the implementation of technologies for managing learning is more ceremonial: a seeming match to the spirit of the organization, to the predominant fashion, or to the political interests outside the organization. These all affect the network's vision as represented by its director and are expressed in the nature of pedagogical and organizational technological changes that generate first degree changes as islands of innovation. A new organizational culture in which there is a fundamental change in values is not generated through this process because the link described by the vertical arrows on both sides of the figure does not exist. Hence the change is not one of comprehensive innovation and it does not enable increased task-oriented efficiency, particularly in the field of pedagogy, which is the essential core of the organization (Halverson & Smith, 2010). Thus, as Ben Peretz claims, a new policy of implementing educational innovation requires joint work on the part of the members of the organization, consensus regarding shared values, and an ongoing internal dialogue among the members of the organization and additional factors through the process of in-depth study (Ben Peretz, 2009), which enables the creation of the new culture of comprehensive innovation that creates second degree processes – a change in which the values and basic assumptions also change (Raz, 2002, 2006). This process does not exist in the network studied, in which the gap between the values of the management and those of the teachers regarding technological innovation lead to the ineffectiveness of the islands of innovation. The contradicting values are also a force blocking the expansion of the islands of innovation into comprehensive innovation.

The islands of innovation are a phenomenon found in leading and implementing organizational change in educational systems (Carter, 2008; Day & Smethem, 2009; Del Val & Fuentes, 2003; Mioduser et al., 2004). The findings of this study refine our thinking about the effectiveness of the 'islands of innovation' approach as a strategy for successful implementation of educational technology innovation. The study raises the danger of islands of innovation as a disruptive factor in spreading innovation from a first degree change to a comprehensive innovation which creates a second degree change. Our recommendation to those who wish to lead innovation in education systems is to be aware of the danger of islands of innovation which may blind them with regard to

turning islands of innovation into comprehensive innovation. We also recommend the study of the phenomenon of islands of innovation in the formal public education system and on a larger sample of schools.

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Biography



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