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With contributors from Argentina, Norway, Poland and USA

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HØGSKOLEN I NESNA

Om Fredrikke Tønder Olsen (1856-1931)

Fredrikke Tønder Olsen ble født på handelsstedet Kopardal, beliggende i nåværende Dønna kommune. Det berettes at Fredrikke tidlig viste sin begavelse gjennom stor interesse for tegning, malerkunst og litteratur. Hva angår det siste leste hun allerede som ung jente "Amtmannens døtre".

Kildene forteller at Fredrikke levde et fascinerende og spennende liv til tross for sine handikap som svaksynt og tunghørt. Hun måtte avbryte sin karriere som gravørlærling fordi synet sviktet. Fredrikke hadde som motto: "Er du halt, er du lam, har du vilje kjem du fram." Fredrikke Tønder Olsen skaffet seg agentur som forsikringsagent, og var faktisk den første nordiske, kvinnelige forsikringsagent. Fredrikke ble kjent som en dyktig agent som gjorde et utmerket arbeid, men etter 7 år måtte hun slutte siden synet sviktet helt.

Fredrikke oppdaget fort behovet for visergutter, og startet Norges første viserguttbyrå. Hun var kjent som en dyktig og framtidsrettet bedriftsleder, der hun viste stor omsorg for sine ansatte. Blant annet innførte hun som den første bedrift i Norge vinterferie for sine ansatte.

Samtidig var hun ei aktiv kvinnesakskvinne. Hun stilte gratis leseværelse for kvinner, inspirerte dem til utdanning og hjalp dem med litteratur. Blant hennes andre meritter i kvinnesaken kan nevnes at hun opprettet et legat på kr. 30 000,- for kvinner; var æresmedlem i kvinnesaksforeningen i mange år; var med på å starte kvinnesaksbladet "Norges kvinder" som hun senere regelmessig støttet økonomisk.

Etter sin død ble hun hedret av Norges fremste kvinnesakskvinner. Blant annet er det reist en bauta over henne på Vår Frelses Gravlund i Oslo. Fredrikke Tønder Olsen regnes som ei særpreget og aktiv kvinne, viljesterk, målbevisst, opptatt av rettferdighet og likhet mellom kjønnene.

Svein Laumann

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Redaktørens forord

Åtte artikler er i seg selv ikke all verden, hver artikkel for seg gir ikke så mye nytt. Det som imidlertid er interessant er at lesere kan sammenlikne ulike syn. For utvilsomt ligger det ulike tanker bak hver av artiklene, fra ulike land, ja, fra to kontinent.

Tittelen ”Læreren i Kunnskapssamfunnet” har vært en invitasjon til refleksjon over skolens nåtid og nærmeste framtid. Spesifikt handler mange av innleggene om skolen i en raskt voksende teknologi der innhenting av kunnskap og ferdigheter er i fokus. Med voksende teknologi som bakteppe er det flere av artiklene som angår forandring, og noen artikler inkluderer konkurrerende verdier. Polske Anna Watola tar opp dette med utvikling og forandring og hvilke utfordringer det gir både for skolen som institusjon, men også utfordring for den enkelte lærer. Tilsvarende er det Harald Nilsen (Norge) peker på, men opp i stadig fornying tror han på stabile, grunnleggende verdier; et læringsfellesskap som består av elever, lærer og situasjon (atmosfære). Elsa Løfsnes (Norge) tar opp i sin artikkel forventninger i forhold til skolens muligheter til å innfri, og hun tar opp to syn skolen må forholde seg til, målbare prestasjoner i konkurranse med helhetlige, allmenne verdier. Elzbieta Perzycka (Polen), Graciela Alvare og Marisa Silvana di Giuli (Argentina), Jarek Janio (California) og Dorota Siemieniecka (Poland) setter alle informasjonsteknologi på dagsorden, men med ulike erfaringer og fra ulike perspektiv. Ronald D. Paige (Cleveland) belyser læringsbegrepet i forhold til den foranderlige tiden vi lever i, og oppfordrer til selvmotivert, uformell, livslang læring som ”ballast” å møte utfordringer med.

Editors’ preface

This eight articles in the serial Fredrikke are of interest for those readers who will compare different point of view worked out by professionals from different countries. The authors reflect about school, about the role of the teacher and about new, technical remedy made for education, and - one may suggest – knowledge and skills are in focus.

Anna Watola from Poland discusses how the continually *changing world* (mainly technology) rises challenges for school in general and for teachers in particular. Similar view is introduced by the Norwegian Harald Nilsen, but in spite of rapid, technological progress Nilsen believes in *basic values*; a “learning community” which includes students, teacher and good atmosphere. Elsa Løfsnes, Norway discusses pressure resulting from too great expectations,

and with reference to the new national school program she makes herself a proponent for holistic thinking as opposite to fragmentary. Elzbieta Perzycka, Poland, Graciela Alvare and Marisa Silvana di Giuli, Argentina, Jarek Janio, California and Dorota Siemieniecka from Poland place in front discussion related to technological remedy (ICT) in educational context; what about teachers' competence, how should students separate the flow of information, what is the link between use of ICT and creativity, etc? Ronald D. Paige from Cleveland gives "good" advice for our changing world; he encourages to self-motivated, *informal lifelong learning* to meet challenges nobody not yet know.

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January 2008

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Recenzent
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Anna Watola

A kindergarten teacher - their role in the changing educational reality

Introduction

The first kindergartens were created mainly because of the necessity of supporting children from poor background with care. During the post-war period the development of kindergartens was connected with the growth of female employment and the necessity of giving care to children whose parents worked. The moment the research showed how important, complex and diverse the experiences the child in the pre-school period acquires, the role of the kindergarten has been shifted from the child-care role to upbringing and educational role.

Nowadays, according to the valid educational law, pre-school education includes support of the development and early education of a little child since being three years old up to the start of education in a six-year primary school. Pre-school education is performed in different types of institutions, such as: municipal kindergartens, private kindergartens, kindergartens run by monastic congregations and non-public kindergartens.

All types of pre-school can employ people having pedagogical education in the line of pre-school education. Majority of teachers have higher education (BA and MA), and many of them are also postgraduates in speech therapy, oligofrenopedagogy, corrective gymnastics, pedagogical therapy, Information Technology or foreign languages, which makes it possible for them to continually undertake new tasks in the changing educational reality.

More and more teachers with a long practice acquire new competences, the most important of which are media and information competences (E.Perzycka, 2006:57).

Legal conditions and pre-school education aims and tasks

Pre-school education includes supporting the development and early education of a little child since being three years old up to the start of education in a six-year primary school. Pre-school education is performed in different types of institutions, such as: municipal kindergartens, private kindergartens, kindergartens run by monastic congregations and non-

public kindergartens. These places ensure care, upbringing and education in the atmosphere of approval and safety. Kindergartens create conditions enabling a child to acquire the so-called 'school readiness'. They play the counselling and supporting role towards the family, they help to recognize the developmental capabilities of a child and to undertake early specialist intervention when needed, they inform about the current child progress, together with parents they adjust the directions and the spectrum of tasks performed in kindergartens.

The aim of pre-school education is to support and direct a child's development according to their innate potential and developmental capabilities in the social, cultural and environmental relationships. The resulting tasks, following the needs and developmental possibilities of a child, are fulfilled within the defined educational areas.¹

Preparing a child for school

Preparing a child for school is not a separate area in a teacher's activity. This task is performed in all activities leading to activate a child, so that they can achieve the highest possible level of school readiness (I. Dudzińska and others, 1976:216). One of the most important tasks of pre-school education is preparing a child for school. Pre-school institutions create conditions necessary for a child to achieve „school readiness” understood as the effect of development and learning. School readiness, according to Barbara Wilgocka-Okoń is not only preparing a child, but also a school, which means adjusting its educational activity to a child's different ways of cognition and representation of reality. This means mutual adjustments – a child must know what the school will expect from them, and the school must meet the possibilities and expectations of the child. Preparing a school for the varied level of school readiness of children starting school education is necessary because of the developmental differences and environmental conditions. Attending a pre-school education gives a child a chance to gain important intellectual and social skills making school adaptation easier (B. Wilgocka – Okoń, 1999nr3).

Each child has their own individual way of learning, receiving and responding to stimuli and an individual type of intellectual and social experience (R. Więckowski, 1998:278) This is why pre-school teachers, through creating conducive environmental conditions for individual development, enable a child to acquire school readiness. The contact between a child and a

¹ Podstawa programowa - Ministra Edukacji Narodowej z dnia 23 sierpnia 2007 r. (DZ.U. z dnia 31 sierpnia 2007 Nr 157, poz. 1100).

teacher in a kindergarten is also supposed to protect them to some extent against the unfavourable influence of the family environment (B. Wilgocka - Okoń , 1972:151). A kindergarten is a place where basic children's rights are especially taken into consideration. According to the document introduced by the National Assembly of the United Nations Organisation, including the catalogue of the basic children's rights, a child has the right to:

- Be accepted the way they are,
- Peace and quiet when they need it,
- Individual process and their own pace of development,
- Active discussion with children and adults,
- Active formation of social relations and to be helped in it,
- Play and choose friends to play with,
- Have responsible and engaged people to turn to,
- Acquiescent agreements and contacts with adults,
- Research and experiment,
- Experience the consequences of their own behaviour (restricted by the safety means),
- Diverse, reach in incentives and experiencing originative processes of the environment,
- Sleep and rest if they are tired, not to sleep at one's order,
- Food and drink when they are hungry and thirsty but also to regulate their own needs,
- Healthy food².

Knowing and respecting the rights listed in the document should not only be the responsibility of all kindergarten teachers and workers, but they should also be communicated to parents within the programme of pedagogising a child's family environment.

The influence of pre-school education on the level of school achievements is significant, especially for those children, whose home environment does not fully satisfy their cognitive needs. When a child attends a kindergarten, during different activities a teacher can notice some symptoms which may hinder achieving school readiness. The teacher's task is to:

1. Observe a child's development with special attention paid to:

² M. Zagula - Holzer, T. Ogrodzińska, Polska Fundacja Dzieci i Młodzieży. Koncepcja pedagogiczna przedszkola. Konwencja o prawach dziecka. Zgromadzenie Narodowe ONZ. Warszawa.

- physical and manual efficiency, language skills,
- visual and auditory analysis and synthesis,
- cognitive, emotional and social spheres

2. Stimulate a child's development by:

- ensuring the feeling of approval and security,
- arousing and developing the interest in learning,
- understanding oneself and the surrounding world,
- supporting a child's own activities so that they can learn through action,
- teaching to find one's place among peers,
- creating the system of values.

1. Correct disorders in the motor-perceptive functions that are vital in the process of learning to read and write, by exercising:

- concentrating attention,
- orientation within body and space,
- manual efficiency,
- visual perception,
- auditory perception,
- auditory-visual-motor coordination,
- speech and ability to express oneself.

The forms of active observation and exercises listed above concern only the most important developmental spheres in the process of reaching school readiness. Observing a child systematically during different forms of activity in a kindergarten makes it possible for a teacher to create the most adequate ways of educational-didactic impact and to co-operate with each individual child (M. Karwowska - Struczyk, W. Hajnicz, 1986:16).

A special element of functioning of a kindergarten is the contact between a teacher and a child's family environment. Co-operation in this respect is its statutory duty.³ In many pre-

³ Rozporządzenie Ministra Edukacji Narodowej z dnia 15 lutego 1999 r. w sprawie ramowych statutow publicznej sześcioletniej szkoły podstawowej, publicznego gimnazjum oraz publicznego przedszkola (Dz. U . Nr 14, poz. 131 z późniejszymi zmianami).

school education institutions the quality standards include different forms of this co-operation. Both the standards of achievements and the standards of requirements and the adapted criteria are frequently related to the organization of a kindergarten's educational-didactic process connected with the conditions which help children reach school readiness. In this aspect a kindergarten:

- Performs diagnosis and documentation of each child's achievements and monitors the growth of abilities and knowledge,
- Runs pedagogic observation in order to learn about and satisfy developmental needs of children,
- Teachers keep a record of the results of pedagogical observation according to the rules set in the kindergarten statute,
- The results of pedagogical observation are to direct the actions according to both the individual needs and these of the group,
- Assists and directs the development of a child according to their innate potential and developmental capabilities
- Helps parents to recognize their children's developmental capabilities and to undertake the early specialist intervention,
- Cooperates with specialists giving psychological, pedagogical and another specialist help.⁴

The role of a kindergarten teacher is to perform observation and diagnosis of individual development of a child, and in the case of discovering specific difficulties to undertake equalizing actions. It is important to make family environment involved in these actions and to point at the ways of leveling the difficulties. The co-operation between the kindergarten and the family should consequently ensure the uniformity of the educational effect on a child (R. Pawłowska, 1986:43).

When a child starts attending a kindergarten, they must overcome the difficulty connected with parting from their parents and changing the surroundings for several hours daily. Such change takes place again when a child finishes pre-school education and enters a new reality, which is the school reality. S. Kowalski (1962:91-97) writes that while changing

⁴ Projekt „Standardów jakości pracy przedszkola” opracowany w Oddziale Standardów Edukacyjnych Wydziału Jakości Nadzoru Pedagogicznego i Standaryzacji Edukacyjnej, opublikowane w: Magazyn Szkolny 12 styczeń 2001, Nr 3/ 10/ 212.

environments, a child very often experiences a crisis in development. Helping a child to overcome both kinds of crisis (early kindergarten and early school), is also a task that should be undertaken by a teacher. Child care and education in the period of their starting attending pre-school require taking actions to make it easier for a child to feel the differences between their family and pre-school environments. An analogical situation is when a child leaves a pre-school environment and becomes a first grade student. One of the pre-school teacher's functions is then preparing a child to adapt in the school environment with no or little sense of crisis. One of the pre-school teachers' most important tasks is the co-operation with psychological-pedagogical centres, which popularises the knowledge about school readiness between a kindergarten, a parent and a future school. Such integrated actions are most effective and create greater educational chances. It is not necessary for specialists from psychological-pedagogical centres to contact every child. It is a teacher's task, after finishing child observation and an initial diagnosis of a child's development made in the first months of a school year, to decide if there is a need for specialist help. Giving specialist help to a child encountering their first difficulties ensures long-term, although sometimes distant effects.

Continual co-operation and the possibility of frequent contacts between a kindergarten teacher and specialists from psychological-pedagogical centres are the most important factors which influence reaching school readiness by majority of children attending a kindergarten.

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Teachers and schools suspended between result measurement and holistic educational ideals

Introduction

Our teachers are to fulfill the goal-oriented knowledge learning and the basic skills that are outlined in the national curriculum and national tests. At the same time they are to fulfill the holistic goals that the national curriculum outlines in the description of the seven human characteristics that the education system is meant to develop; the spiritual, the creative, the working, the liberally-educated, the social, the environmentally-aware, and the integrated human being. However, these idealistic goals are difficult to reconcile. The national curriculum concedes in the description of the integrated human being that these goals require efforts that appear to be conflicting in nature.

The insights we have gained regarding teaching and learning suggest that the teacher is systematic and aware of goals, but at the same time gives room for pupil influence (Dale et al., 2006). Pupils themselves must undergo the actions that are necessary for learning (Tyler, 2001: 98-99). These principles are acknowledged in our national curriculum. It says for example that ‘good teaching can set in motion learning, but it is accomplished only by self-effort’(p.10), and that ‘good teaching is to give pupils experience in succeeding at their own work, and build confidence in their own abilities and develop responsibility for their own learning and lives’ (ibid.).

In addition to the many goals for teaching, there is an openness requirement towards the community that the school serves. There is to be a distribution of responsibility between all the involved parties both on the national level as well as on the local level in the education system. The openness requirement also relates to the requirement of effective knowledge learning and the best possible measurable results. The focus is on specific, measurable aspects of a complex educational system.

The school’s foremost goal is to promote knowledge learning. A central question is whether the goal is a one-sided factual production or whether it is a knowledge learned in situations

that promote holistic education and meaningful application of factual knowledge. This question is related to the kind of organization and learning environment that is thought to promote goals set by teachers and school administrators. Parallel to the requirement of effective knowledge learning we have an increased understanding that knowledge must be developed as individual knowledge in order for it to be used in practice (Pettersen 1997).

Two research projects conducted on teachers' didactic thinking and planning, reveal the complexity of teaching contexts and how easily these can be disturbed causing problems for further development. The first research project (Løfsnes, 2002) is a doctoral study that focuses on teachers' thinking and planning in the subject of social studies. The other research project is a survey of teachers' and school administrators' education perspectives related to beginning reading and writing and how national testing influences these perspectives (Løfsnes, in progress). These research projects are conducted within the framework of Alfred Schütz' (1972, 1982) phenomenological-sociological perspectives on research and Gary Fenstermakers' (1994) epistemological analysis of teachers' thinking. Both projects build on teacher interviews after being present in the classroom, analysis of examples from pupils' work and teacher lesson planning. The latter also includes an analysis of organizational planning and interviews with school administrators regarding perspectives of didactic development. The research projects are grounded on criteria of knowledge learning in meaningful educational contexts.

The many balancing acts in education

Teaching is comprised of complex relations, and by focusing on one side of the complex reality that constitutes teaching, there is a risk that other aspects of teaching can be underemphasized or suffer (Løfsnes, 2002; and in progress). Abiding by pupils can for example be over emphasized if it is not tempered with a clear balance of teacher control. On the other hand, an exaggerated amount of teacher control will reduce the amount of pupil influence and responsibility.

Good learning environments require goal-oriented action by participating parties. Schütz (1982) uses the term "patterns of action" in order to phenomenological-sociologically depict actions in social contexts. "Patterns of action" refers to realization and response, the reciprocal expectations and the reactions that are created between people in social contexts

and how these influence human behavior. Teaching situations that set out to achieve complex goals are dependent on good patterns of action, and a clear leader who maintains and develops good patterns of action and learning conditions for pupils.

Pupils easily describe the conditions they work under when they evaluate teaching (Packer, 1985; Hundeide, 1989). To a large extent, teaching is about a teaching community in which all the participants' actions and collaboration are decisive for how the work flows, whether the pupils work individually or in groups.

The tools that a teacher uses in teaching must therefore be adapted to patterns of actions that are established in the learning environment. Further development must happen gradually based on these patterns of actions. Not every method fits into every pedagogical context. The pedagogical relations that are implicit in a method use must be developed gradually and fit into the pupils' expectations for mastering the method. When pedagogical relations that a method is built on, are not sufficiently understood or developed, then the method will not work satisfactorily. Method use has often been tried out on pupils in situations where they have been left to themselves to master a number of challenges and goals in which they did not have the necessary basis for mastering the situation (Løfsnes, 2002; in progress). When teachers try out new ideas without an already existing solid foundation that gradually can be developed in line with these ideas, the learning environment is weakened. Experience from contexts such as these, can lead the teacher to conclude that the goals are not attainable or give up and not try again.

In some contexts, the goal of organizing pupil activity and experience-focused teaching are given a dominating position at the expense of what is explicitly to be learned (Løfsnes, in progress). Teachers can, for example, emphasize outdoor school and other variants of locally-based teaching. The goal is for pupils to become more motivated, but it is not always the case that pupils are made aware enough of the goal of what they are doing and how they are to relate to it (Melander, 1998). Method use can also become rather technical. With exaggerated use of individual work programs for example, pupils can become more interested in getting the tasks completed, than in what they are to learn through the work (Løfsnes, in progress).

Many factors point towards that we have, over a period of time, had our attention on teaching and learning forms without being able to take advantage of these as tools for learning (Calrgren and Marton, 2000; Aukrust, 2003; Løfsnes, in progress). Method use can easily be a goal instead of a means for meaningful and stimulating learning.

When considering new initiatives for development in a teaching context, the starting point must always be from the existing learning environment. There must exist a foundation of skills, attitudes, and knowledge, in order for new initiatives to be able to take hold in the relevant teaching context. Such a foundation can, for example, be the pupil's ability to define goals and evaluate goal fulfillment, the ability for independent work and cooperation. Pupils must, for example, have developed meta-perspectives of what they are doing in order for them to be able to take responsibility. In other words, they need to have some thoughts about the purpose of the work, what skills are required, and what results they will achieve. The work needs to be put in a larger context that makes it meaningful to be involved, stimulates curiosity for answers and gives meaning in other ways, strengthens the possibility to understand the goals or to set their own goals with the work. For example, if the work is to be done in groups, then the pupils need to know what is required of them and how they can contribute to a collective learning process.

Teachers need ideas for modification and further development of teaching, but exaggerated focus on single aspects of teaching can easily unbalance the many goals as well as their attitudes, skills, and knowledge (Løfsnes, 2002; Løfsnes, in progress). The focus on results of national tests can easily have such an influence, and disturb the didactic relations that make up the organizational and environmental basis for obtaining good knowledge results.

It is also the case that emphasis on certain aspects of didactic relations that dominate good teaching, whether it is about measurable results, or certain method use or otherwise, is damaging for holistic learning and education. Teaching that pupils experience as meaningful and motivating can only be understood within circular thinking (Haslebo, 2004). Circular thinking is based on an understanding of how different factors in a school reality intertwine with each other and create the basis for success or problems.

The opposite of circular thinking is linear thinking. Linear thinking is based on a focus on simple measures without sufficiently maintaining the holistic connections. In the goals for school development, there is generally too much focus on simple initiatives based on linear thinking. In other words, knowledge of a limited area has been imparted without consideration for the context in which the knowledge will be put into practice. In circular thinking, in certain circumstances, it can be more meaningful for pupils to listen to a teacher's story than it can be to do work in groups. Circular didactic thinking requires that teachers have clear intentions and a broad range of goals for their work, can analyze the learning process and formulate conclusions for future work.

With implementation of a new curriculum, new methods and emphases can easily be exaggerated and be given the focus of attention. Tom Tiller (1990) describes schools that superficially try out new ideas and then abandon these ideas for other new ideas and then abandon these as 'kangaroo schools'. The way I see it is that this is very much related to the linear thinking that has dominated pedagogy on all levels in the education system. Ideas are thrown out because they do not fit into the existing learning environment. Teaching can only be understood from a circular and holistic thinking perspective.

According to the Ministry of Education, the national tests are supposed to work as a tool for pedagogical development and school development. Out of the twelve schools in my second research project (Løfsnes, in progress), only the school that functioned best in terms of holistic education managed to put the national tests to use in a systematic manner for further development. This was the school that had a clear pedagogical vision and was constantly creating a togetherness feeling and strategies for many subjects. This school has maintained both interdisciplinary cooperation as well as academic subject cooperation. At the same time, the teacher who was my informant managed to balance the emphases on basic skills and process-oriented writing in a meaningful context. She was able to make explicit what was to be done and make room for the pupils' initiative and cooperation. The emphases and pedagogical thinking that I found among these teachers and administrators can be described as taking care of the 'apparently conflicting goals' (Løfsnes, in progress).

Some of the teachers at the other schools (ibid.) had noticed specific emphases in the national tests without having analyzed the tests collectively. One teacher who earlier had emphasized

the development of the pupil's capacity for independent reflection had noticed that the writing test put emphasis on the pupil's capacity to see an issue from someone else's perspective and reflect on their situation. However, most teachers did not feel that they managed to take full advantage of the tests in a positive manner. They preferred the standard knowledge tests that they had used in the past. These tests measure only the factual knowledge and not the pupil's ability to reflect and reason. It was easier to put these tests in an analytical context. When the emphases of the national tests are not understood in the context of the school's already established vision and strategies, then these tests are not perceived as a useful tool for development.

External pressure on schools

The purpose of external pressure on education as represented by national tests in concurrence with the national curriculum is to stimulate teachers to think about what is positive in their teaching and what is less so. For schools that already have developed their pedagogical thinking and have formulated clearly both short and long term goals, national tests can be used as a tool in pedagogical development and learning (O'Day, 2002; Løfsnes, in progress). However, schools that are struggling with developing collective pedagogical perspectives and agreement on choice of strategies to achieve these, can easily have problems with the one-sided focus which is perpetuated by the national testing system's focus on results (O'Day, 2002; Linn et al., 2002; Gipps, 2003; Stone and Lane, 2003, Løfsnes, in progress).

For fear of scoring poorly on the national tests, many teachers lose sight of the holistic and context dependent thinking that must be at the foundation of good teaching. Teaching can be focused on increasing results on the national tests. This can lead to improving specific skills (Linn 2002). But when the contents of a test are changed over time, then there is a 'saw tooth effect' (ibid.). The saw tooth effect suggests that when a test that has been used for several years is replaced with a new test, the results decrease. Such results have a tendency to even out over time (Gray et al., 2001).

Much evidence suggests that also schools that function relatively well can succumb to an external pressure that can influence this development in a negative manner (Løfsnes, in progress). If schools recruit pupils who are less fortunate in a social cultural way, then this will be reflected in the results of the national tests (Turmo and Lie, 2004). This can contribute

to creating doubt about their own pedagogical foundation. If a school at the same time goes through a relatively large turnover among teaching staff, for example because of expansion, retirement or leaves of absence, change of leadership team, these can cause a break in an ongoing positive development process. In a school, aims must be created over and over again. A school culture is often stable and is 'in the walls' so to speak. But the collective development processes that create long term development can indeed be easily altered (Løfsnes, 2002).

In many schools there is a desire to develop collective areas of importance and understanding (Løfsnes, in progress). Therefore, teachers can be rather frustrated when a developmental process that works well is terminated. For example, one of my informants (ibid.) was extremely frustrated when a research project on the development of method use was no longer followed up by the school administrators. The administration's focus on the new national curriculum and new trends infringed on the time the teacher felt should be used to continue work on the ongoing development project. The teaching team, however, continued their work using their spare time, but experienced that the school in general slid towards an increased focus on subjects and preparation towards the national tests. Uncertainty surrounding the new leadership strategies was very frustrating. This is in accordance with Gipps' (2003) conclusions from England about when such external pressure is combined with a certain sense of powerlessness that, teachers can feel threatened. Some are even caught in a irreconcilable situation that they resign and disappear out the schools.

Whilst often wishing to innovate and/or encourage creativity within the curriculum, many schools are inhibit from doing so through anxiety over attaining and/or sustaining high levels of achievement (The Qualification and Curriculum Authority, England, 2002).

By being under external pressure many schools can have problems developing a collective platform for their institutions. The external guiding requirements must therefore, be designed with the greatest of caution. Incentives should provide support and offer help more than as a controlling device. Development must occur based on an understanding of how the various aspects of a learning environment intertwine with each other and how this collectively, creates the goals for efficient knowledge learning and holistic education.

Openness requirement

Not only must the teacher adhere to the external requirements of results, there is yet another requirement of openness. The requirement of openness constitutes an aspect of the distribution of responsibility system that are related to international trends for school development and the promotion of competence (Hood, 2006). Just like many 'good' management ideas, open systems incorporate goals that are difficult to define in clear terms.

Hood shows that the type of openness that has been most common in the western world over the past 40 years is the indirect bureaucratic form for openness rather than a direct and general openness. He points out that the idea about development of a new culture for openness and the confidence in the highest levels of the distribution of responsibility are difficult to attain. Much of the debate has been about replacing institutional procedures and decisions that would otherwise be implicit. It has also been about setting requirements that documentation makes it possible to ensure that written documents and intentions are followed up.

In an analysis of an institution, it is common to differentiate between first order and second order changes (Hood, 2006). The first order changes are usually defined as changes that do not alter characteristics of the institution, while second order changes imply alterations of these basic elements. When strategies are made at the higher levels in a distribution of responsibility system, the requirement of openness can easily lead to superficial first order solutions that operate on a level for themselves. Responsibility is still attributed to the level in which it was carried out. Solutions are then chosen that easily result in switching from one strategy to another producing negative side effects.

The requirement for openness can also easily lead to superficial inspection systems that damage more than help. The external requirements can disturb the developing processes at the individual schools. Certain aspects of the institution receive focus. The focus can be directed towards which of the changes that are begun more than how the change worked. This represents the same kind of linear thinking that was previously mentioned that can be unfortunate for pedagogical development.

Hood (ibid.) calls attention to the problems that are connected to such ideas about openness in the distribution of responsibility systems, and claims that implicit within such systems is that they can easily lead to a kind of renouncement of responsibility and blame assignment. The effects are often the opposite of the original intention.

Even though the defined goals on the national level imply a distribution of responsibility, and should reduce a possible one-sided assignment of blame on the teachers who are to achieve the goals, in the end, it is the teachers who get the blame when things go awry. When a teacher is to evaluate goals, the flow of resources and ways of being responsible, the goals become vague and contradictory. That in itself assigns blame to teachers, but teachers continue to have expectations of reaching the goals. Whether the nationally defined goals are results or the procedures to achieve these results, the same problem arises when the goals are to be realized. Neither the distribution of responsibility nor the tools completely solve the inherent problem related to the idea of openness and the distribution of responsibility in such responsibility distribution systems (ibid.).

The goals that are attempted to be implemented, in that which is to be measured by the national tests, will in any case function as bureaucratically defined goals that are removed from the pedagogic reality in many schools. The distribution of responsibility works for those who are able to fit the goals into their pedagogical reality without draining the holistic education perspective.

Challenges for those who are to follow up and lead pedagogical development

Today in line with the requirement for openness and the distribution of responsibility that is to exist on many levels in relation to the school's activity, school owners have the follow-up function and the inspection function with respect to their schools. School owners in Norway are most often the school authorities at the municipal level. Following-up most often occurs when the school administrators from the individual schools within the municipality agree on the important areas, and the teachers participate in a collective course within the area of importance (Løfsnes, in progress). It is easily the case that school administrators for schools with a collective vision and agreement on strategies for the direction of development have the most influence on the strategy choices at the municipal level (ibid.). School administrators, who are not aware of how the collective strategy choice at the municipal level can fit into

their own learning environment, still prefer the collective strategy choice. Collective strategy choice that does not easily fit into the school organization in question functions according to linear thinking. If for example, it is a question of method use, then the method can easily represent 'an empty structure' for these schools, because the foundation for implementing the method is not in place.

The same often happens when a school for example visits another school in order to get ideas about method use. Methods are often not used in ways that serve as a useful tool for learning. In order for a method to become a useful tool for learning and be successful, the user must have detailed knowledge of the method. Furthermore, they must have knowledge of how the development can be seen as part of the continuing process that is intertwined with the remaining factors, and how the method use can impact learning.

School administrators' efforts at designing a collective development process constitutes a difficult balance between securing insight into that which must be done and with the teachers defining further goals. It appears to have a substantial impact on the existing structure on the organizational level that makes it possible for the administrators to get insight into the challenges in different and specific teaching contexts. All further development must occur with the starting point in what is already done well (O'Day, 2002). How visions at the organizational level are to be realized must be decided in relation to the teaching culture in the individual teaching context. Collaborative cultures at the organizational level can, in the same way that collaborative culture in the pupil's environment, easily fall into routines. Development requires continual analysis and teacher cooperation connected to the specific pupil group and varied cooperation at the organizational level.

In my data (Løfsnes, in progress) teachers are generally very loyal in relation to development of collective visions and collective pedagogical focus in their schools. This is in accordance with what Siskin (1994) has registered. Both teachers and school administrators understand the importance of creating collective strategic thinking. Many factors, however, must fall into place before they are able to cooperate on ideals and put ideals into action. Schools must be developed from the inside out, and it is the faculty at each school that must be able to analyze the starting point and the developmental directions and then together gradually develop from there. What the individual teacher does must fit in with the respect to an analysis of the

established learning environment and how further development can occur with this as a starting point.

School administrators must have both a vision about the direction of development and be able to balance the tools in relation to the individual school's starting point for further development. At the same time as there must be some pressure for development, the school administrators must also take care of the human characteristics, the relational side of development. In the process of development it is often the case that schools develop collective values, school culture or 'school codes'. Therefore, it is not strange that results appear much at the school level (Sammons, Thomas and Mortimore, 1997). The strategies chosen by the pedagogical leadership will soon dominate the school culture, and structure will be dependent on it. School administrators must be able to be unambiguous leaders and to be able to get the best out of the staff members.

School administrators need the same insight into the organization of teaching and method use as teachers do, in order to be able to lead the development processes at the team level. A central problem is, however, finding enough time to keep both themselves updated and be capable of leading the development processes while dealing with the other tasks of being a school administrator (Løfsnes, in progress). The most important development occurs at the interdisciplinary team level. Cooperation there is clearly related to concrete challenges in each actual group of pupils. Pedagogic leaders require a balance between plenary meetings and interdisciplinary meetings that is not the easiest to achieve. Cooperation in subject areas occurs also in teams that are associated with the specific subject. The fact that there are relatively few conflicts between these levels (ibid.), must be attributed to either a general sense of loyalty, or may also be attributed to the challenges that have not yet become visible.

Goals for elementary/lower secondary school teaching

School is a place where all pupils according the national curriculum are to be able to get a collective goal-oriented education. The school of the future must be able to attend to a pupil's holistic development. The next generation and future is at stake. The deciding factor as to how teaching is experienced by pupils is the manner in which various goal dimensions are presented/attended to at the same time. There has to be a safe and good learning environment. Pupils must master the method use, and the method use must function as a useful tool in the

learning process. Pupils must be given the opportunity to demonstrate initiative and cooperation, and teaching must be experienced as meaningful and motivating. At the same time the goals must be realized such that they can be evaluated in terms of achievement. Such evaluation can be in the form of tests and other forms without over emphasizing the test aspect in a complex teaching reality.

It is necessary for us to attend to several goals at the same time. Teaching is all about holistic development, knowledge as well as attitudes and skills. The human characteristics that are to be developed are much more than what can be measured by written tests. In order to be able to succeed in the development process, it is necessary to see how a simple goal affects the holistic learning context. Even in cases where teachers are aware that the learning environment can be developed, it is not always the case that they are able to analyze the learning environment's starting point for further innovation. Therefore, they need support to analyze, and encouragement to take the small steps that are necessary for goal-oriented development.

The trials and testing that have been done regarding method use and various goals and objectives have given us experience on learning that is worth building further on. In Norway we think that it is positive that our new national curriculum opens up for local input and development of method use, and that it puts more focus on what is to be learned (Løfsnes, in progress). The teacher must create a foundation for a breadth of goal realization and pupil influence through a step-by-step development, and see the steps in a holistic context. This requires that the teacher practices analyzing contexts and develops teaching step by step. Adaptation for development must accommodate the specific pupil group in question.

Summary

Schools in Norway achieve in varying degrees the goals proposed in the national curriculum's perspective on holistic education (Løfsnes, 2002; in progress). We have idealistic goals for our pedagogical establishment. It is necessary to strive to reach these goals, and it can be difficult to completely fulfill them. The learning environments in our schools are diverse and multifaceted. I would believe this to be the case for schools in other countries.

It is necessary to put focus on the aspects of pedagogical activity that should be strengthened or improved, but society at large must be cautious of putting too much emphasis on certain aspects of such a complex reality. It also appears that the focal points of new curriculums, as for example, more focus on what is to be learned and on developing pupils' basic skills, is also the same thing that schools have partially begun to focus on before the implantation of the new curriculum (Løfsnes, in progress). National tests can best serve as correctives for teachers and school administrators who have already established a clear awareness of how they fit into the short term as well as the long term goals. The utmost care must be used, when regarding teachers and school administrators who have not developed this collective consciousness. Pressure can magnify the problems that occur when a teacher is forced to establish their own values and yet feels partially helpless when faced with the many powers that govern development.

Even though emphasis on certain and limited goals can cause the weakening of other goals, we cannot give up our ideals about what constitutes good teaching. Striving to create a good school for everyone necessarily includes many challenges. Development does not come easily, but we cannot afford to give up our knowledge and educational ideals for future generations and the advancement of society.

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Information neocompetences of the teacher in regard to communicating by means of the Internet with students, parents and other participants in the education process.

Introduction

The Internet is an excellent means of human to human communication. It enables global exchange of thoughts, views or theories. It can be successfully used by the teacher, students, parents and other education participants for the purpose of communication (K.Wenta, 2006:188 and J. Grzenia 2007). Using computers connected to the web, the teacher can convey information also after classes, during holidays, while being outside of school or even outside his or hers own place of residence. The format of the message may vary – it can be for example an important announcement, homework, a hint, description for a given grade, description of an event, additional exercises etc. The content being conveyed may refer equally well to the educational as well as the didactic sphere. Using the Internet for communication and its evolutionary nature depend however on the teacher's competence occurring in certain historical and cultural circumstances (M. Castells 2003:18).

Before our very own eyes a new communication education is arising, based on the principles of bit, as well as qubit and sub-qubit information science (J. Gnitecki, 2005:8). In such constellation the information user does not have to resort to only one source and means of transmitting information. He has previous and present knowledge as well as the ability to extrapolate on the possible future image of information. Therefore, the basic element for information competences of a teacher and a student will be knowledge of digital sources of information as well as ability to use a variety of digital means of storing information. Will the prior information competences be enough to face the tremendous volume and variety of digital information that can be found in such a vast resource as the Internet? I am fairly certain that it will not. A person skillfully using the information found on the Internet falls under different requirements regarding knowledge and other information skills than before, and therefore new education competences are required. I call them information neocompetences. Regarding Polish information neocompetences of the teacher, one has to remember Polish understanding of the quality of the teacher's work. It is advisable to consider proposals

coming from such countries as the United States (ACRL Institute for Information Literacy), Australia (ANZIIL Australian and New Zealand Institute for Information Literacy), United Kingdom (SCONUL Information Skills in Higher Education), yet one shall also take a closer look at one's own backyard since the competences of a Polish teacher are difficult to consider without taking into account the specific conditions in Polish schools, grounded in the Polish culture, both the national and the regional one.

A schematic for the information neocompetences of the teacher

Information neocompetences of the teacher have been defined as a structure of information activity, comprising of knowledge, skills, abilities and attitudes (M. Czerepaniak – Walczak 1994:67) in regard to a plan for solving a problem by means of finding, selecting, creating and providing digital information. A detailed analysis of information neocompetences is presented in Table 1.

Table 1. A schematic for information neocompetences of the teacher in Polish reality

Information neocompetences of the teacher		
L.P	The scope of information activity of the teacher	Manifestations of information activity of the teacher
I.	PLANNING for solving the problem by means of digital information	<ol style="list-style-type: none"> 1. Plans the purpose of the information activities. 2. Identifies key ideas and terms describing needed information. 3. Determines the format of digital information searched for (text, audio, visual, audiovisual). 4. Prepares plans of information inquiry. 5. Provides equal access to information needed – organizes educational space.
II.	ACQUIRING digital information	<ol style="list-style-type: none"> 1. Uses online search engines. 2. Uses discussion groups and forums. 3. Differentiates and uses primary and secondary information sources. 4. Knows dangers (including ethical issues) arising from improper use of digital information and cautions own students about it. 5. Reevaluates the plan for Internet research.
III.	SELECTING digital information	<ol style="list-style-type: none"> 1. Evaluates information in regard to availability, credibility and usability for educational purposes. 2. Recognizes different formats of recording digital information. 3. Sets hierarchy for acquired information.
IV.	CREATING	<ul style="list-style-type: none"> - Is aware of the rules for providing information on the Internet.

	digital information	<ul style="list-style-type: none"> - Recognizes and explains to students the difference between using intellectual property of another person with credit to the author and plagiarism. - Respects legal regulations for creating digital information.
V.	DISTRIBUTING digital information	<ol style="list-style-type: none"> 1. Knows the rules for providing information on the web. 2. Uses the web to communicate with students, parents and other education participants. 3. Provides didactical materials to students and other teachers on the web. 4. Conforms with legal regulations when distributing digital information.

While planning a career, the teacher has to evaluate the state of one's own education competences and compare that to the requirements. Evaluation accompanies teachers throughout the whole period of professional activity and self evaluation is one of the basic education skills. Therefore, scientific research has been started aiming at diagnosing the state of teachers' information neocompetences. The presented results are a fragment of research carried out in 12 cities in Poland, among 192 Polish language teachers in secondary education, with account being taken for their professional promotion hierarchy and their place of employment. The results pertain to the matter of providing digital information using appropriate means of communicating via the web with students, parents and other education participants (E. Perzycka, 2007: 76-79 and E. Baron-Polańczyk, 2007:22-30).

Quantitative analysis of the obtained results

It is difficult to choose reliable, ideal and universal sources of cognition, and the questions assuming authoritarian character of the problems of human knowledge (why, on what basis?), have been proposed by one of the contemporary philosophers, K.R. Popper to be replaced with the following uncertainty: „Is there a way to detect and eliminate mistakes?” (K. P. Popper, 1999:365). The scholar proposes eliminating mistakes in the inference process and approaching the truth by ongoing criticism of various theories. Such attitude of a so called critical rationalism originates from the traditions of ancient Greeks and is in itself a supplement to classical theories of outstanding philosophers such as Kant and Descartes. The truthfulness formulated by I. Kant as „the accordance of cognition with the subject of cognition” (I. Kant, 1957:146), is based on bivalent logic and the principle of autonomy. He prefers seeking truth in multiple sources with important acknowledgement of tradition and observation. The tools used for the herewith presented studies include a survey, interview and

observation. The self evaluation of the teachers' information neocompetences based on survey research is presented in Table 2.

Table 2. The state of self evaluation of information neocompetences of Polish language teachers in secondary schools in regard to using the web for communicating with students, parents and other education participants with account for professional promotion hierarchy.

Professional hierarchy level of the teacher	Self evaluation of teachers in regard to internet communication with students, parents and other education participants									
	Level 0		Level 1		Level 2		Level 3		Level 4	
	L	%	L	%	L	%	L	%	L	%
Junior teacher	34	70,8	11	22,9	0	0,0	2	4,2	1	2,1
Contractual teacher	33	68,8	13	27,1	2	4,2	0	0,0	0	0,0
Appointed teacher	22	45,8	14	29,2	8	16,7	4	8,3	0	0,0
Chartered teacher	36	75,0	6	12,5	5	10,4	1	2,1	0	0,0

Source: Author's research

Self evaluation of information neocompetences by Polish language teachers in secondary schools in regard to using the web for communicating with students, parents and other education participants, with account taken for professional promotion hierarchy, does not vary significantly. All teachers evaluated themselves by very low marks. This pertains especially to 75% of chartered teachers in the group under study, as well as 70.8% of junior teachers. Similarly low values have been chosen by contractual teachers with 68,8% estimating themselves to be at „very low” and 27,1% with the „low” level. Only one junior teacher has declared his level to be „very high”. There were also a few declarations for the „high” level. Definitely the highest self evaluation mark can be observed with chartered teachers, who have declared the „average” level more often than other teachers. Nonetheless, self evaluation of information neocompetences by teachers themselves, in regard to using the web for communicating with students, parents and other education participants, yield very low marks with all teachers.

Qualitative evaluation of the obtained results

Virtual communication may be either direct or indirect. In direct communication we are dealing with a media infosphere comprising of a logosphere (word-text, sound), iconosphere (image, animation – moving picture) and telematic services (transmitting messages,

videoconferences, everything that pertains to the observed development of structures in the World Wide Web)(Z. Kierzkowski, 2003:15-16). In order to initiate or maintain contact with another person, the teachers use both forms of transmission, most frequently resorting to language and text. Shall that not be sufficient, they resort to using pictures and sounds. The most frequent means of communication is a typed text.

There are two reasons for such situation. The first one is hardware requirements – each speaker has to have appropriate external tools allowing for directing one's own voice or image into the computerized medium. Also crucial is the bandwidth for the files being transmitted. Low bandwidth will not allow for rapid transmission of an image captured by the camera which impairs communication leading to discouraging the interlocutors or to abandoning this form of transmitting content altogether. Another factor is the willingness of the communicating people to actually use the aforementioned tools. Both sides have to agree to that. Frequently individuals do not wish to be viewed or listened to by others because: *physical anonymity means safety, we do not have to feel uncomfortable when our haircut is not what we want it to be. In our free time we can send a message wearing a bathrobe or a training suit. Also, using instant messengers allows for many activities to take place simultaneously or for simultaneous communication with multiple individuals.* Regardless of whether the teachers use a microphone, headphones or an internet camera, the important thing is that they are actually trying to nictitate internet communications with students, parents and other education participants.

Teachers just like other professional groups are ever more frequently complaining about the lack of time, therefore the possibility of using e-mail or instant messengers may enable them to contact individuals who are hardly available for direct contact or not at all, such as parents, who also usually do not have enough time. Internet communications may be helpful in expanding the tool arsenal of the teacher, however this is extremely rare among the interviewees. As little as ten people, including five junior teachers, two contractual teachers and three chartered teachers declared this form of exchanging professional information. E-mail is used by the teachers more frequently for communicating with friends, family and less often with students and their parents. Teachers do not engage in remote teaching nor learning (S. Juszczak, 2002).

Teachers using instant messengers such as the Polish „Gadu-Gadu” software to provide a follow-up for a lesson or clarify issues to students, which would enable them to prepare for the classes – is another way of using the Internet besides e-mail. Instant messengers are used for mass communications. They enable our information to reach large numbers of users on the web. In their statements teachers appreciate lessons (and in numerous cases even series of lessons) devoted to analyzing the records of conversations over the „Gadu-Gadu” instant messenger. Issues which appear to be worthy of being verbalized, may affect the way we view the phenomenon of communication in the 21st century. When analyzing the „Gadu-Gadu” conversations, teachers pay particular attention to: 1) *non-compliance with the rules of Polish grammar – lack of punctuation, exclusive use of lower case characters etc. – the form of recording the conversation;* 2) *fragmentary nature of the conveyed information – it is hard to determine who is talking and when as well as who and when listens;* 3) *chaotic utterances – the first message may have nothing to do with expecting a comment, being rather a stream of consciousness;* 4) *doubtful level of politeness in one of the speakers – lack of formal contact with a given human being, not taking into account one's attitude or personality;* 5) *excessive use of emoticons – expressive means of using graphical signs.* Often teachers express complaints regarding language correctness of their students. *Brevity in expressing judgment and opinions, domination of informal words pauperizes the richness of a language. However, it is also not advisable to allow for continuous disruption of communication over Gadu-Gadu by repeated remarks about the correctness of the student's typing.* The reality of mobile phones and the Internet makes it difficult for the teacher to develop language competence in the students. Therefore, a serious challenge for the teacher is attempting to analyze during classes the conversations over Gadu-Gadu or other instant messengers or to pay attention to communication disruptions arising from disregarding Polish grammar and spelling. Up until recently the teacher would only comment on essays written by the students in their note books or during the tests, whereas nowadays it is possible and highly desirable to use records from instant messengers, since students have developed a specific language for communication on the web, which can be called a limited code, *characterized by: using short sentences, limited vocabulary, swear words, euphemisms, colorful expressions, using words in a broad range of meanings.*

The rise of digital civilization enabled young people to be „at ease” in their conversations. This results from a multitude of factors. A young individual has very little time to type and

send a text or rapidly answer a question asked on the instant messenger – and therefore strives for maximum brevity. This is also the reason for devising abbreviations and symbols, whose meaning is only known to „insiders”. In course of that they misspell a lot of words, use metatheses or do not finish the words. Just like teachers, parents have difficulty understanding abbreviations used on the web by their children, such as „cze” - for „cześć” (hi), „nara” – „do zobaczenia” (see you), „spoko” – „spokojnie” (don't worry), „impra” – „impreza” (party), „dzięx” – „dziękuję” (thanks), „pa” – „podaj adres” (give me your address), „adn” – „lada dzień” (soon), „bbl” – „wracam za chwilę” (be right back), „bmw” – „bardzo mało włosów” (very little hair), „zw” – „zaraz wracam” (will be right back) and many others. The new language arising before the very eyes of the teachers and parents (A.Watoła, 2006:28-32) is full of: abbreviations, slang, emoticons, borrowings. Can it be that apart from learning foreign languages such as English, German and others, the teachers now have to face the challenge of learning a web language used by young people, in order to be able to understand them? I am fairly certain that this is a problem posed to the present day Polish language teachers. How could they deal with that? I do not think it would be a good idea to step aside and wait while observing the new phenomenon, as its consequences noted also by B.L.J. Kaczmarek⁵, can prove detrimental for the new generation. Constant use of a limited code causes: 1) exclusive development of „divergence” in thinking, 2) rapid growth of overconfidence leading to self-assertion, 3) developing a belief for only one truth, 4) oversimplifying the view of the world, 5) being subject to manipulation, 6) liberating overwhelming superficiality in expressing one's own thoughts, 7) developing external morality.

Summary

Social communication, in which the Polish language teacher participates, is the broadest possible way of communication which encompasses all processes pertaining to communication of human individuals, using a rich arsenal of tools: apart from speech and its substitutes (writing, print), we should also mention gestures and facial expressions, singing and music, sculpture and drawing, photos and films as well as many others. This leads us to posing fundamental questions about the process of communicating: who communicates with whom, by what means (media), for what purposes, with what kind of consequences and in whose interest? Answers to those questions can tell a great deal about the society we live in as

⁵B. L. J. Kaczmarek, from a lecture titled: Język Internetu jako rodzaj kodu ograniczonego, held during the 6th National Conference titled: „Media w edukacji – szanse i zagrożenia” 28-29 May 2007 at University Nicolaus Copernicus in Toruń.

well as forms of imposing power and social control. We cannot assume that communication is always beneficial or neutral. The terminology used for communications science includes such terms as "propaganda", "manipulation" (B. Siemieniecki, 2006:25-26), "indoctrination", "ideology", "deception", etc. Communication conducted by students via the Internet as noted by B.Siemieniecki does not only create a specific cyberspace culture, but is also a place where new forms of communication and mutual relations arise, which leave room for implementing new forms of manipulation. Students create a new media and peer environment Are they going to stop at this stage?

Teachers together with students should create an environment for web communications with an educational dimension (B. Siemieniecki, 2003). We cannot „oversleep” a situation where the gap in information neocompetences that exists between the teachers and students will start widening which could lead to increasing negative feelings towards the school expressed by both sides. At the same time one should also consider that communicating via the Internet is no substitute for genuine talk and face to face contact. It is due to non-verbal messages – body language comprised of: facial expressions, gestures, stance – that the expressed emotions show understanding of a given subject or the lack thereof. A challenge for multifaceted education run by the contemporary teacher is establishing a connection between the two worlds so that the „Matrix” interwoven into reality becomes an ally in building social relations suitable for the 21st century. One must not forget that not only is culture made by people but also people's minds are shaped by culture.

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A Learning Community – time, freedom and acceptance

The Society of change

There is no doubt we cannot, in fact, foresee the conception of school in the future society. Please, go ahead ten or twenty years – what will be the school buildings we are familiar with? Where and who will be the teachers – may be you will find a robot, or you will find a human being left alone in his private room, separated from students, and surrounded with electronics. Or – she is included in a technical based network treating electronic based, educational remedy. And what about the students? Where will be the ordinary school classes? Students sitting alone in their private media room loaded with electronics we do not yet know, or sitting in large groups in monitoring centres for learning? This is the scenario of school in the future, and what then should we with persuasion and wisdom write about school, about teacher in school, about students and most important – what should we, even if using our best wit, say about teaching and learning in general, and in particular about the human relationship between teacher and students, between school and parents, between school and society? A lot of questions – who will answer?

What is this unexpected future *actually* about? Of course – it is about the society of modern technology. And – we may add – it is about educational technology which calls into being the *information society*.

More than 30 years ago the sociologist, professor Daniel Bell (Harvard University) had the vision of what he calls “the post-industrial society” about which he claims “The post-industrial society is an information society, (...)” (1973)⁶. Here we are just now – in the information society and – we may add - in an overwhelming amount of information, too much information, one may complain. We should not disagree with professor in educational psychology (Sweden) Roger Säljö (2001) who inquires how one shall make meaning in the confusing stream of information.⁷ When the amount of information is unforeseeable, Säljö

⁶ Bell: referred to in H. Gaard 2006). About Bell: go to GOOGLE

⁷ In similar way the Norwegian sociologist I. Frønes (2002) states that information society is not – necessarily – an informed society. In the cyberspace there is a lot of facts, but there is an important leap to construct *knowledge* out of pure facts. More about Frønes: go to GOOGLE.

asks, how should one take the important step from information to knowledge? (Cf. Nilsen, H. 2006A.)

The professional of adult education and critic to IT pedagogy, Scavenius Lopez, C (2002) speaks about “pre” and “now” scenario, and the school does not in adequate way prepare the students for our digital based and complex society. School (she claims)

“suffer from an educational and structural baclog because school culture is not in sync with the information society. (...) it is not enough to add a bit of problem and process oriented learning here and there. What is needed is a far more radical change of the educational system: a change in the overall philosophy behind education and learning, (...)” (quoted from Gaard 2006:487).

To repeat what is already said: here we are with dubious future what concerns to handle the overwhelming flow of electronic based information, and the leap between the stream of information and genuine knowledge. When pushing in front how to cultivate this situation, we are close to the role of the teacher. Even we cannot predict the future scope of school, teacher’s role in school and what will be the role of students and classes, we pretend or hope that teachers will occupy a prominent role any way, a role that has strong impact upon students’ knowledge base, wisdom and their cultivating for society.

Teacher in the information society: to need or not to need ...⁸

We may state that the teacher as the most prominent mediator of information (facts, meanings, etc.) is passed and so will be to some extent the ordinary textbook based form of teaching and learning (cf. Säljö 2002). However, the teacher should have a superior role to mediate what will be the great challenge for the school as such and for the teacher in particular; that is to support pupils to separate information needed from information not needed. This will be, in detail, to support the processes how to pick up (adopt) the flow of information, how to separate needed info. from not needed, evaluate and contextualize and finally how to use the information at hand. This process imposes and pressures *holistic thinking* in a living world characterised by pieces of information and fragmentary knowledge. The scenario seems obvious – the school aimed for the

⁸ More about the role of the teacher, see: Nilsen, H. 2007, and Nilsen, H. 2006B. This article printed in Norwegian form in: Nilsen, H. *Fredrikke* nr. 4-2007. See also Djuliman, E. & H. Nilsen (red.) 2007: *Dijete, nastavnik i skola. Ideje za inspiraciju i za djelovanje*. (Serbisk/Kroatisk).(Barnet, læreren og skolen) Helsingforskomiteen.

future must prepare the students for an electronic and complex society. This scenario calls for “the logic of inquiry” (R. Lain 1966)⁹. For Lain the logic of inquiry is the basic to transform pure information to genuine knowledge, and in another way, “he (Lane) also seeks to emphasise the increased *self-consciousness* about society which such knowledge provides” (Gaard 2006:484).¹⁰

Students self-consciousness is well documented in the New Norwegian (school) Reform, 2006; *Knowledge promotion*.¹¹ The National Curriculum stresses pupils responsibility for own learning, suggests the need for organizing the learning process, encourages for critical, independent thinking. And the “good” teacher is advised to be in the role of model and supporter for personal, reflective thinking (cf. Løfsnes in this volume).

To separate relevant information from irrelevant will be the basic and obligatory, next step will be how to use information. This aspect will be illuminated by data linked to observation and talk with a teacher.

From discussion to practical school issues

Here the article will refer to a case study carried out in a classroom, students grade 9 (class no. 9B) and the subject mathematics, and IC technology included as learning resource.¹² In the role of observer I noted that use of computer had at least three aspects worth telling: (i) changes of the teaching method and the relationship between teacher and students, (ii) changes regarding the general conception of learning, and finally I noted the learning outcome.

Regarding the conception of learning the teacher, Henning Bueie, was a proponent or an organiser of *understanding* rather than teacher of teaching.¹³ The term understanding, in my opinion, provides a user perspective for the object and for the subject as well (the student); i.e. a pragmatic, functional (interactive) perspective. For the individual (the subject) understanding appeals more than learning to the idea that pupils should be able to reflect

⁹ In Bell 1973, referred to in Gaard 2006:484.

¹⁰ Self-consciousness: aware of one’s surroundings and of self; a persons thoughts that to a certain extent determines choices of action (*COLLINS* paperback English Dictionary)

¹¹ More about “Knowledge promotion, see: Nilsen, H 2006C. Also printed in *Fredrikke nr. 3-2007* in English form slowly edited, and with a summary written in Norwegian form.

¹² More in: Nilsen, H. og H. Bueie 2007.

¹³ Bueies conception of understanding merging with professor of Library & Information Science, Carol Kuhlthaus states about IC technology in use and for critical thinking (referred to in Gaard 2006:489).

upon and do something with what they have learned. In other words, understanding is linked to cognitive competency (cf. the DeSeCo-report calls cognitive competency “reflectiveness” which is “the heart of key competencies”). About the same in Kuhlthaus book *Seeking meaning* (1993). “Seeking information is a meaning-making process that includes the whole human being: thoughts (ideas), emotions and actions”.

In my role of observer I noted that “understanding” was linked to the teacher’s position; he positioned himself in an anonymous way, and teacher’s anonymity had a praiseworthy impact upon the students, something like an attitude of “wait and listen”, an indefinable atmosphere like “we are here to learn” and – “the teacher is here for us.” As I see it, the anonymity of the teacher was a signal to the pupils that they themselves should take steps for learning process. The personal, electronic equipment was present, the computer in itself was interesting and opened up possibilities for investigation. The teacher explain:

In my view the learning situation has changed after we started to use ICT. The focus has shifted from teaching to learning, from the teacher to the pupil. This means that pupils themselves must be more active in knowledge acquisition. Through their interaction with the computer, pupils control their own progression. They navigate through net pages, investigate, try out things, and the learning process is circular and recurrent rather than linear; cognition research has too long seen learning as a linear transfer of knowledge and knowledge as a storeroom of mental representation.

To sum up – I observed the teacher in the role of manager for functional learning strategy or – in another word – learning competence, that means: to give the pupils time enough to take initiative, to pick up and evaluate information from Internet, and finally use the relevant information to solve the mathematical tasks.

The teacher points out the concepts skills and understanding, and the solving of the task by way of electronic remedy is designed to demonstrate both aspects. Bueie states about this relation that a skill comes from understanding. Understanding is the motivation behind the skill to “use” a tool. One can nevertheless add that a certain technical skill is also the prerequisite for understanding, i.e. a cognitive process. Understanding and skill are qualities that reinforce each other in an endless process.

Learning strategies

In a conversation with four pupils in this class I asked what it meant for them to use the computer during the math class. Their answers contained terms such as “easier”, “revise”, “exact”, “remember” and “order”: “it is somehow *easier*, we can *revise* and delete and get it done more *exactly* than by using pencil, dividers, and exercise book—there were so many things to take care of. When we use the computer we have everything, we *remember* where things are placed, and there is *order*.” One girl expresses it in this way: “the challenge is to remember and to think, because we know that everything is there”.

The pupils’ comments indicate something about learning strategies, about learning as cognition. This means that the computer invites or demands a way to think, remember, and investigate, in other words, invites and demands attention and concentration. In conversations we come across the term “smart”, and the pupils tell that everybody keeps up initially, but that after a while some become smarter because they remember better, “those are smartest who remember where things are”, as one pupil points out.

The pupils’ statements can be described in terms of both a cognitive and a process view of learning. What the pupils pointed out is that to be “clever” (the pupils used the term “smart”) was not “smartness” in terms of getting many correct answers, but they talked about the conditions for learning, to remember what was where, to remember/think/understand what one needed, in other words, learning strategies. Indirectly they demonstrated that the process was more important than the final product. This is in accordance with the teacher’s view; he talks about “navigating” the web pages, investigating, trying out. This point needs to be elaborated.

About pupils’ identity

The subject was mathematics, the tool was the computer, the teacher was a “conductor”, and the framework was relational pedagogy. It is the role of the conductor to “see” everybody, everybody is seen. To be seen means to feel included, and this describes the situation in class 9B. Furthermore it appeared that pupils were equal, independent of any measurable “smartness”. The teacher gave them time to try things out, to make mistakes, to succeed, to succeed “eventually”. This practice appeared to create secure pupils, and feeling secure is a

prerequisite for being a learning pupil. The pupils did not only learn a subject and learning strategies, they furthermore learned an *identity*. It appeared that the use of computers in the classroom, the seeking and trying pushing of the keys in combination with the teacher's accepting patience formed the foundation for a type of security in terms of equality. A non-segregating, relational pedagogy provides a good basis for reinforcing human value, which is the basis for a positive identity.

Summary

In this study there is a focus on rapid changing society in which the school should have an outstanding role. The main message of the article is the author's scepticism what we can – within a certain amount of security – say about school for the future. What about the role of the teachers, what about students, what about educational remedies and the size of the use of information and communication technology? The article states there will or should be strong impact on the role of the teacher, still we don't know *who* and *where* the teacher will be looking forward for a period of 10 -20 years. In every case, we suppose there will be great focus on how to prepare and how to use information and information technology. The Norwegian teacher Henning Bueie throws a glance into the future when claiming: "The positioning of the teacher is a decisive factor. After we started using ICT, the focus in the classroom was shifted from the teacher-pupil dialogue to a dialogue between the individual pupil and his or her computer. Pupils must be more active and *search* for new knowledge, navigate net pages, check and try things out. My role is that of an aid, directing a learning community". Experiences from this study show that the positioning of the teacher is an important prerequisite for the experience of the computer as an inspiring tool. Pupils must have sufficient *time, freedom, and acceptance for a learning strategy marked by inquiry and investigation*. To state explicit: Responsibility for own learning.

In regard to learning gains, the article stresses the importance *understanding*. Understanding surpasses skills - the ability to navigate with one's own electronic remedy – and understanding surpasses the overwhelming flow of information and pure facts, because: Understanding means insight into *what* one does and *why* one does what one does. The computer is not the final goal, however a tool in an investigative process towards insight, wisdom, "cultivating". Our teacher Bueie stresses the importance of quality in the process and thinks that the process itself must receive as much attention and priority as the final result.

Focus on processes means focus on *learning strategies*. Learning strategies are related both to an individual-cognitive and to a social-cognitive view of learning, which both correspond to the 2006 school reform “Knowledge Promotion”.

The article furthermore analyses the learning of *identity*: who am I as a pupil in general and as a pupil in the school community and in the class (eventually)? Questions like these are linked to the relationship between teacher and students - *relational pedagogy*. In spite of rapid changes – there should be a “firm reference”, that of the role of the teacher, and – more important – that of the interaction between teacher and students, i.e. the *learning community*.

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What's pedagogical about technology? Selected observations concerning instructional technology applications in the United States

“Technological progress achieves advances of general utility, but the concrete form in which these advances are realized is through and through determined by the social power under which they are made and insures that they also serve the interests of that power” (Feenberg, 1991, p. 35).

Introduction

Schools in the United States are connected. According to the National Center for Educational Statistics in the United States: “In fall 2003, nearly 100 percent of public schools in the United States had access to the Internet” (NCES report, 2003). As schools acquire hardware, software and high-speed Internet connections are becoming commonplace the discussion of physical access has been shifting from student-per-computer ratios to the quality of use (e.g. Becker, 2001; Clegg, Hudson & Steel, 2003; Cuban, 2001, McGrill, 2006). Consensus over the good connectivity rates is usually justified as a necessity of the phenomenon for “education of the 21st century (e.g. Judge, Puckett, & Bell, 2006). Just as quickly many researchers agree that the impact of computers on education has not met its expectations (e.g. Becker, 2001; Cuban, 2001; Warschauer, 2006) whereas others observe that computers did not bring about change like other pedagogical practices such as cooperative learning or whole language (e.g. McGrill, 2006). While tasks for computer presence in the classrooms seem to be plentiful, their actual application and impact on student academic achievement leave much to be desired. Some argue that with access to the newest of technologies in their classrooms, teachers still teach the way they were taught whereas personnel, socio-economic context and educational policies are apparently much better predictors of student success than teaching practices (Papanastasiou, 2003; Reynolds, 2003; Wilson, J. D., Notar, C. C., & Yunker, B., 2002; Warschauer, 2003). In accord with Feenberg’s (1991) observations about the embedment of technology in the society, powerful computers connected via the fastest of connections do not guarantee student progress above and beyond the socially constructed parameters originating outside of the school walls. The question then remains: what is really

taking place in classrooms in the country, where access to computers connected to the Internet is not a challenge any longer?

Learning theories underpinning constructivist ideals, normally associated with technology-oriented pedagogical efforts, are rooted in Dewey, Erikson, Piaget and other theorists (e.g. Rakes, Fields, & Cox, 2006). Following that lead instructional technology thinkers seem to focus on indispensability of critical thinking, creativity, collaboration and development of other human traits as ideals to be aided with technology (e.g. Stahl, 2006). Educational practice and policies in the United States, however, seem to be pointing in a different direction. What teachers actually do in the classrooms with computers remains questionable (e.g. Fletcher, 2006) and what is called the most far-reaching educational reform attempt in recent history in the United States, the No Child Left Behind legislation has also been described as “repressive” (Dede, 2002). These conflicting theoretical assumptions and colliding with them educational policies and practices seem to be the underlying forces dominating discussions around educational technology, its implementation and impacts. While connectivity to technology is not a problem, dynamics governing its implementation have not changed the underlying system while leaving pedagogical practices mostly unchanged. Despite the richness of technology in schools throughout the country, teachers do what’s tested.

Challenges to technology integration in Texas

Following the State’s mandate (Texas Educational Agency, 2005), teachers in the State of Texas are expected to integrate technology into instructional processes throughout the curriculum. Fletcher’s (2006) examination of technology implementation practices among 5th grade teachers in two elementary schools in Texas, however, points to an acute shortage of integration practices among both: students and their teachers. Despite the State mandate, majority of the participating in the study teachers indicated that they did not model technology nor did they integrate technology in their practice and that they did not even ask their students to use technology in their learning. Immediate results of the Fletcher’s study paint a starkly grim picture of technology integration. At the same time, however, although majority of the respondents to the surveys did not develop technology units that would require students to use technology, they also indicated that they did use the Internet to access relevant for them information.

While teachers did seem to find their own niche for interaction with technology, students apparently are left with access that may not only be reflective of the theoretical assumptions about technology, but even the State mandate. In case of scheduling, to use an example, the author claims that: “Each school already has a lab available that is focused upon drill and practice behavioral skill implementation, but does not leave time in the schedule for more cognitive or constructive technology applications endeavors” (p. 217). The statement suggests that “drill and practice” are concepts taken for granted in the examined schools, and are normally given a priority, whereas more creative uses are not seen as necessary in scheduling of time in the computer lab.

The above examples seem to attest that educators pick and choose applications to suit their professional needs while curricular technology applications tend to be addressed in terms of support for development of basic skills for the students. The relevant applications for computers in Fletcher’s study: finding information for teachers and imposition of drill and practice exercises for students may not necessarily be seen as catalysts for innovative pedagogical practices among teachers nor conducive to development of critical thinking among students. As recommended remedies, Fletcher suggests more teacher training, access to portable technology, better scheduling for time spent in the computer lab and even required documentation to prove that the technology implementation actually takes place. It may seem somewhat doubtful however, that while access to desktop computers at the schools that she studied was not a problem, more portable devices would be a viable solution. While Fletcher shows how very little actually happens in the sphere of technology integration, her study also points to remedies that reveal a school culture not clearly dedicated to development and fostering of complex cognitive skills with technology, but leading to mundane pedagogical tasks, and top-down administrative approaches as readily available panacea.

Portable technology: next steps?

In a study examining secondary English teachers’ attitudes towards a laptop integration initiative, McGrill (2006) observed that schools in the United States move towards portable computer equipment to “encourage student centered learning and critical thinking in collaborative classroom” (p. 1055). Most of the participating in her study teachers, however, perceived this type of technology in their classrooms as an ambivalent effort. Despite positive expectations for laptop applications such as individualized instruction, raising students’ self-

esteem, improving study skills and support for constructivist teaching, the initiative was met with great variety of challenges. Frictions in school governance, testing procedures, curricular applications of technology and even professional identity of the teachers in the technological context, among others, have been discovered as areas of concern to study participants.

The list of problems with laptop integration started with the lack of teacher engagement in the technology planning processes. In a similar fashion to Fletcher's study, top-down approach taken by the administrators to implement technology resulted in teachers' resentment and frustration. Another gap between administrators' and teachers' expectations arose because one of the reasons given for the laptop initiative was the promise of expected raise in test scores but computer-based instruction advocated by the administration, was not the best way to achieve higher scores on paper-based written exams. Teachers perceived their daily and apparently more traditional instructional tasks as more important and separate from technology integration efforts. As administrators insisted on more laptop applications, teachers found themselves ill prepared and with very little time to practice the new skills. The promise of technology did not meet the expectations with focus on instrumental approach to laptops as new tools, to fulfill the old tasks. Instead of helping, technology became a problem to overcome, part of a political rather than pedagogical process.

Highly individualized applications

The youngest of technology users, the so-called Net Generation (D.G. & J.L. Oblinger, 2006) tend to describe available to them technology as a broad spectrum of devices and applications that make the desired tasks possible. The key term here is customization, or the ability to adapt technology to meet individual needs, rather than to impose rigid technology-based drills for students to master the most basic of skills (p. 3.5). Technology is believed to allow for highly individualized modes of exposing students to the pedagogical content. Teachers in Fletcher's study, although not in line with the State mandate, did manage to find their own individualized niches in the spectrum of access to computers. These examples seem to suggest that instead of looking for generalizations applicable in other environments, the discussion about educational technology should focus on highly specialized and individualized modes of teaching.

High specialization, however, may not necessarily imply improvement. Even taking advantage of just-in-time access and applications may be done for all the wrong pedagogical reasons. NCLB, for example is a repressive legislation (Dede, 2002) whose aims seem to confirm the political upper hand over technology as understood by Feenberg, rather than the idealistic Global Village. From Fletcher's study it should be clear that school culture has much to do with the way technology is implemented. Drill and practice are still considered the better part of the time spent in the computer lab and top down administrative approach is still a reality for many teachers. For the most part, teachers teach they way that they were taught and that may be one of the reasons why technology applications are lacking and why there is room in pedagogical consciousness in the United States for calls to basics as embraced in NCLB. Considering that legislative stress on education lies on teaching of basic skills, as reflected by the NCLB in the United States, then creativity and profound educational changes seem to be lying very far ahead. Dangers of technology integration can be extended by political dimension or rather who controls the curriculum, long before any instructional technology is actually applied. Considering that students from rich socio-economic schools do better on tests than students from poor schools, perhaps content of the curriculum is much more concerned with maintaining the status quo in terms of political divisions, as reflective by testing. The discussions with regard to technological applications in schools should perhaps be shifted to examinations of who is served by the outcomes of education: test results and funding patterns. Access to technology may not be considered in terms of who has access to computers connected to the Internet and who doesn't, but rather in terms of how these devices are used (Warschauer, 2006).

Perhaps technology in schools is slowly becoming a commonplace to the point where we do not need to talk about it in terms of novelty and resulting models for others to follow, but rather as support for highly specialized applications that expand the field of teaching practice. There is not one technology-oriented solution in the educational spectrum, but rather individualized solutions; sensitive to local and immediate needs of the students and their teachers. Teachers will always be instrumental in the instructional processes (McGrill, 2006) and technology applications will never be free of the political powers governing society at large (Feenberg, 1991). The intersection of politics and classroom practice, technology notwithstanding, in accord with Dewey's and Freire's ideas, has been and always will be embedded within educational practice. Teaching, learning and technology applications are

complex skills and environments and they should flourish in environments where they are not subject to calls for minimal or basic education. Intersection of technology and pedagogy probably cannot and should not be delineated as sets of prescribed rules, but rather as a process in which human dynamics among teachers and students results in behavioral change associated with learning. It seems that the idea behind saturating classrooms with technology rests on an assumption that some of it is going to be put to a good use. It probably is a good assumption. Integration however, is not going to happen in a predictable and systematic fashion. It will probably happen when students being taught with technology now, grow up to teach others to build a tradition of technology integration.

Summary

Technology allows for high levels of specialized customization to fulfill students' and electorate needs. The human traits of struggles for power remain unchallenged, however. Learning by doing in the context of rich and meaningful interaction is still an aberration rather than a rule. Examples of technology implementation described above do not necessarily mean that technology as such has failed but rather it still is a medium in search of its niche if any. Studies done on educational practices point to the importance of strong development of human and cognitive traits like critical thinking and independent interpretation before teaching with technology is successful. The challenge may be that the term "technology" itself represents different concepts to different people. By 2007, understanding of what computers in education should and should not do moved away from one specific application that could be overarching ideal of meeting specific expectations. Filling schools with computers, while not always perfect, serves the purpose of providing tools. Teachers will find ways of using them just like they do with more traditional applications: chalk and blackboard. The difference is not the level of technological sophistication of available hardware and software, however, but critical thinking skills demonstrated and applied by the teachers.

Epistemic engagement (Warschauer, 2006) and not sheer presence of technology will make a difference. It seems that the view of education for the 21st century will not necessarily revolve around the newest technological advances but rather around human traits that have been focal points of education much longer than the concept of the computer, let alone the Internet. The gap apparently can only be filled with teachers, who pay attention to their students' necessities technology notwithstanding. Teacher's task is to be aware and sensitive to the

needs of the local student populations they serve - a trait of good professionals regardless of their technology proficiency.

Authors like Warschauer attempt to show the positive aspects of educational technology, while putting the blame for the project's failure on the context of its use. Dewey (1916) already talked about the embedment of education in the social structures surrounding the school walls. In the contemporary classrooms, the students' needs are the same, but the means are changing. The imperative then quite absent from the daily pedagogical practice is the social context of its applications that is to be taken for granted and discussed. Attempts to apply technology in isolation from its socially generated settings are bound to fail. Dewey's and Feenberg's thoughts remain to hold true. Technology in education will always work only to the extent allowed by outcomes of struggles outside of the classroom walls. Judging from examples in the United States, other countries may need to be mindful of these dynamics. In accord with Feenberg's (1991) theory of technology as a field of contention, what takes place in the classroom is an outcome of interactions among human beings and it still is up to the teachers, who are influenced by those social forces, charged with socially-embedded values that determine student learning outcomes, test scores and extent of technological applications.

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Teacher in the Knowledge Society - Overview of the information and communication technologies in education in Argentina and its importance for the teaching practice

In recent years, new information and communication technologies (TICs) have exerted tremendous influence on our daily lives. The influx of these technologies results in changes in the ways we communicate, obtain services and learn. Unfortunately, not everyone in our society has access to TICs. A phenomenon known as “digital divide,” which defines limits of access because of socio-economic level, age, lack of technological infrastructure, and even personal attitudes, seems to be intensifying.

Education cannot and it should not be isolated from society influenced by these changes. Schools need to assume teaching practices embedded within modern-day society, stressing democratization and equality in line with Argentinean law which states that “administrative regions recognize the importance of the communication media and they will ensure access to the information for all children so that they can obtain information and materials originating from national and international bodies, and especially information and materials which in the end may promote their own social spiritual, moral well-being and physical and mental health” (Regulation Number 17). Educational and economical policies need to be based on thorough diagnosis and plans of action that consider: teachers’ skills, equipment, connectivity, didactic strategies and other factors. These efforts need to be supported by both: political and educational professionals. In Argentina, incorporation of the TICs is a problem that may not be readily solved on a larger scale considering the depth of the digital divide and different educational experiences among students. Planes, projects, campaigns, should be focused on incorporation of the TICs with help and assistance from educators with experience in computer science whereas discussion regarding the kind of equipment to be purchased should be focused around students’ needs to be addressed with technology applications and its functionality:

- Why use TICs in education?
- Why teach how to use them?
- In what way do TICs benefit student learning?

- What are the benefits and what are the arguments against TICs?

TICs in Argentina

The new technologies have been introduced into schools in an unsystematic and even disorganized manner throughout Argentina. Systematic and national plans of action that would consider stages of implementation, equipment, and capacity building have been lacking and they did not include all schools at all levels. Plans for TICs incorporation in higher education have not been modified either and problems with technology applications in schools will not be solved with technology workshops for teachers but with specific actions that will empower educators of tomorrow to actually teach with technology, and what will contribute to the formation of educational professionals equipped with skills necessary for the full utilization of the TICs.

The different jurisdictions (national, provincial, Federal Capital) have carried out in the last 15 years projects numerous initiatives for acquisition of the TIC equipment such as making agreements with banks and soliciting corporate and individual donors. The obtained equipment, as described above in a very unequal manner, was normally placed in a computer lab, usually one of the smallest rooms still available at a school previously used for other purposes with minimal electrical wiring and security. Most of the computer networks then consisted of seven to ten computers with a printer, whereas Internet access was an addition in recent years. Each jurisdiction has implemented specific strategies for utilizations of the computer labs at schools, in majority of cases with a computer science teacher. That teacher had the knowledge and with the knowledge power which he could use to communicate, offer and share what few teachers were interested in receiving.

One of the initiatives to remedy the unequal access to technology and information in the last decade is project “Schools in the Net” (Aulas en red) within Buenosairian Network Telematics (Red Porteña Telemática) from the Ministry of Education targeting primary public education. The project was implemented in October 2001 in 47 public schools. Its main goal was to enrich educational experience with daily use of TICs for all students. Among many changes, schools work with technology facilitators, who work with teachers planning projects or instructional units which include applications of the TICs to be carried out by the students. Their weekly hourly load is related to the classroom level that they teach within the given school and varies from eight to 22 hours per week. Development of teachers’ capacities to

teach with technology is required on a weekly basis with no class interruptions. Schools also receive assortment of hardware to fulfill the goals of the Project and annually receive subsidies for technology equipment. Project's web site contains areas for teachers to create their own materials, collaborate with other teachers, and organize circles around specific interests, wikis, blogs, webs, and discussion fora. The project staff maintains communication via e-mail with all interested teachers.

At the national level Educational Advisory General (Consejo General de Educación) has been developing since 2004 The Program of Equality in Education, which promotes equity in policy making and educational practices. The program consists of educational proposals from the Ministry of Education, Science and Technology of the Nation, whose goal is to strengthen primary urban educational institutions for children with greatest needs in the country. Program is limited to schools that can be identified as "urban" and those who have at least 300 students. In 2004, 43 schools entered the program, in 2005, 22 and in 2006, 25 educational institutions were included. The program serves over 90 institutions by now. The Program of Equality in Education provides pedagogical, informational and capacity building resources. Participating in the project schools receive support in instructional activities strengthening teaching practice, access to new technologies, articulation with the community and scholastic reintegration. Efforts are articulated through cross-sectional and national trends towards capacity building among teachers and curriculum management, remedial education and evaluation of the quality of education. In majority of the Argentinean provinces, numerous educational institutions benefit from the program: July and Mendoza provinces are the best of examples.

Resistance to TICs

Why is it then that despite such efforts, technology integration comes so slowly? One of the most convincing reasons is the resistance among teachers. Unwillingness to use technology for educational purposes seems to be widespread and sheer access to computer even with support from a computer technology specialist may not provide all the remedy needed. Capacity building efforts, for example, are isolated in the Buenos Aires area because of the teachers' mobility. Modification of the teaching practice seems to be more acceptable among younger teachers. Resistance could also be attributed to the lack of technology-oriented culture, which would allow for access to knowledge via the newest of technologies. For that

reason, teachers are not prepared for TIC utilization to create knowledge in the classroom, although they may use technologies to access information, at the same time limiting, however, potential for learning. With this attitude, teachers are not prepared to utilize TICs as media capable of creating knowledge in the classroom, to the fullest potential, whereas access to the technology-oriented culture is very unequal. Other possibility could be resistance to change, manifested by lack of willingness to learn TIC applications, using a pretext that technology is difficult, that it is for the youth, or simply fear that the new practices will not bring about the desired change. What is certain is that the resistance to change can be seen not only in terms of technology or intention to change pedagogical practices, but in the difficulty to develop and maintain new curricula based on TICs.

TIC integration in the schools is not only a problem of good hardware, but also the question of politics that shape the environment in which these technologies are implemented in the scholarly environment. From educational point of view, TIC incorporation in educational practice requires development of certain cognitive, creative and communicative abilities among students, teachers and administrators as they use technology to fulfill pedagogical goals. Here, hardware and software donations are not sufficient without offering creation of spaces where students and teachers recognize potential benefits for adequate usage in relation to their pedagogical objectives reestablished in their projects.

What in general is the use of TICs today?

Primary schools:

In the pedagogical and didactic contexts, these schools work with information, rather than TICs. Although some improvements are conducted and finished on a yearly basis, they are not related to any broader vision. Technology-based projects are usually isolated and implemented in a general sense of soft education only for drills and entertainment. As for the benefits to the students they are expected to do exercises, be entertained and amused, get familiar with the personal computer platform and its terminology, learn how to use the mouse, keyboard, concentrate on learning the software without posing behavior problems and without asking technical questions of teachers who do not know how to solve them anyhow. In case of the computer science teacher, he or she is the one who is supposed to know the technologies, plan instructional activities to the extent necessary for students to use the software and to propose activities on the basis of the content given by the teacher.

Preconceptions:

1. Teachers in general, know little computer science, even less than their students. Teachers need to know computer science to the point that it is possible for them to propose interesting activities and to ask a computer specialist teacher for help.
2. Students in general do not have the technological sophistication to operate PCs, they do not necessarily understand the logic behind Windows, they do not know how to use the mouse, and they may not even know how to use the computer better than the teachers. They only wish to play and entertain themselves.
3. Educational software serves the entertainment purposes, allows for content-based exercises, helps with discipline, confirms teacher's autonomy, and contributes to the students' readiness to learn how to use the computer. Software is also used for text editing, spreadsheets, and graphics especially for younger children with limited literacy skills and limited attention span.

TIC application is characterized by lack of theoretical foundations for learning that would support teaching practice. Majority of the educational software available on the market, leads students to the correct answers on a trial and error basis, where confirmation and negation of the answers are marked with sound effects, and where no productive work can be accomplished with error analysis. Interface of many programs designed for the youngest of students, also distances them from the pedagogical objectives limiting the computer's capabilities to provide for a meaningful educational experience. Such interfaces are characterized by icons, sound effects and animations with dubious attraction. Whereas for some they may present some utility, for others they are distractions and limitations for the school work. Learning valuable enough to be taking place in the computer lab is usually known as "the computing hour," sometimes devalued by the same teachers weary of the time they will have to spend to compensate for the computer lab time away from their curriculum. Other times, the activity is called "an hour of play" on days when regular curriculum is not taught.

In the second cycle of the primary school (students of 9 to 12 years of age) searches for information are usually initiated. This is the time when Internet appears to be a resource more useful in the classroom, given that Internet is a very powerful and diverse source of information which permits rapid access to books, museums, articles, radio, television, maps,

photos, videos and other resources. This information, however, should not always be trusted to be useful to students. Teachers should pay attention to utilize criteria for their students so that they in turn can access trusted sources of information and select those sites that will allow them to complete their work. Generally, however, teachers do not provide sufficient support for students to orient them in effective ways of search for information and its evaluation. Hypertextual form of the Internet only adds another variable to this discussion. Teachers need to realize the importance of critical evaluation of information, how to select trusted sites, with valid content and how to utilize effective searches for best results. Although students may approach the Internet without much criticism, in reality Internet does not always exhibit the quality of information that adults are accustomed to access from more traditional sources. The large quantity of sites retrieved as a result of a search and quality of their content need to be questioned at all times. It is the teacher's responsibility to expose students to rigorous search routines that would lead them to trusted web sites from recognized and established organizations and institutions whereas instructional activities should lead to reflection over utilization of such sites.

One of the more popular preconceptions is that students as young as 11 years of age know more about computers than their teachers. It seems certain that students are well acquainted with everything digital, because they are used to utilization of technological objects, they know how to chat, write emails and contribute to photo logs (flogs), blogs and video logs. Some of them know how to make changes to audio and graphic files. The problem is, however, that not all of them use computers to enrich their learning, for lack of critical thinking skills, they do not know how to search for information effectively.

At the same time, however, there are many professors who take advantage of the TIC's potential and who realize activities that truly enrich curriculum, projects, didactic units on the basis of significant learning, prepare their own digital materials, webquests, collaborative projects, treasure hunts, wikis, blogs for students and their teachers. Students utilize word processing, spreadsheets, presentation software, graphic editors, geometry simulators, maps, web sites and other programs to realize the different school works which teachers propose in the pedagogical sequence.

Educational software

There are many interesting software titles which allow for student learning in non-traditional forms. These may allow for game-oriented approach to problem solving, organize information about student progress for the teacher so that analysis of erroneous and successful answers is possible. Some software allow for evaluation of the students' work. Moreover, this group of software programs is characterized with lack of insistence on simple drill, where student responds to a prompt and the program indicates whether the response is a correct one. There are graphic organizers which allow students develop habits of information organization. Such visual organization of information allows for better understanding of what has been studied. One of such graphic organizers is Kidspiration, designed for students of up to 9 years of age, and its version for older students: Inspiration considered very useful for creation of the following:

- Concept maps (interrelated and interdependent ideas)
- Data networks (main topics and sub topics)
- Planning (definition and clarification of objectives and prioritizing of the communication work)
- Graphical organization (cause and effect diagrams)
- Brainstorming (geration of new ideas, context development, discovery of patterns and general solutions)

What resources do TICs offer?

The incorporation of the TICs in the educational spectrum has as its goal a betterment of the pedagogical qualities. TICs are embedded in communication and information, the two aspects realized by the Internet. Among resources made available thanks to the Internet: electronic mail, videoconferences, discussion groups, educational portals, and chatting can be cited, which make communication at a distance possible. The communication can be established among people and groups within one school, or among different institutions located in the same community and other regions, provinces, states, countries, among teachers, teaching and learning subject specialists. Internet is not only a good source of information where students can not only find materials for their studies, but can share with others products of their work through weblogs, where anyone can post comments about anything that has been published.

Another resource is the development of web sites where students and teachers can publish text, photos, images, and those in turn can be analyzed and used in other productions. Strategies that favor such work are treasure hunts, webquests and wikis. TICs are appropriate for collaborative learning, for creation of virtual study circles, collaborative projects, webquests and other forms of online interactions. Today, we can collaborate with other people thanks to sharing of online documents and plans such as resources proposed by Google.

Our educational experience using TICs

It seems obvious that teachers incorporate TICs in the education of their students, but what traits will indicate that the chosen path is a correct one? In what way do TICs enrich educational experience? Project Schools in the Web, among other initiatives, provided ample experience of working with information. This project's findings tell us that instructor does not have to extensive computer science experience to enrich his or her practice and students' learning with TICs. With interest, willingness, curiosity, creativity and innovation, students will utilize best available technologies for their own learning. Later, students can acquire other desired skills by means of their own experience.

Between 1998 until 2001 authors of this text worked using computer lab with activities related to planning of a classroom and using Microsoft Word, Excel and other software with students of 6,7 and 10 years of age, and later seventh grade (October 2001 until December 2003) relying on help from other professionals such as technology facilitators supportive of the project. In the planning process for the whole year assessment of the current teaching practice, time that it will take to get acquainted with TICs resources available, and evaluation of which technologies could be used to achieve educational goals for students and teachers in the program had to be considered. A diagnostic to obtain data on how project Schools in the Net helps students on different levels reach their academic potential was formed. Some of the data in question came from variables such as: complexity of the homework, written and verbal expression, teachers' experience, students' behavior, group identity, roles and positions of the adults involved, their interests, and conflicts and resolutions among others. The goal was to obtain as much information as possible about competencies and experience of students who would use the new technologies for their benefit. The data permitted planning and organization of the content in academic areas, activities and resources

necessary for optimal learning of all students involved. Each assessment unit and four bimester for each area were developed during each academic year. In the assessment unit a research project to recollect data during a series of didactical activities was planned, which on top of being related to the knowledge of the students of the basic areas at the sixth grade level, would let students utilize local area network (LAN) to take advantage of the resources that would possess capacity for realization of programs from each area such as: using the Internet (e.g. searches and sites to complete online activities, subscribe to science bulletins), organizing information in files (each computer was used by four to six students of two different project groups), using resources such as CD readers and knowing how to access multimedia libraries. Respect for the materials and equipment have been found crucial for students if they were to take responsibility and consciously use computers. Results were very positive as students took charge of letting the technical support know to work out strategies for trouble resolution.

In subject areas such as natural science, mathematics and language arts, projects were organized in accord with the curriculum design for the city of Buenos Aires. For example in natural science: Earth's view from space, Earth as a changing planet, biological diversity and materials. Each project was presented to the students by means of a PowerPoint presentation, had a pedagogical sequence and was organized within guidelines of the digital studies and evaluated by means of traditional strategies and evaluation rubrics and matrices. Within the digital guidelines, there were suggestions for the students to work with open-ended questions, search for information on the Internet, multimedia encyclopedias and other recourses, processing of information using Word, Excel, PowerPoint, Publisher, FrontPage as well as other programs in different formats such as: informational texts, presentation of transparencies, web site development, brochures, bulletins, or virtual libraries, study circles, sharing of materials via e-mail, chat, and videoconferencing with other schools in the country. The digital work with the information was in accord with the goals of the project. Students worked on identification of the key words, questions and answers, working out graphic representations of the information and concept maps among others (Schools in the Web Project, 2003).

In language arts immigration of 1850 through 1950 was discussed on the basis of distinct text: informative and argumentative, for which search and selection for information had to be

performed. Using the Internet to share the knowledge, students designed mock interviews with the immigrants of that time, used spread sheets to convert their data into visual displays that told the stories of the motifs behind immigration, the quantity of the immigrants who came to which countries, cities and places where they lived. Students used Microsoft Publisher to design informational brochures and Power Point presentations to teach the material to students in other grades. Evaluation rubrics and matrices accompanied students who knew beforehand how they could evaluate their teachers within the context of their digital products and processes. Results of this experience were very positive and received recognition from parents, teachers, administrators and coordinators of the project.

The question whether students actually learn better when they use TICs still remains? Do they learn better than with more traditional resources? It is the belief of the authors of this text that learning is a process interwoven with so many biological, social, economical and cultural variables, that response with a definite “yes” would not be an informed answer. If we can say that students participating in the project experienced the daily practice of learning with various multimedia resources, which in turn developed habits and capacities of self guidance, conflict resolution, autonomy in decision making, which worked critically with the information in various projects and within different formats, which assumed responsibilities of personal care and computer equipment, and which armed them with strategies and useful tools for their information as students, who remained enthusiastic towards learning using computers and who developed personal strategies to work with others appreciating strengths and academic achievement for all. These would be some of the achievements of the ITCs in our schools.

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Creative use of multimedia technology in teacher's work

Introduction

Technological progress dictates the necessity of using dynamic changes in education. In Poland we can notice a growing interest for new solutions in the field of education such as *e-learning* and computer-aided education taking advantage of multimedia. In spite of the vast literature and extensive research accumulated in the field of *e-learning*, we still lack a clear set of standards for preparing didactic multimedia materials. On the other hand, the teachers' community is still featured by a low level of knowledge regarding the methods of using new media for education, as indicated by research carried out in this field (D.Siemieniecka-Gogolin, 2005). Changes in education require new didactics based on the latest research in the field of cognitive science. Technology in education puts the reproductive forms of pedagogical work (R.Schulz, 1992) out of date and stimulates searching in new fields of knowledge. This search yields questions regarding the place and role of a teacher in the technological world. Schulz (R.Schulz, 1992) points out that in educational relations there is a perceivable new subject and object of education taking shape, being the „new learner” and „new teacher”. He also notices the development of pedagogical (social) knowledge and the possibilities for its creative use. Equally important is technological and organizational modernization of the upbringing base, the shaping of a proinnovative system of values among the participants of the educational process, as well as creatively oriented philosophy of education in theoretical pedagogy. The problems of shaping values, ethics and creative attitudes are becoming increasingly important for education in the era of technology.

The creative and non-creative teacher

In Schulz's (1992) view, the work of the teacher is in a state of gradual transition from reproductive forms of pedagogical practice – that consist in passive use of the existing cultural foundation of education - to innovative forms that consist of active development founded in experience. Based on the aforementioned theses, the author characterizes the reproductive teacher, who „(...) resorts to passive implementation of pedagogical experience and would only use solutions that are already known and widely practiced for a very long time, simply reproducing the cultural heritage of the past”. The work of a non-creative teacher is habitual in character, schematic, stiff and stereotypical. On the other hand, a creative

teacher is internally steerable and therefore nonconformist and highly autonomous. A creative teacher „(...) enriches the existing body of pedagogical experience; such teacher designs and introduces into own practice new and improved solutions, functioning as a teacher-innovator; in addition to the realized meritorical functions such teachers perform developmental functions: their work contributes to the progress of didactic and educational practice” (R.Schulz, 1992:10). The work of a creative teacher is characterized by reflexiveness, awareness of the set goals and means for fulfilling them. Creative teachers adapt the means of action to the situation at hand. Their way of working is flexible. In contrast, a non-creative teacher is characterized by external steerability. Schulz points out important transitions from pedagogical reproductivism to pedagogical creativity, which take place in two axes: from automated to reflexive actions, from stiff actions to those which are flexible, from external steerability to the internal one, from a „standard' to an „innovative” product.

Therefore, the transition from reproductivism to the „new teacher” requires suitable preparation of future teachers based on the changes in two dimensions: the global one – in the scale of the whole world, social – in the scale of a whole country as a nation and in the individual dimension i.e. in personal scale (M. Dudzikowa, 1992:43). Such education needs to be based on accounting for the development of free expression, the development of one's own imagination, the development of divergent thinking, perfecting non-verbal communication, better knowledge of one's own self, development of empathy and intuition (B. Matwijów, 1992:127-129). According to Bogusława Matwijów (1991:127-129), in order to prepare future teacher-innovators for their work, one has to account for their individual development with particular notice for the sphere of creative abilities. Furthermore, „(...) introducing didactic innovation is not possible until the teacher himself starts working creatively”(S.Palka, 1988:182-187) This fact is confirmed by research on pedagogical innovation, which suggests a close relation between innovative activity and creative attitude as well as the creative style of teachers (D. Ekiert-Grabowska, 1994). Preparing the teacher for creative and innovative work should aim at pointing out the factors which allow for the existence of the process of creation and autocreation (S.Popek, 1988:31), which in turn involves significant changes in the process of educating candidates for the profession. We can say that creative or innovative use of multimedia for teaching should comprise of:

- multimedia material design stage (at this stage the teacher may use heuristic methods such as: synectics, *Checklist* questions method, *brainstorming*; systematical heuristic

methods, such as: morphological, tree of solutions, systematic)(W. Tarnowski, 1986), as well as algorithmic methods based on logical inference.

- implementation stage accounting for designing the layout and structure of the content, as well as relations and cohesiveness of the content. This stage should be based on the rules for creating presentations (the layout of the text in a presentation, color and type of fonts, background colors, graphical elements, animations pertaining to the subject).
- Investigation and evaluation of the use of multimedia material both in the field of content reception as well as the development of thinking capabilities.

Multimedia material should also contain the tasks and content characterized as open problems. Creative multimedia presentations are connected with divergent thinking, bringing a multitude of solutions and openness. An IT product that is creative in nature (a multimedia presentation) falls into the category of divergent thinking and relates to the situation: "I can solve this problem in this way or another (but I do not know how yet)". A product that is creative in nature results from seeking many possible solutions to a given problem. On the other hand, convergent thinking manifests itself in reproductive, routine performance of problem solving tasks(J.P. Guilford,1978). One has to point out the fact that we do not regard as productive the products resulting from solving convergent problems which have one or more possible solutions (J. Strelau, 1987). Therefore, a piece of software, database or web page, which does not comply with the criterion of creativity, is one where there is only one correct, optimal way of solving a problematic situation. An IT product cannot be regarded as creative if it pertains to typical and widely used solutions.

Multimedia in the creative work of a teacher

Multimedia are defined as a **multitude** of means for communication(W. Kopalinski, 2002). Multimedia "(...) combine different means for communicating: text, image, animation, narration, video, music"(A. Lepa, 1998). These means are placed in different classification systems within the category of audiovisual media. One important feature of multimedia messages is a high level of audience activation. Accounting for different levels of audience activation, media can be divided into: presenting – based on transmitting messages, interactive - demanding a rather high level of activity among learners (W. Strykowski,1997:13). Multimedia materials (multimedia presentations as products of IT) should include both of the aforementioned characteristics, providing transmission of

messages, facilitating their understanding, as well as allow for the activity of learners and their actions and learning through interacting. Multimedia, due to activating all channels for receiving information both visual and audio for teaching, allow for mental operations taking part in the creative process, such as: analogous thinking, metaphorical thinking, making associations, abstracting, making transformations (D. Siemieniecka, A. Siemińska-Łosko, 2007). Creative use of multimedia in teacher's work can be pondered upon by analyzing:

- the features of the teacher (personality and character factors such as: the level of ability and creative attitudes) affecting the style of using media,
- products of the creative activity of the teacher: features and analysis of multimedia materials and projects implemented by the teachers
- products of creative activity of the students taught by creative teachers,
- the creative process itself – the process of creating learners and teachers.
- analyzing factors activating and impairing creativity: internal (perceptual, intellectual, emotional), external (physical, social, environmental).

I shall further concentrate on determining the features and criteria for a multimedia product (a multimedia presentation or a multimedia software aiding the teachers in their work).

When can we regard a multimedia presentation as a creative didactic material?

A multimedia presentation used as a didactical aid performs the following functions: motivational – its aim is to intrigue, evoke interest, willingness and readiness to learn; the cognitive function – it allows the learner to explore reality in a direct way, the forming function facilitates developing cognitive abilities, solving practical and theoretical problems based on one's knowledge and abilities and implementing the knowledge acquired into practical actions; the educational function – facilitates shaping proper attitudes, views and ideas about particular phenomena; the control function – verifying information and ways of thinking, allows for evaluating the level of mastering the knowledge and abilities. In order for a multimedia computer software or a web page to be considered a product that is creative in nature, one would have to assume the following criteria for analysis: originality meaning "free from reproductiveness" and from autoplagerism (E. Nęcka, 1994), featured by individuality (J. P. Guilford, 1978), novelty M. I. Stein, 1982), being unusual - related with rare occurrence of similar products in a human collective, as well as esthetic value (E. Nęcka, 1992), artistic value and social significance (J. P. Guilford, 1994).

Technological creativity of IT relates to modern technologies, which may be classified into: presentation technologies, information distribution technologies and technologies allowing for interaction in the process of communicating, meaning telecommunication tools as well as tools for artificial intelligence (expert systems, neural networks, genetic algorithms, fuzzy systems, intelligent agents, Bayesian networks, hybrid AI systems) (D. Siemieniecka, 2007).

The context of the set of problems analyzed here requires approximating the characteristic features of IT products pertaining to creativity, such as: originality, individuality, novelty, being unusual, esthetic and artistic value, as well as social significance.

An IT product (multimedia presentation) may be regarded original if it results from creative activity. We can use the term for a web page, database, multimedia presentation, whereas software that is featured by novelty may occur rarely. This feature may pertain to both rarely encountered solutions as well as associations (D. Siemieniecka, 2007).

Originality comprises new unconventional solutions regarding the form, organization of information, and therefore both the external and internal form of a product regarded as creative.

The individuality feature is strictly connected with the criterion of novelty. Individuality pertains to being unique, to the characteristic features of a product. Tatarkiewicz points out the dualism inherent to the novelty of a work (product): he writes that what is new "is partly similar to the thing that was before and in a way also non-similar" (Wł. Tatarkiewicz, 1982). Novelty according to Tatarkiewicz also undergoes grading. The degree of novelty of a given object may be higher or lower. Human creation is abundant in qualitatively different kinds of novelty – we may point here at a new shape, model, method or creation. Novelty may have different origins: it may be intentional or unintentional, impulsive or directed, spontaneous or methodically achieved (D. Siemieniecka-Gogolin, 2005). Web pages, presentations or multimedia programs may include new, interesting solutions inherent to only the one product and not encountered elsewhere. The characteristic features of an IT product (e.g. a multimedia presentation or educational website) may include both external features such as content, form, graphics, applets as well as internal, which may include a different code, algorithms, the

structure of a piece of software or application. Individuality and novelty may refer to a general idea of a product, a concept.

Being unusual, on the other hand, pertains to the rare occurrence of similar products in human collective. It results from free choice and combining elements placed in a product. Unusual are those products, which show previously hidden connections between elements of the whole structure.

The esthetic and artistic value of IT products (multimedia presentations) comprises of the content and layout of graphical elements placed on web pages, in multimedia presentations, educational software, as well as the esthetic sensation caused by such products. The esthetic and artistic value pertains to the color scheme of web pages, their form, keeping the layout, proportions and richness.

The social significance of IT products means that they should be socially valuable. These products result from intentional human activity and constitute new material and spiritual values having social significance. Social significance relates to interacting with the audience. A product may be regarded as creative only when it relates to social demand (D. Siemieniecka, 2007).

A multimedia material accounting for creative features can be used in computer aided education in different subjects as didactical aid, it may also be a program meant for individual work carried out by the learner. And finally, it can also be widely used in the field of computer diagnostics and pedagogical therapy.

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The Relationship Between Self-Directed Informal Learning and the Career Development Process of Technology Users

Introduction

A 1979 report exploring the state of education in Europe and the United States concluded that much more attention must be paid to lifelong learning (Botkin et al, 1979). This position is especially true due to today's rapid technological changes and increasing social complexity (Brown & Duguid, 2002). According to some career development researchers, the primary way people respond to the lifelong learning needs precipitated by change is through informal learning; that is, they learn from the everyday experiences they encounter (Livingstone, 2001; Livingstone & Sawchuck, 2000; Merriam & Caffarella, 1999; Merriam, Courtney, & Baumgartner, 2003). This condition has precipitated a significant social dilemma.

Technology is the driving force of change in our lives and our careers (Bandura, 2002; Bridges, 1994; Brown & Duguid, 2002; Collin, 2000; Drucker, 1999; Storey, 2000; Toffler, 1990). Technology, on the one hand, is meaningless without context; on the other hand, given context, technology is not neutral (Norman, 1993). In other words, predicting the influence of technology on people is, at best, a very difficult task. Fortunately, the effect of technology on society is most readily observable in a common context: the workplace (Merriam & Caffarella, 1999). That understanding drove both the selection of the population for the study and the sampling strategy.

Theories related to the workplace and career development abound. Likewise, there is no shortage of theories about learning. However, conspicuously missing from the literature and from general practice is a single plausible theory depicting the relationship between individual career-related decision-making and the various forms of individual learning. Little is known about how an individual directs the learning necessary to continually develop his or her career trajectory. While there is some agreement that the majority of career-related learning in the workplace is acquired informally, attempts at understanding the connection between self-directedness and informal learning during career development have been exacerbated by competition for attention between two well-documented yet apparently conflicting theoretical

views: Bandura's (1977, 2001) agent-oriented social cognitive theory and Lave and Wenger's (1991) social context-oriented theory of social practice. Therefore, the purpose of this paper is to interpret and explain the relationship between self-directed informal learning and the career development process.

Uncovering "the meaning people have constructed" (Merriam, 1998, p. 6) while engaging in self-directed informal learning during career development required accessing how people interacted with the many opportunities to learn that were afforded by the context of their everyday environment. Exploring the tacit side of learning-to-learn led to the solicitation of self-narrated life stories from thirteen purposefully selected participants. These were people who had created and developed a career trajectory based in large part upon their role as formative technology users; that is, one or more computer-related information storage, processing, and/or communication technologies made up a significant part of the career role from which the majority of their livelihood was derived. They represented multiple age groups between 25 and 65, a cross-section of educational backgrounds from high school dropout to doctoral candidate, a variety of work roles from self-employed to corporate management, and multiple work place venues. The data acquired from the participants' life-story narratives were used to seek out meaningful relationships between personal agency and the influences of one's career community of practice.

The Entrepreneurial Nature of Career Development

According to *Webster's Ninth New Collegiate Dictionary* (1986), an entrepreneur is "one who organizes, manages, and assumes the risks of a business or enterprise" (p. 416). Combining a content analysis with a holistic examination of the collected narrative data revealed a decidedly entrepreneurial "conception of occupational self" (Thorén-Jönsson and Möller, 1999, p. 73). In addition, participant response to the entrepreneurial nature of career-related learning fell along a continuum summarized as The Entrepreneurial Nature of Career Development matrix, shown in Table 1:

Table 1. *Entrepreneurial Nature of Career Development*

		Activity	
		Entrepreneurial	Passive
Learning	Entrepreneurial	Entrepreneurial Catalytic Learner (E²) Highly agentive <ul style="list-style-type: none"> • Self-directed • Autonomous • Risk-taker • Self-reflective • Innovative 	Passive Social Learner (EP) Negotiation-oriented <ul style="list-style-type: none"> • Self-directed • Late adopter • Conservative • Self-reflective • Imaginative
	Passive	Reactive Learner (PE) Stimulus driven <ul style="list-style-type: none"> • Other-directed • Catalytic events • Early adopter • Norm-reflective • Maintenance 	Reactionary Learner (P²) Highly contextual <ul style="list-style-type: none"> • Other-directed • Serendipitous • Single task-oriented • False agency • Maintenance

Landman (2001) states that when asking how questions “about people and their behavior the answers tend to fall into two generic categories: internal (personal) or external (situational)” (p. 63). Such an interpretation helps explain the two main categorical labels for the matrix: Learning and Activity represent the two critical components arising from participation within an activity system (Lave & Wenger, 1991). In other words, the matrix depicts as Lave and Wenger instructed: “Learning itself is an improvised practice” (p. 93) that implies “participation in an activity system about which participants share understandings concerning what they are doing” (p. 98).

Learning and Activity are consistent with the conception of knowledge as being, respectively, declarative (factual) knowledge and procedural (performance) knowledge (Merriam & Caffarella, 1999), as well as being personal and public (Rawson, 2000). However, as Lave and Wenger stated, the two are not mutually exclusive. Additionally, argued Hansman (2001), the self-directed learning associated with career development “takes place as learners practice doing the real thing, adapting what is necessary from models and working on their own” (p. 47). Indeed, the participants’ self-narratives made it clear that learning cannot be separated from action; both aspects defined them as learners because, as Bloom has shown us, knowledge implies the use of information (Driscoll, 2000). With rare and often whimsically narrated exceptions, few of the participants wanted merely to engage in what Bruner called

“learning about” (Brown & Duguid, 2002, p. 128), but rather each desired to do something with his or her learning, what Bruner referred to as “learning to be” (p. 128).

The descriptors Entrepreneurial and Passive represent two conceptual poles idealizing career-related learning and their respective career-related activities. A fully Entrepreneurial approach is as rare as a totally Passive one; and, as is often the case with polarized values, observation and analysis showed all participants falling at various points between the two in either their career-related learning or their career-related activity. For example, one participant demonstrated a strong entrepreneurial propensity for activity in acknowledging his limitations, assessing resources, and visualizing desired outcomes in order to hire another individual who would then actually do the entrepreneurial learning required to achieve the imagined outcome goals. Conversely, another participant’s nature as an entrepreneurial learner occasionally propelled her desire to learn to exceed the entrepreneurial activity necessary for efficiently and effectively meeting the demands of her community of practice.

Finally, understanding the dynamic relationship between Entrepreneurial and Passive as participant descriptors “requires understanding humans as more than simple ‘goal pursuing agents.’ For humans, rules and goals bear a complicated relationship to the social fabric. Both may shift dynamically in practice depending on the social conditions that prevail” (Brown & Duguid, 2002, p. 50). Consequently, individual episodes within each participant’s self-narrative moved back and forth across the continuum, sometimes showing the participant to be more entrepreneurial, other times showing him or her to be more passive in either their learning or their activity.

The Catalytic Learner (E²)

Content analysis of individual narratives revealed multiple means linking individual agency and career development. Many participants described a meta-cognitive link between their perceived learning needs, learning style, and resource assessment. Some described the use of artifacts as the primary trigger for precipitating the agentic activity of assessing learning materials while others relied more on people. Several narrators described situations of reflective persistence in which they purposefully forced task solutions to fail in order to better understand an underlying process. Ironically, what one might think to be the essence of agentic behavior—a strong desire for independence and aspiration toward one’s own sphere

of influence—was rarely included in the participants’ narratives. In every observable instance, agency was an expression of action: no action, no agency. Importantly, one’s sense of agency could be either positive or negative in its influence on learning and learning outcomes related to career development.

Additionally, content analysis exposed multiple means linking one’s environmental context and career development. In fact, most participants provided unaided recall of events related to their sense of agency and their perceptions of contextual influence in almost equal proportions. As a result, although rarely sustained through multiple narrative episodes, the entrepreneurial learner engaging in an entrepreneurial activity was not an uncommon event. It was important to determine that both agency and context existed as elements of career-related learning; however, determining the connection between the two required a holistic perspective. Taking a story perspective of each narrative provided such a holist view and it painted an interesting picture of emerging agency.

Schank (1990) pointed out the critical importance to one’s learning associated with personally examining and then explaining the world. Moreover, he asserted that “everything people say regarding their . . . experiences [with the world] is a story of some sort” (p. 29). Thus, it is not the number of stories told that made one an entrepreneurial learner, but rather it was the “sort” of story told. Indeed, following Schank’s pattern, the more agentive the individual learner, typically the more his or her stories tended to be “first-hand experiential stories” (p. 36) of personal growth. These were often “invented stories” (pp.32-33) created to capture a new experience. The less agentive learner relied more upon “official stories” (p. 30), “second-hand stories” (p. 36), and “culturally common stories” (p. 38).

Participant reflection on the actions of their story protagonist carrying out the plot of an episode being described proved illuminating. Anne (all names are fabricated), an aspiring corporate employee, provided a narrative that represented variations of the official corporate story. The protagonist of her stories typically spoke the appropriate corporate jargon in following a logical causal plot in which she strove “to solve issues for our clients [making them] more dependent on us.” Dirk and Fred were often caught up in renditions of the culturally common epic of the quixotic hero jousting against the inefficiencies of time and the inadequacies of the tools at their disposal. And, Kari depicted her agentive aspirations through

the second-hand stories of others she admired and aspired to emulate. All of these participants did, indeed, narrate authentically agentive episodes; other less prolific narrators did also.

On the other hand, in her first-hand experiential story about getting an auto dealer's software running, Cassy demonstrated her meta-cognitive ability to assess her inventory of skills in terms of her task needs. In doing so, she acknowledged that she was part of the problem. Because she was "not a tech person," she could not just dive into the program and make it work. Cassy took responsibility for the disruption as opposed to merely attributing it to bad luck or the fault of a prior employee. By integrating herself with the problem, Cassy became an interactive element of the problem situation.

Roberson and Merriam (2005) observed that "motivation and intensity to learn are often enhanced" by the injection of "a catalyst" into the learning activity (p. 275-276). The entrepreneurial learner taking action within an entrepreneurial context is such a catalyst. Cassy had positioned herself to become "aggressive" in stimulating others to help her solve the problem as well as in the evaluation of the usefulness of their technical responses. She had become a catalyst, triggering new learning for herself that provoked both personal and task environment change. In framing, organizing, and managing the problem with herself integrated into it, by assuming the risks associated with becoming aggressive in demanding information, Cassy represented herself as a truly agentive protagonist in her story. The results of Cassy's career-learning endeavors were multiplicative (E2). Action, especially action as a disruption of the status quo, was an important part of the stories of entrepreneurial learning.

"Thus," stated Schank (1990), "in order to find out how we learn, we must find out how we know that we need to learn. In other words, we need to know how we discover anomalies. How do we know that something did not fit?" (p. 60). Clearly, protagonists' evaluations of their environment and reflection on their actions played an important story role regarding agency in career development. However, evaluation and reflection required a field of opportunity where protagonists could, in one participant's words, "play with stuff," play with strategies and experiment with meanings. Whereas unstructured and unreflective play can be perceived as serendipitous in nature, the structured play in which the knowledge embedded in a learning activity is strategically coaxed out was a hallmark of entrepreneurial agency. Several participants made specific references to it; a few others longed for it.

Making time for play was an entrepreneurial gesture. Anne, in spite of subscribing to a corporate story to describe her activity, allowed her protagonist to make clearly agentic decisions in taking control of her own learning so that she “can turn off the phone . . . or . . . just ignore email . . . and just really focus.” In his story about gossipy clients, Link’s protagonist covered his ears to eliminate extraneous influences he did not want to hear. Fred’s protagonist weeded things out in order to isolate himself from “all the stuff that doesn’t directly effect you or is of little use to you.”

Like Link and Fred, Mary presented a protagonist who was tired of dealing with information overflow. The difference between Link’s, Fred’s and Mary’s protagonists, however, was that Mary’s was unable to evaluate her actions against a desired future outcome. Mary rarely represented her protagonist as being able to visualize outcomes. She rarely revealed a plan or expectations that could be used to evaluate present actions.

Dirk offered stories in which his quixotic protagonist was often overwhelmed by issues of time and money. Yet, in spite of Dirk’s character falling regularly into a narrative of cultural scripts in which he played the role of the mythic hero, his protagonist held great expectations. “A script,” according to Schank, “is a set of expectations about what will happen next in a well-understood situation” (p. 7). Therefore, while the entrepreneurial Dirk’s stories often began as a script, they frequently evolved through plot shifts based upon his first-hand experiences and concluded as invented stories with unique expectations that set the stage for new directions in career-related learning. The result was that Dirk, in spite of a common script, was a catalytic learning agent.

How self-directed informal learning is related to the career development process is through the self-directed and self-reflective actions of a catalytic agent: one who dares to take it upon him or herself to try something different, reflect upon his or her actions, and use what was learned to make changes in a previous learning strategy. Fundamental characteristics associated with a successful catalytic learning agent include at least several aspects of a perceived confidence to learn: imagining multiple outcomes related to the task; acknowledging one’s own limitations for handling the task as perceived; selecting an appropriate initial strategy for addressing the task; locating, assessing, and accessing potential resources; and seeking a sense of socially legitimate autonomy for dealing with the task.

Moreover, socially legitimate autonomy appears to originate from perceptions of the agent's career competency. While an awareness of career-related interests and a personally acknowledged desire for success may prove advantageous (although are not necessary), establishing a sense of learning and outcome ownership coupled with clear personal expectations are critically important to career-related learning and, ultimately, to one's career development. Although age, level of education, occupational level, and career path may alter the relative influence each individual associates with the various characteristics of catalytic agentive learning, each is generally present in the stories of successful self-directed learners.

Although many instances of agentive behavior were displayed through the respondents' narratives, none of the participants can be identified only as a catalytic learning agent. Individually and as a group elements critical to defining catalytic agentive behavior were shown to be compromised in the content and form of the stories told. For example, as important a resource identification and evaluation appeared to be, none of the story protagonists was presented as examining more than two resources before making a selection. Most protagonists were described assessing and making their resource selection from a limited, often pre-filtered, set of alternatives. Thus, rather than exploring a mix, resource selection was often relegated to one type of resource: texts, artifacts, or human. A similar phenomenon arose as protagonists rarely responded to multiple interests in pursuing a career-related learning option. For the most part, participants told stories of protagonists who were engaged by a single interest, which he or she then pursued.

Another interesting phenomenon disassociating protagonists from the agentive nature the participants would have liked to convey was the negative definitions most protagonists employed to describe themselves. Almost every protagonist described him or herself as *not* being something: *not* being a Web designer, *not* being a programmer, *not* being a musician, and so forth.

Finally, a good entrepreneurial learner must know when enough is enough, when the expenditure of personal resources has become too great in relationship to the career outcomes anticipated. That is, the truly entrepreneurial career-related learner understands when learning has become sufficient to achieving the analysis, synthesis, and evaluation necessary to make

knowledge useful to successfully developing one's career. Thus, Schank (1999) was more than rhetorical in asking: "Where does our tendency just to repeat what we already know end and at what point do we create something new?" (p. xxxv). No protagonist demonstrated this level of cognitive control, although several respondents acknowledged it as a worthy goal.

The Social Learner (EP)

Less catalytic in his or her actions, the entrepreneurial learner emerged also as a social learner. That is, still agentively self-directed, the social learner depended less on him or herself as the source for determining outcomes and driving goal-oriented activity. The negotiated input of others became a critical element of the determination for learning action. As a result, the social learner was more conservative in his or her decision making, leading to being a later adopter of career related learning actions; however, he or she remained self-reflective and imaginative in evaluating the appropriateness of the direction to be taken.

All participants told stories in which their respective protagonists were presented as a member of one or more communities of practice: rock band, workplace, family, and so forth. These revelations were not merely settings for the protagonists to act upon or within, but rather all participants narrated episodes in which their story protagonist negotiated the one or more roles related to being or becoming community members. As might be expected, the ability to communicate with community of practice members was of great importance to negotiating the experience of belonging. The communications tool of the protagonists was manifested as language use and fell into two main areas: language of community and language of relationships.

Schank (1999) stated that, in addition to being story-based, people's perceptions of their interesting and important experiences are the foundation for reasoning. As a result, "our knowledge of the world is more or less equivalent to the set of experiences that we have had, but our communication is limited by the number of stories we know to tell" (p. 12). Comparing stories and individually unique perceptions of experiences, then, constitute the negotiation of communally shared meanings. Participation in the negotiation of meaning, therefore, "is no more than searching for [the story] one has already thought up" (p. 12) about an experience and transforming it into a language that can be shared with others. Each participant, following Schank's simple formula, filled their respective narratives with the

language particular to their own communities of practice.

The language of community revealed itself in several ways. The most common uses employed community-specific terminology, jargon, metaphor, and idioms. Nearly every story protagonist was portrayed in one or more episodes negotiating with others. One classic scene involved the varying success of Dirk's protagonist communicating the technical aspects of object-oriented programming with two different staff members. The successful communication with Ian, with whom Dirk shared the common language of a formal educational experience in programming was not duplicated in Dirk's communications with Bart who apparently lacked the formal language of experience Dirk relied upon to talk shop.

In addition to Ian, three other participants were most typical of the social learner type: the self-employed Belle's protagonist was regularly found to be negotiating the processes associated with online sales. The collegiate Halle's protagonist was constantly negotiating the processes of digital administration for web-based education. In fact, knowledge sharing with her college community was Halle's dominate narrative theme: "People . . . I'm very much of a collaborative learner." Cassy, too, demonstrated negotiation as the theme of her narrative, her protagonist proclaiming that "the most important skill you can take from . . . high school, college, or any experience is just improving your communication. . . . learning how to communicate better with people is the most important skill that could happen to a person."

Each of the four participants above generated a narrative protagonist that had proved to be quite self-directed in creating a unique means for negotiating meaning and learning from his or her respective communities of practice: Belle by observing others' work, Cassy by becoming aggressive in demanding answers, Halle in her collaborative relationships, and Ian through his use of the artifacts of his community (i.e., books and formal courses). Each protagonist was represented as more of a patient learner, taking risks only when absolutely necessary. Finally, through careful self-reflection, each was able to demonstrate resourcefulness in creating imaginative solutions for their specific career-related tasks. For each, a substantial amount of protagonist activity was inspired or influenced through the negotiation of tool, task, or situational meaning with others in the community of practice.

Moreover, the outcomes of negotiated knowledge were generally shared by story

protagonists. Each of the participants narrating episodes of social learning did so for largely the same reason: to do something useful for others, typically a co-worker or client. Outcome legitimacy, personal competence, and career satisfaction—motivating elements for the agentive learner—thus became directly connected with the negotiated expectations of others in the community of practice. Although narrators acknowledged the importance of communications in anticipating and serving the needs of others, even as they depicted a protagonist's struggle with various communicative limitations, few narrators gave voice to their protagonist for presenting a plan for remedying those communicative shortcomings.

One other respondent gave the initial appearance of being a social learner; however, Mary's protagonist dispelled that notion unquestionably. Her frequent excuses for inaction based upon lacking the "terminology" for success demonstrated her awareness of the importance of a language of community. Missing, though, was any agentive action of self-reflection regarding the lack of terminology acquisition or self-direction in setting expectations and anticipating outcomes. Even a passive approach to entrepreneurial learning required some elements of agency.

Several other story elements were fascinating in their representation of the narrators as socially embedded learners. These story elements included the frequent use of jargon, metaphors, and idioms. Anne's and Karri's protagonists, often immersed in an official corporate script, were left with little that was original beyond their application of the jargon of the workplace. Gabe's protagonist, as he moved in and out of the engineering stories moved in and out of the jargon of his automotive engineering environment. Like Anne's and Karri's narratives, the engineering portions of Gabe's narrative were more the rehearsed script, less the inventive story-telling. As both Anne's, Karri's, and Gabe's protagonists became agentively involved with new learning situations, their stories dropped the jargon and the actions were generally more imaginatively described in everyday terms. While the use of jargon may have been employed to reflect well upon the narrator, it reflected poorly on the narrated actions of the story protagonist. Jargon appeared to be associated with old, well-rehearsed scripts that represented a reactive protagonist with little material from which to learn and develop further.

On the other hand, the incomplete use of jargon in describing one's career environment was

indicative of an undeveloped or missing story of career-related social participation and learning activity. Jake, a radio station manager, provided his protagonist with many of the more visible terms associated with radio equipment: Simian, Adobe Audition, Pro-Tools, CDs, and so forth. However, when it came to the terminology necessary to describe the uses of that technology, Jake's protagonist was left wanting, showing he actually participated little in the practices of the community.

“People need context,” stated Schank (1999), “to help them relate [current experiences] to what they already know” (p. 15). Certainly, one's use of the figures of speech associated with one's cultural community are a positive indicator of participation at the most common social level (Schank, 1999). Even as Earl, a self-employed computer shop owner, acknowledged his penchant for socializing, his protagonist reveled in the commonality of that participation: “Bottom line, if you don't keep some of your knowledge of the new stuff coming down the pipeline up-to-date, you're going to miss the boat.”

Characteristically, Ian's protagonist spoke occasionally using literary metaphors; past musicians, Jake's and Link's protagonists resorted to musical metaphors; Gabe's engineering-oriented protagonist included a metaphorical reference to the construction of a house; the more sedentary Belle described her protagonist's learning as a mushroom; and the quick-witted and dazzling dialogue of Anne's protagonist referred to her light burning brightly. As might be expected, with their focus on time and efficiency, the infrequently used metaphors of Dirk and Fred were related to racing.

Most interesting, while the female participants might be considered to be the more likely of the two genders to be social learners, as a group, they rarely used figures of speech in their narratives, the more agentive Anne being the major exception. Just the opposite, male participants who used figures of speech infrequently, such as Dirk and Fred, tended to be the most agentive learners. Clearly, there is a relationship between one's use of figures of speech and one's sense of agency. One possible connection arose between the use of figures of speech and the apparent inventiveness of one's story: figures of speech rarely appeared in well-rehearse official scripts.

The language of relationships was evident in many of the narratives; and, it was expressed in

a number of ways. The range of personal limitations associated with inter-personal communication was broader than just the communal language of the work environment; it included what Cassy referred to as “that kind of vibe [that] comes off of other people.” Halle’s protagonist had to formulate the right set of questions for interacting with instructors and their needs for technology, Earl’s character dealt with establishing a database for communicating past problems to future employees, Ian’s protagonist acknowledged the importance of learning through collaborating with other students in his class, and Dirk’s character was stymied by the learning required to become effective as a teacher for his partners and clients.

The language of relationships was important to participants for demonstrating the sociopolitical or hegemonic location of their protagonist within the structure of the career workplace. Dirk’s character never referred to himself as the boss, but often addressed staff members as “my guys.” As a result, although he often resorted to the collective pronoun “we” during descriptions of company projects, Dirk’s protagonist rarely came off as authentic in his attempts at appearing communal. On the other hand, Ian, presented a much more communally believable protagonist. His many uses of the collective “we” were sustained by descriptions of his interactions with Bart, his “right-hand guy when it comes to discussion,” and Nard, the African fellow he was sharing cultural knowledge with. Ian’s protagonist could be taken at his word when he expressed his communal excitement in being part of “the team environment that I love.”

Link’s protagonist, although more managerial than Ian’s, shared many of the communal characteristics of Ian’s character. He was very believable in his portrayal of a community of practice in which members were “always feeding off each other,” because he often conversed about relationships with his community and enthused about the “great sharing” that occurred among his peers. Additionally, Link placed his protagonist in one scenario only to use the story to moralize about the importance of “diffusing” potentially combative situations by encouraging others to talk about people instead of things.

As might be expected for someone often caught up in the corporate script, Anne’s protagonist was located within the “administrative” staff of the “executive levels” in her company. Anne’s protagonist never articulated the position exactly, but rather described it by its relationship to the other people she worked with and answered to. Jake and Mary provided

stories with protagonists who often appeared obsessed with their respective position title; however, both rarely provided the supporting scenes for sustaining their protagonist's claim. As a result, both Jake and Mary found great difficulty in integrating and locating their respective protagonist into the surrounding community of practice.

Gabe's story about being a vocational instructor presented the most interesting use of the language of relationships. Gabe's protagonist was narrated into the situation of being constantly reinvented by learning anew from his students and from his own constant demand for evaluation. This, in fact, became a common theme in Gabe's narrative. If taken at face value, Gabe's protagonist was a truly communal entity.

Schank (1999) pointed out that the learning agent uses the community to remind him or her of what they already know about. In other words, distributed learning is a manifestation of social negotiation. Link used his protagonist to demonstrate this, narrating a story in which his protagonist-self acknowledged not being able to remember everything he had learned about early versions of networking software, even though that knowledge might still be useful. Unable to recall it on his own, Link relied upon others in his community of practice.

In unknowingly demonstrating Schank's point, participants often narrated stories in which the distinction between the setting and the tools their protagonists used within the setting became indistinguishable. Belle identified a problem with a payment tool as the setting and described her working through the problem by working with the pooled knowledge of her community. Ian similarly looked to formal education not so much for the factual content he might acquire, but rather for the social interaction and the intellectual stimulation provided by the instructor. Ian's protagonist expressed several judgmental statements suggesting it was not the content of education but rather the delivery he relished. The structure of the content was the key as he sought a model for organizing the thoughts he already had and would continue to accumulate. In the same way, Earl's protagonist used his "cheat sheets," Jake's the camaraderie of musicians in the band, Belle's the eBay chat rooms, and Dirk's his "script kiddie" approach to programming. In each situation, a participant's peers, rather than instructing the protagonist, were much more involved in reminding the participant of something he or she already had prior knowledge about.

What one knows to say, what one says, and how one says it are each important in helping to

define one's identity within the community of practice and for preparing one to negotiated with others in that community. These concepts were not lost on the participants, several of whom went to great lengths to give their protagonist the appearance of belonging to and participating in a community of practice by way of certifications and other socially legitimate manifestations of social appropriateness. However, with the possible exception of Gabe, most participants seemed to accept participation as some type of unconsciously acquired skill or condition, not unlike learning to talk. As a result, protagonists occasionally felt left out due to the costs associated with the sharing of knowledge.

Additionally, negotiation was revealed to involve a high degree of socio-political segregation. Negotiation, left to the agents within a setting, was often a discriminatory process. Story protagonists were most likely to negotiate with those they considered to be their peer equivalents or those they aspired to be like. Every narrator alluded to this in discussing their communicative interactions with others: Anne's protagonist learned from administrative guidance, Dirk's felt he learned best from other formally trained programmers, Gabe's from college educated engineers, Jake's from competent professionals, and Fred's from the experts who wrote the books and manuals. Ian epitomized this notion by evaluating almost everything in terms of the language of academic achievement.

The Reactive Learner (PE)

For the reactive learner, entrepreneurial activity remained but it was precipitated more by the setting than by the protagonist who was the agent of the activity. That is, the event or events were the catalyst that the narrator's protagonist responded to in the most socially appropriate manner. Any reflection upon the protagonist's role in the activity was prone to be norm-based and the learning that resulted was maintenance learning related to addressing a specific problem, group of tasks, or individual task.

Of particular interest was the apparently weak overall response of story protagonists to the perceived importance of their respective career and to their sense of career development. As a whole, the narratives demonstrated a dearth of responses related to career respect, satisfaction, and contentment, arguably the cornerstones of building and sustaining career interest. Also interesting was that protagonists spoke boldly and aggressively about how they had taken charge of their own career development in response to their desire to develop, but expressed

much less confidence in the learning that might enable such competence. In other words, there was a stronger sense of career competence among participants than confidence that they could get there. Consistent with the observations of Locke and Latham (Pintrich & Schunk, 1996), what appeared to be missing was not the ability to set goals or even the personal belief that the goal could be achieved, but rather the “volitional element of goal commitment” (p. 211) that marks the learning endeavors of the catalytic entrepreneurial learner.

Anne’s attempted to portray her protagonist as a catalytic character met with a result that she “lost where [she] was going with this’ as she deviated from the corporate script. Her inability to sustain the plot of her story thereby called into question her own agency. Similar conflicts between story form and protagonist actions revealed the study participants’ narratives were spread across a range of agentive action consistent with the continuum suggested by the matrix. Several participants narrated methodical and less inventive stories; others offered stories that appeared inventive but had almost no form and their protagonists vocalized few goals. Each of these were to some extent symptomatic of reactive learning.

Unlike the strong logically causal plots that dominated the stories of Anne, Dirk, Fred, and Jake, the stories that Ian and Gabe told were difficult to follow, often because they did not fit a typical pattern. Regularly, the learning-related action of Gabe’s protagonist was shown to be a direct outcome of the story’s plot. Moreover, goals were rarely mentioned and the protagonist rarely triggered the disruptions that generated the learning experiences. Carefully constructed settings within which their protagonist interacted with others to learn were the hallmark of their stories. Events more than interests drove protagonist activity.

Dirk’s narration often integrated his own agency with the setting of his story—a setting his protagonist then came into conflict with. Dirk had chosen many of the elements of the scene that made up the context of his workplace environment. He elected to start his own business, hired the people of his choice, and he took on the specific tasks of his clients. Thus, the context itself was strongly influenced by the application of Dirk’s agency, even as the environment constrained his protagonist and set the events-biased stage for Dirk’s new learning. Moreover, with his protagonist almost obsessed with time and money, Dirk’s narrative demonstrated a strongly norm-reflective direction: “In honesty, something that is related to all careers and that’s really what drove everything that I’ve been talking about is

money. As in I have none.”

Most of the narratives revealed that interactions between a protagonist and a narrator-created setting triggered a substantial amount of learning that was reactive in nature. In fact, the vast majority of narrative themes fell within the defining parameters of reactive learning: other-directed (Link’s protagonist saw the future of his career development through the critical lens of his family’s needs), catalytic events (the learning of Mary’s protagonist constantly being sabotaged by the demands of others), early adopter (the efforts of Belle’s protagonist to be ahead of other virtual retailers in setting up an eBay store), norm-reflective (the striving of Anne’s protagonist to become part of the successful corporate structure), and maintenance learning (the tasks undertaken by Halle’s protagonist requiring learning skills primarily to meet the demands of her colleagues).

Disruption within the status quo of one’s environment was often the trigger to new learning. The catalytic agent precipitated such disruptions in order to learn. The reactive learner responded to disruption arising from his or her environment. Typically, participant learning was associated with acquiring the skill or means to restore balance within his or her environment. For example, Belle narrated a story in which her protagonist encountered a disruption, which was followed by a learning episode, which created new affordances for perceiving her on-line retail environment in a more entrepreneurial manner.

Restoring balance might not always be through the application of new learning, which, as Schank (1999) pointed out, results in the generation of a new story. Jake, for instance, revived an old story for his protagonist to use in order to restore balance. In a type of backwards justification, Jake’s protagonist described the radio station as pieced together so it was satisfactory to piece together everything associated with it. Schank called these “standard stories of our culture” that can be moved from context to context, “skeleton stories” (p. 149). In Jake’s case, when his protagonist wanted to justify his response to how he balanced the routine disruptions of his career workplace, he resorted to a well-know scenario that had worked before: “We’re just piecing stuff together. I mean that’s what the whole radio station is really.” As opposed to becoming a learner and a new story generator, Jake resorted to using old learning “as a story fitter” (p. 169).

Disruption was key to entrepreneurial activity because without disruption there was no need for rebalancing the environment, no entrepreneurialism, only routine. Most interestingly, routine—even disruptive routine—rarely triggered new learning. Dirk’s protagonist struggled with the daily desire of wanting his colleagues to learn faster, Belle’s with the petty domestic interruptions of working at home, and Halle’s with ubiquitous unnecessary meetings. In each case, the story protagonist was left constrained by a story of everyday routine interruptions that were never addressed as triggers for new learning. The protagonists complained about them, yet accepted them as necessary evils of daily routine. For some unspoken reason participants do not or cannot use their agency to address these particular contextual disruptions, thereby remaining bound reactively to their environment through of them. They have found no need to generate a new script for how they should deal with routine disruptions.

An over-reliance upon scripts, especially “skeleton stories,” for dealing with routine disruptions typically led not to new learning but rather to protagonists becoming bound up in narrative contradictions. Anne, for example, placed her protagonist in a world in which technology was so crucial, she proclaimed that “we would not have a service if it weren’t for computer technologies.” Yet by the end of the very same statement, she was acknowledging that “in the old days, before computer technology” the service did exist. Even though Anne apparently knew the history of her company, having no prior experience with that history provided her with the skeleton of a corporate story that actually began in the near present. Similarly, Dirk’s protagonist was able to recognize multiple causalities while inventing the stories necessary to serving clients in unique ways, yet he was captive to a script that failed to make similar connections for working with colleagues on new and faster learning techniques.

No protagonist’s learning was as constrained by poorly defined and contradictory scripts as Mary’s. On one occasion she complained about the demands her colleagues had placed upon her to learn Adobe PhotoShop for making Web page buttons. She then took the position, in a discussion about creativity, that PhotoShop was the single most important task she wished to master. She wanted to get a position with more creative responsibility yet went back to school to take the business courses she disliked. She wanted to learn but had no time for it. Additionally, Mary, who derogatively framed her story protagonist as an “administrative assistant,” was similar to most of the other participants whose protagonists were either

empowered or constrained by the narrator's interpretation of the occupational title used to locate his or her protagonist within the structural network of the community of practice.

For the social learner, if not actual participation, then the appearance of participation in one's community of practice was important. When appearance prevailed over practice, the outward symbols of participation became important. The use of one's peers was more to locate oneself within the community network than to acquire new knowledge. Although social learning based upon the criteria of maintaining appearances relied on the negotiation of meaning with other members of the community of practice, the social criteria for the evaluation of meaning was typically filtered through participant perceptions of his or her role in the community. When participation prevailed, the acknowledged rules of the community became helpful for shaping the assembly and distribution of practices through legitimate strategies that enabled the structuring of learning outcomes. Gatekeepers became important models and were actively sought out not so much for their skills as for their ability to grant access to resources, tasks, and the community itself. Participation, however, could also lead to conflict which required participant choices based on totally different criteria than those associated with the situational objectives one anticipated.

The Reactionary Learner (P²)

The reactionary learner demonstrated no entrepreneurial characteristics. Any learning that occurred originated from outside of the learner. The reactionary learner was substantially driven by serendipitous events as well as being immediate and single-task oriented. This set of characteristics often led to a sense of false agency: that the protagonist was in control of his or her activity when, in fact, he or she was actually being swept along in the torrent of surrounding external daily events. Ironically, by being so far out of touch with the causal relationships related to career-related activities, the reactionary learner became the unbalancing disruption triggering actions by others, thus giving the false appearance of being an event catalyst. Schank (1999) suggested that the reactionary learner had no stories to tell, or worse, had selected the wrong stories to build career learning upon.

Even the most agentic learners were reactionary in some respects. Dirk represented his protagonist as occasionally laboring under a false sense of agency driven by a serendipitously motivated desire to become a wealthy and socially accepted business person. Fred devised

plots for his protagonist in which the setting was often as conspiratorial as descriptive. Halle's main character rarely initiated the activity she ultimately ended up working with. Fortunately, for the benefit of their career development, many of the scenarios mentioned above were ultimately responded to by participants in an agentic manner that led to new learning. Typically, the single event task that precipitated the activity became the tip of a problem-solving iceberg. Often the story protagonists were described not as responding to serendipity as much as embracing and engaging it.

Such was not always the outcome for Jake and Mary, whose protagonists most closely expressed the characteristics of reactionary learning. Jake and Mary were generally other-directed in their career-related choices. Even when Mary's protagonist was cast agentively as a trial-and-error learner, she described the process not as the effective application of patient research, but rather as a technique of randomly responding to serendipitously inspired actions. Moreover, because Mary's protagonist was not motivated by the potential for failure associated with trial-and-error learning, she used her learning to address single, simple tasks. Her perceived successes thus engender what she called "little successes" leading to a false sense of agency in which she critically evaluated not her own personal limitations but rather the perceived shortcomings of her environment. By refusing to negotiate the terms of her learning and responding in other ways negatively to her environment, Mary's protagonist thereby became the disruption—the unintentional catalyst—to the balanced flow of knowledge distributed within her community of practice. The result was that the self-directed learning she engaged in was incomplete, episodic, and constantly interrupted by what she recognized as the unrealistic demands of events and others in her environment. The learning activity, and thus her career development, was defined almost exclusively in terms of the demands of others she referred to conspiratorially as "they."

Where Mary's narrative demonstrated more a lack of being able to create a coherent and relevant story related to career development, Jake's narrative often represented the consequences of making the wrong selections based upon old skeleton stories. For example, even as Jake was having difficulty demonstrating the software he was attempting to use, his protagonist explained how "easy" to use and "intuitive" the software was because he had been involved with a start-up radio station 30 years ago in college and because he had participated in a rock-and-roll band. For Jake, the inappropriate assessment of prior resources led to a false

sense of agency during learning by doing resulting in his devaluing the trial-and-error component.

Moreover, through his protagonist Jake revealed that dealing with failure was not a matter of self-efficacy, but rather his inability to respond to goal commitments. Unlike Mary's protagonist, Jake's frequently acknowledged his personal limitations. Among those limitations was his protagonist's acknowledgement that he "hated technology." This admission was not inconsistent with Jake's skeleton stories, because time and again his stories demeaned technology, recalled problems with technology, demonstrated the ill-effects of technology, and generally characterized technology as "a pain in the butt."

Jake's character recalled a story from the past in which he described liking his music but not his keyboard. He used the story to condone his dislike for computers. As a result, it became Jake's fate to hate technology and only a quirk of fate put him in charge of a computer-equipped radio station, serendipitously exclaiming "Here I am!" To be narratively consistent, Jake's story attributed any successes with technology to fate rather than to any new learning or skill of his protagonist. Or, when he did acknowledge using technology, there was no growth perceived and usually a reversion to the old way, because in his experience technology "was just a lot of crap."

Like Mary, Jake was totally task-oriented. Jake's narrative depicted the radio station position less as a career and more as a succession of on-going tasks, a setting which his protagonist agreed: "That's what it really is!" As a result Jake's sense of agency was expressed through his protagonist more as job task competence rather than career competence. There was no problem-solving, no exploration of tools for future use. Decisions were approached in Jake's stories in a job-task manner: Rather than evaluating software based upon features versus studio needs, Jake's protagonist made and justified the decision based solely upon price. Additionally, his protagonist found legitimacy not in career development but rather in getting the task done, even if he was not the one who accomplished it. Moreover, potentially complex problems were handled by Jake's protagonist as a series of linear tasks that he internalized as personal learning.

The theme for Jake's narrative appeared to be concerned over his battle with technology. A

couple of critical inconsistencies point out a potentially deeper theme more related to self-directed informal learning. The contrast between his high school, college, and early band era protagonist's interactions with technology was decidedly different from that of the late band and current radio station era protagonist's interactions. On the one hand, the question might arise as to whether Jake was merely reinventing the past to substantiate his current views on technology, projecting his distaste for technology backwards in time to look coherent in the present. On the other hand, the more important observation appeared to be that Jake had no new stories of his own in which his protagonist had a successful encounter with technology beyond its limited use as a tool for delivering entertainment, which Jake's narrative referred to as "content." Equally problematic was that Jake had no new stories in which his protagonist was a problem-solver with the result that task accomplishments were described as though they were stories of problem solving. For each condition Jake was forced to rely upon old skeleton stories, situationally useless prior knowledge that no longer worked. The misapplication of these skeleton stories led to his protagonist being endowed with a false sense of agency; and, much like Mary's, Jake's protagonist became the unintended catalyst of events which took control of the direction of his career development narrative.

The reactionary learner is so contextually bound that he or she is able to make sense only of the singular tasks presented by events occurring within their immediate environment. However, because the learner must typically fulfill multiple roles in that environment, he or she quickly is thrust outside their comfort zone into a story they do not know. Life goals, including career development goals, become tasks requiring immediate and often simplistic resolution. Serendipitous circumstances appear to conspiratorially gain control separating the learner from others in the community of practice and leaving the learner to fend for him or herself. Self-directed informal learning, improperly fueled by a sense of false agency, becomes the only recognized means to force upon the environment one's own sphere of influence. Learning becomes attuned to a perception of "actual needs," as Mary called them.

Without any sense of community and the knowledge potentially distributed across it, there is little ability to learn through doing, little ability to learn by trial and error. Reactionary learners do not know what a legitimate or socially appropriate outcome looks like. There is no career competence being generated because there is no criteria being generated for making value-based individual judgments; there is no awareness of sociopolitical causalities; and,

ultimately, there is little satisfaction that arises out of shared practice. With no true sense of agency, there is no true commitment to goals, learning, or development. The unfortunate result is that self-directed informal learning, while typically useful, can take learning activity in the wrong direction. In the scenario of the reactionary learner it becomes an infection that feeds upon itself compounding the illness of its host.

Summing Up the Entrepreneurial Learner

Agency and context, as well as the individual perceptions of them, are inextricably interwoven and interdependent; neither can be identified as the single unit of analysis for understanding how people learn to learn in a career context. Through the collection and analysis of self-narrated career stories, the relationship between agency and context emerged as a two-dimensional cross-section of four thematic and interrelated groupings of characteristics. As a result self-directed informal learning is related to the career development of formative technology users as a continuum of entrepreneurial learning.

The learning that underpins career development is varied and one's ability to self-direct it varies also. The goal of the career-related learner is not to become a catalytic learner. In fact the matrix quadrants are based upon abstractions, "conceptualizations based on observations of reality that are designed to make comparisons possible" (Rogers, 1995, p. 263). Moreover, there are strengths associated with the less agentic yet still entrepreneurial social learning, and reactive learning, as well. One should make an effort, however, to avoid becoming a victim of on-going reactionary learning. Additionally, self-directed learning has many potential outcomes, not all of which are beneficial to the learner. Self-directedness in learning can be efficient or inefficient, effective or ineffective. Self-directed informal learning can also precipitate an outcome that relates negatively to one's career development.

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