CHAPTER 13

TRANSFER THROUGH LEARNING FLEXIBILITY AND HYPERTEXTUALITY

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CHAPTER OVERVIEW

The rise of flexible, independent learning has created a dilemma for institutionalized, accredited teaching. Concurrently, there is student nonconformity to most top-down classroom practices, which has been induced by nonlinear, or hypertextual, processing as a result of immersed usage of, among others, social software and electronic gaming. Exploration of the full change needed to match teaching practices with the mutated procedural schemas of cyber-natives is still under way, but there are indications that the very nature of the change has brought about a potential new route to transfer of learning, so elusive within rigid curricular face-to-face and online teaching environments. The diffusion and multifocusing that are at the base of hypertextual processing, and the personalization, diversification, and acquisition of general knowledge that infuse independent, flexible learning can create an amenable setting for the generalization and abstraction needed for effective transfer. This chapter explores the connection between processing change brought

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about by immersed new-media usage and new potentials for transfer of learning.

PREAMBLE

Cyber-society's Web-immersed digital natives have moved decisively away from conventional processing of information, and its rigid schematic makeup. Through persistent exposure and responding, they are now complying to the hypertextual architecture of what has slowly become an extension of their own selves.

There is a constant presence of social software in the lives of heavy users of the Internet, as well as interaction with role-playing games and other video games, both online in their millions, motivated in a large number of ways (Yee, 2006), or with the use of gaming consoles, creating progressively more advanced environments that promote problem-solving on the go. These are causing transformations that go quite a long way beyond the well-researched positive/negative social interactions of users. There is no doubt that technological immersion is causing social change, and that some of that is diminishing personal user participation in society

The use of hypertextual conventions in interactive environments has instigated what I speculatively term "hypertextual processing" (Mallia, 2007), which underpins the very process of thought, mirroring the architecture and navigational processes of most of the software with which users interact.

HYPERTEXT

There is an extensive literature examining formalized hypertext assisted learning (Niederhauser & Shapiro, 2003; Shapiro & Niederhauser, 2004), with its singling out of the main features of hypertext, primarily its non-linear structure, its flexibility of information access, and its greater degree of learner control, and distinguishing "self-regulated readers" and "cue-dependent readers" (Balcytiene, 1999), with the second scoring better on content acquisition than the first, but with the first being more independent and exploratory in the way hypertext is read.

Self-regulation emphasizes independence both in search and reading patterns, as well as in the possibility of self-generating schemas that do not depend on a controlled scaffolding of cues, adapting to stimuli that are both irregular and, at times, from the perspective of the self-regulated, independent hypertext reader, chaotic. Self-regulated learning, even within classroom contexts, has proved to lead to improvements in

performance and increases in positive learning behaviors (Schloemer & Brenan, 2006). "The combination of positive expectations, motivation, and diverse strategies for problem solving are the virtues of self-regulated learners" (Paris & Byrnes, 1989, p. 169).

A number of theories have explored the need for cognitive processes to develop flexibility in the face of hypertextuality and of, among others, forms of conceptual complexity and irregularity in knowledge domains, predominantly cognitive flexibility theory (Spiro, Feltovich, Jacobson, & Coulson, 1991).

Strongly significant within navigational independence are the meta-cognitive processes that put the learner firmly in the center of the learning in a cyclical process, the medium feeding the learner's own conscious approaches to the usage and the subsequent learning, with that same usage modifying the mechanisms of perception and application, and reflecting on the actual medium. Research does indicate that metacognitive awareness may precede effective strategy use (Sperling, Howard, Staley, & DuBois, 2004). It is also an important element in self-regulated learning.

Learner control also depends extensively on how the individual that is using the hypertext utilizes the baggage of prior knowledge he or she brings with him or her to the usage and how this affects whether learner control predominates. Prior knowledge is *the whole of a person's knowledge* and, as such:

- is dynamic in nature;
- is available before a certain learning task;
- is structured;
- can exist in multiple states (i.e., declarative, procedural, and conditional knowledge);
- is both explicit and tacit in nature;
- contains conceptual and metacognitive knowledge components (Dochy & Alexander, 1995, p. 227).

Those with high levels of prior knowledge are more in control than those with low levels of prior knowledge, who prefer more structured program-controlled hypertexts (Gail & Hannafin, 1994). A structured approach is not entirely necessary for information to be acquired (Shapiro, 1998). Hierarchies can be built even in unstructured hypertext links, providing they have cues to meaning (Shapiro, 1999). An interesting addendum to this, if one were to bundle Web-use with videogame use for the sake of examining of immersed usage, is that eye-tracking research about novices learning how to use computer games, indicates the prefer-

ence of a trial and error strategy, with little time given to actual teaching hints as they learnt how to use the game (Alkan & Cagiltay, 2007), problem-solving and independently figuring their way around the gameplay, the learning of which they deemed to be easy.

HYPERTEXTUAL PROCESSING

There is a strong, independent problem-solving evident in frequent, particularly self-regulated users' navigation of these media, with metacognitive processes at work creating a schema-driven means of procedural acquisition. Hypothetically, this has led to a cognitive and affective reflection in the way users process information of the very structures of the navigational processes in the media. The result is an intrinsic move from predominantly linear information processing to a more lateral one. In many cases, this takes the form of multifocal hypertextual leaping, arbitrarily superficial in content, but quite wide in spread, allowing the freedom associated with hypertext that is evident even in the early literature on its use (e.g., Rouet & Levonen, 1996, and George Landow's seminal volume on the topic, now updated, Landow, 2006), and in direct structural links with, for example, the cinema (Gaggi, 1997; Mancini, 2005) and literature (Schneider, 2005). This multifocus is very much evident in media that is aimed primarily at young people who form part of the digital native generation, for example on such television stations as MTV, with its fragmented edits and erratic camera moments (Williams, 2003).

The result of persistent immersion is, hypothetically, hypertextual processing (HTP) which organizes perceived information into an erratic, loosely grouped number of simultaneous focal points, resulting in coherent, if sporadic information gain. This provides a change from a linear format within a chronological progression, to a partially controlled chaotic format, with tracking achieved primarily through hypertextual nodes. In turn, this conflicts with the perceived linear (if stratified) organization of thought processes on which presumption most traditional formalized pedagogies are built. The conflict makes for a very limited attention span and a resultant lack of follow-through.

One would assume that HTP affects to varying degrees and is dependent on a number of variables, not least of which are varying cognitive styles (Riding & Rayner, 1998), and the individual learning strategies of the immersed user that can determine how and in which way hypertextual architecture is perceived and handled (Graff, 2005).

What is certain is that HTP is anathema to traditional top-down schooling, be it institutional, or formalized e-learning. The lack of focus, diminished attention span, and lateral processing that are direct manifestations

of HTP do not go well with the chronological linearity of hierarchical structures, and this includes most educational methodological practices.

LEARNING FLEXIBILITY AND INDEPENDENCE

Internet-immersed users, and heavy users of social software, as well as many forms of video gaming, live in an environment in which knowledge acquisition is at their fingertips, and the processes they have mastered to interact with the software also gives them the rudimentary skills needed to navigate, absorb, and integrate the learning into a cohesive, if chaotically absorbed, body of learning. In this sense, the acquisition is both substantive and procedural.

Tuschling and Engemann (2006) noted that "the structure sought here is integrative, a self-reflective technique of self performance ideally centered in the individual. It seeks to make learning independent from setting, from personal and financial effort. Informal learning can take place regardless of circumstances" (p. 456), and it can take place any time and anywhere, given that new media technologies are both desktop and mobile.

Mobile phones have become increasingly more versatile, with an integrated interface that can access the Internet through GPS and Wi-Fi. PDAs, aided by full-sized, foldable keyboards, mice, and other accessories, are little less than full-blown computers to be used on the go. The same can be said for most portable versions of static gaming consoles (for example, the Playstation Portable and the Nintendo DS), with Wi-Fi and a limited Internet connectivity being an integral part of their onboard facilities. Many major Web sites are creating pages specifically made for mobile devices, accepting the importance of mobile ICT. Bluetooth and other remote connectivity methods have also led to cordless ease of use, permitting multitasking while away from the desktop.

Formal research about informal learning has been with us since the 1980s (Marsick & Watkins, 1990), concentrating primarily on work-based learning, but often emphasizing the acquisition of transferable skills.

From the start, and to this day, there is the problem with measuring the extent and transferable impact of informal learning, and this is definitely the case with regard to accessible information on qualifications and participation rates (Conlon, 2003).

TRANSFER OF LEARNING

Transfer of learning can almost be taken as a measure for the effectiveness of learning. Yet, transfer is extremely difficult to trace. In spite of the fact that a body of research has been dedicated to understanding it (Analoui,

1993; Cormier & Hagman, 1987; De Corte, 1987; Detterman & Sternberg, 1992; Ellis, 1965; Grose & Birney, 1963; Haskell, 2001; Haslerud, 1972; Hunter, 1971; McKeough et al., 1995; Singley & Anderson, 1989), transfer has remained an elusive concept.

Nevertheless, transfer is crucial to all learning. Transfer "isn't so much an instructional and learning technique as a way of thinking, perceiving, and processing information" (Haskell, 2001, p. 23), but the fact remains that a lot of research seeking to determine the cause and effect of transfer have resulted in no, or no significant transfer. This has been the experience of experimenters working with spontaneous, as opposed to cued, transfer (informed versus uninformed transfer, reviewed in Gick & Holyoak, 1987)—the most quoted being gestalt psychologist Duncker's "radiation problem" experiments (Duncker, 1945) which yielded very little by way of analogical transfer[1] (Gick & Holyoak, 1980), though a substantial amount of spontaneous transfer was registered in children when the focus was on instantiation of abstract statements designed to enhance the accessibility of the relevant information (Chen, Yanowitz, & Dahler, 1995). No transfer, too, has resulted from experiments with high road transfer[2] when cues in the learning task are context-specific, and these are not present in the transfer task (Voss, 1987).

Nonetheless, the need for a sound knowledge on the way learning transfers has been felt since the inception of educational psychology. The concept of fidelity as having to be part and parcel of the learning task for elements within it to transfer to other situations (Thorndike & Woodworth, 1901) or, as it is better known, the fidelity theory, has been the most explored in the last 30 or so years. "A change in one function alters another only insofar as the two functions have as factors identical elements" (Thorndike, 1913, p. 358).

Hunter's (1971) four factors that generate transfer (both positive and negative) are the common factors sought by researchers into teaching for transfer who follow this as the main idea. These are:

1. The similarity of the situation in which something is learned and the situation to which that learning may transfer.
2. The student's association of the old and new learnings for any one of many reasons.
3. The degree of effectiveness of the original learning.
4. The perception of essential or unvarying elements that exist in both the old and the new learning's (Hunter, 1971, p. 9).

Some studies have found proof against the concept of fidelity being paramount to the transfer task (e.g., Boreham, 1985), bringing forward

experiments in which lowering fidelity of simulation actually improved transfer, putting the accent on the information processing required for the learning task. Most others have accepted the concept that similarity in one or more elements is intrinsic to transfer. Singley and Anderson (1989) proved that the sharing of cognitive tasks between the learning and transfer tasks is essential to transfer, with declarative knowledge about a domain compiled into procedures, which are triggered under highly specific conditions (basically, ones that are identical in both cases).

In fact, a lot of research into transfer seems to have taken for granted the transposition of subjects from what we can continue to refer to as the "real" world, to insular conditions in which a single function is tested and controlled. This was strongly pointed out by, among others, Brown and Kane (1988), who demonstrated in experiments that kept to the natural conditions of their young subjects, that analogical transfer was obtainable with children as young as 3 years of age.

LEVELS AND TYPES OF TRANSFER

The basic problem of transfer is: "In what way and to what extent will acquisition of skills, knowledge, understanding, behaviors, and attitudes in one subject or learning situation influence performance or learning in other subjects or situations" (Bigge & Shermis, 1992, p. 219).

The distinction is also made between horizontal and vertical transfer. Horizontal transfer refers to conditions in which a skill can be shifted directly from the training situation in order to solve problems. Vertical transfer refers to conditions in which the new skill cannot be used to solve problems unless it is adapted to fit the conditions of the workplace—that is, an extension of learning is required before problems can be solved effectively (Joyce & Weill, 1996).

Gielen (1995), distinguishing between near and far transfer, has listed what she believes to be the main promoters of both, basing her premise on the literature and succinctly presenting many of the findings mentioned above. She writes that:

Near transfer is promoted by:

- Introducing knowledge in the context it will be used;
- Behavioral objectives that guide instruction;
- The presence of identical elements in tasks in training and in job environment promotes transfer.

Far transfer is promoted by:

- Introducing varied context, which leads to decontextualisation of learning;
- Stimulating generalization and analogies;
- Discovery strategies;
- Increasing diversity, which in turn decreases contextual bindings. (Gielen, 1995, 2.6.1)

Haskell (2001) distinguishes six levels of transfer based on judgements of similarity. Only levels four and five of these appear frequently in the literature. The six levels are:

- Level 1: Nonspecific transfer—all learning, because it is all connected in some way to past learning;
- Level 2: Application transfer—applying what one has learned to a specific situation;
- Level 3: Context transfer—applying what one has learned in a slightly different situation, often a change in context;
- Level 4: Near transfer—when previous knowledge is transferred to new situations that are closely similar but not identical to previous situations;
- Level 5: Far transfer—applying learning to situations that are quite dissimilar to the original learning; and
- Level 6: Displacement or creative transfer—transferring learning in a way that leads to the creation of new concepts.

Cognitive-interactionism[3] regards transfer of learning in the following amazingly longitudinal seven ways:

1. Opportunity for transfer may occur in many situations. It is not inherent in any subject but is possible from any field of knowledge.
2. Transfer is not dependent upon mental exercise with disciplinary school subjects.
3. Transfer is dependent upon methods of teaching and learning that use lifelike situations. It is facilitated by teaching for large generalizations that have transfer value.
4. Transfer is not automatic; opportunities for transfer must be recognized, and the person concerned must want to use them.
5. Transfer varies according to difficulty of generalization of subject matter and the intellectual ability of individuals.

6. Insights need not be put into words for their transfer to occur.
7. The amount of intraproblem insightful learning, not the number of trials as such, determines the amount of interproblem transfer (Bigge & Shermis, 1992, p. 238).

Taking the "real" world of work as the desired goal toward which to transfer an acquired education, Marginson (1994) suggests working directly on the acquisition of certain attributes which are strategic to the process of transfer itself—those skills and knowledge which themselves enhance the capacity of students-graduates to transfer their other attributes. These key attributes include confidence and the capacity to be proactive in new and familiar situations, learning how to learn, flexibility, adaptability, responsiveness, sensitivity, openness, critical thinking, and dispassionate thought.

Marginson also points out that the student needs to learn how to take into account at the same time more than one viewpoint through the ability of handling multiplicity and complexity and being able to move between different knowledge sets. All of these he calls transferability skills.

THE CASE FOR MINDFULNESS AND ABSTRACTION

An important contribution to our knowledge of what constitutes transfer was made by Salomon and Globerson (1987), who made a case for mindfulness (a state of mind defined as the volitional metacognitively guided employment of nonautomatic, usually effort demanding processes). Especially in high-road transfer, this is a result of mindful abstraction, as opposed to the near-automaticity of low-road transfer. However, Salomon and Globerson accept that distal sources are difficult to gauge, with causal factors being elusive of quantification. These are heavily influenced, among others, by sociocultural factors: culture, intellectual climate, common ways of perceiving a situation, shared habits, and the like.

The concept of abstraction can also be linked to memory retrieval. Kintsch and Van Dijk (1978) suggested that memory structures are constructed from experience as a result of abstracting out the essential content, or "gist" of a situation. They suggested further the processes of deletion, generalization and construction in order to construct abstract representations of events heard or read about.

A schema, too, is a more abstract representation than a direct perceptual experience (Winn & Snyder, 1996), which makes schemata very useful, both in terms of the easing of cognitive load, and in the processes fostering of transfer.

Salomon and Perkins (1989) insist that transfer is not at all a unitary phenomenon. Rather, transfer can occur by different routes dependent on diverse mechanisms and combinations of mechanisms.

They note that an important type of transfer is what they refer to as backward-reaching high-road transfer, because the individual formulates an abstraction guiding his or her reaching back to past experience for relevant connections. This continues to highlight the important role played by background knowledge in both the encoding of the original task and the transfer of content and procedure to other tasks. Duffy (1992) seems to corroborate this and gives an underlying suggestion as to its implementation when he writes that "the instruction of new tasks should always provide a familiar context so that the learner can use his or her knowledge base, what he or she already knows, to interpret and integrate the new skills and knowledge" (p. 81). That knowledge can (and does) affect further learning and as such is a case of *proaction*. The new learning can affect the original background skill and knowledge in its own turn, so as a result we can also have *retroaction* (Catania, 1992).

Salomon and Perkins (1989) point out that far-reaching transfer may be facilitated through mindful abstraction, but at the expense of relatively poor learning of the original material, because the greater level of generality makes it harder to connect the representation to any given particular. Mindfulness, or the conscious pursuit of specific learning, seems to also be evident in Pugh and Bergin's (2006) linking of motivation to, among other factors, intentional learning, as diverse from incidental learning, following the distinction made by Bereiter and Scardamalia (1989).

DISPOSITIONAL TRANSFER

A sort of transfer that is taken for granted, according to Bereiter (1995), is the "transfer of conceptual understanding to further conceptual learning" (p. 27). He refers to Voss (1984) for the "vast research literature that shows the importance of prior knowledge for comprehension" and says that this "is a literature showing the enormous power and range of transfer of conceptual knowledge" (Bereiter, 1995, p. 27).

But it is on the transfer of disposition that Bereiter puts the main emphasis, since while the transfer of *principle* depends on depth of understanding, the transfer of *disposition* depends on incorporation into character, insisting that this can be applied across all school topics—from moral education to science education. The point made by Bereiter is that dispositional transfer is embedded in the character set of the individual, and so this becomes an integral part of all processing.

Prawatt (1989, in Eggen & Kauchak, 1997) seems to be the precursor of Bereiter in this, because he believes that "although transfer of learning tends to be specific, *dispositions*, or the attitudinal element of learning, can transfer in a general sense. A disposition to be open-minded, to reserve judgement, and to search for facts to support conclusions is a general disposition" (Eggen & Kauchak, 1997, p. 329).

DISCUSSION AND SPECULATION

The direct linking between HTP and informal, (often flexible) independent learning, creates a very unique context for learning that collocates quite extensively with a number of the prerequisites that the literature says are necessary for there to be any sort of transfer of learning.

There are a number of divergences from the roles traditionally enjoyed by, for example, self-regulation. Given the semi-chaotic nature of hypertextual processing, the indications are that self regulation tends to be, in the main, incidental, and quite far from Zimmerman's (1998, 2000) cycles consisting of forethought, performance or volitional control, and self-reflection. The self-regulation is controlled by the nature of the hypertextual architecture, or by any one of the multidirectional paths suggested by the game-play. But close, mapped observation of gamers by the present author has yielded indications of schematically induced patterns, with increased hierarchical proficiency, leading to stepped problem-solving. I would say that, of the three cycles, in HTP induced self-regulation, it is the performance or volitional control that is best reflected.

As listed previously, some of the main elements that foster transfer on different levels are: similarity/fidelity; analogy; generalization; abstraction; metacognition; mindfulness/automaticity; disposition; confidence; proactivity in new and familiar situations; and lifelike contexts. Each of these can be mirrored to varying degrees in the instigational processes of informal learning brought about by HTP.

It is also worth noting that transfer of knowledge from education to workplace typically involves five interrelated stages:

1. the extraction of potentially relevant knowledge from the context(s) of its acquisition and previous use;
2. understanding the new situation—a process that often depends on informal social learning;
3. recognizing what knowledge and skills are relevant;
4. transforming them to the new situation;

5. integrating them with other knowledge and skills in order to think/act/communicate in the new situation (Eraut, 2004, p. 256).

Eraut points out that items 4 and 5 above are usually not considered by higher education, and that the final stages draw attention to informal learning at the workplace.

New media technology immersion has expanded the "workplace" to incorporate any and all situations. Learning on the go is persistent everywhere. The need to know has become instantaneous and instantly executable, so Eraut's five steps are daily happenings in the lives of millions of online seekers of the expansion of information about any and all things that motivate such a reaction.

The intrinsic motivation stemming from the volitional nature of the learning plays a primary role in instigating a transferable acquisition of substantive and procedural knowledge from new technology immersion.

Typically, learning-independent, hypertextual processing, immersed technology users have skills that navigate, absorb, and integrate learning within the collective general knowledge so touted by Haskell (2001) as being an essential base for transfer. Though there is a chaotic absorption of the knowledge, there is also a personalization of it that provides recall cues, most often through motivational associations with elements of personal enjoyment. HTP contributes to the mix multifocusing, independent problem-solving, self-regulation, metacognition, and an individually organized utilization of hierarchies of prior knowledge.

The motivational elements are drawn from the implicit fact that users immerse themselves by choice in the media that instigate HTP as a direct result of the heavy usage. In this sense, there is a divergence from Pugh and Bergin's insistence that a greater understanding of transfer "can be achieved by applying the intentional perspective" (2006, p. 155). Incidental learning within the flexible, independent learning context, diffused by the presence of HTP, does not imply a lack of mindful persistence in the pursuit of knowledge. It is just that it is most often a unique unit of information that is sought, rather than a module that is integrated organizationally within a larger, hierarchically designed block of intentional learning.

If one where to take Haskell's six levels of transfer (2001) as the transfer to aim for, HTP motivated flexible independent learning would help facilitate levels 1 to 4, and be an important element in the last two levels.

Level 1: *Nonspecific transfer*—any and all learning acquired directly or incidentally through volitional, self-directed information search, or as side-learning from entertainment-driven activities;

Level 2: *Application transfer*—the value of transfer of training from flexible, independent sources in the world of work has been extensively mapped. It can also be contended that if, in gaming, there is a microcosmic simulation of macrocosmic reality, then transfer application of learnt strategic processes and content should be facilitated;

Level 3: *Context transfer*—taking RP gaming as a primary example, with levels utilizing a bridging of induced schematic strategic and element processing (same characters, tools, psychomotor action generation, etc.), but varying in difficulty of landscape and storyline navigation as well as in the hierarchical transformation, context transfer is a procedural accepted standard. Though incidental and empirical indications point at contextual transfer happening between gaming itself and the gamer's nonvirtual reality, more extensive research still needs to provide evidence of this;

Level 4: *Near transfer*—the chaotic nature of HTP makes for sporadic generalization in knowledge acquisition, which, in turn, ties in with elements of situations that are often different from those for which the knowledge was sought or acquired incidentally in the first place. Though this does not make for formalized, directed near transfer, it does contribute extensively toward creating a widely spread knowledge and skill base that plays an incidental, but extensive role in many day-to-day situations for which specific knowledge was not pursued in the first instance, resulting often in successful horizontal transfer;

Level 5: *Far transfer*—Both volitionally and incidentally sought diversification in knowledge acquisition is quintessential in flexible, independent learning particularly when motivated by HTP. It is presumed that the wide base and diverse general knowledge acquired (with under-running mindful, metacognitive processes at work—the random search is logistical, not cognitive) can transfer vertically to situations dissimilar to the original contexts of acquisition. There is an initial lack of ordering (i.e., nonspecificity, possibly to the point of abstraction) which is eventually mindfully concretized through organizational nodes that can take the form of theoretical or practical tasks that might have had no connection with the original context of the learning. This reasoning is speculative as comprehensive research into far transfer instigated by HTP enhanced flexible learning still to be carried out;

Level 6: *Displacement or creative transfer*—The volitional nature of new media technology immersion and consequent integration into

users' character set, creates a dispositional stance that cuts across all subsequent, personal actions (as per Bereiter's theory, 1995). Apart from this, the very nature of, for example, gaming, is narrative-based (visual, iconic and symbolic narrative). It induces self-determined, often creative decision-making processes that may transfer, since the disposition is invoked in most of the instances and influences all actions carried out by the affected individual.

This speculation on the facilitation of transfer by contexts created by immersed new media usage can be corroborated somewhat by linking to the main elements that foster transfer an expansion of the elements that infuse hypertextual processing (HTP) and independent, flexible learning (IFL).

Similarity/Fidelity

- HTP: Associative hyperlinking among dissimilar elements that, however, have at least one element of fidelity, is staple to navigation both online and in most gaming.
- IFL: The random nature of the learning means that there are incidental elements throughout it that provide a bridging link to other knowledge harvesting (or learning), as well as task-oriented situations.

Analogy

- HTP: In role-play gaming, simulation of reality in three-dimensional animation format, fuelled by storylines that are processed by the player create analogical nodes that at times link with or replace elements in the gamer's own life.
- IFL: Analogy is an integral part of narrative in learning, but it can be a part of both independent and formal learning.

Generalization

- HTP: Multifocusing creates a spread of focus that is wider, if more superficial than singular focusing.
- IFL: Learning on the go (particularly through mobile devices) can be in the form of byte-sized snippets, the concision of which can be

of two extremes: either so totally specific that it is shorn of all excess information and has only the bare essentials of demanded information, or else general, giving an overview because of lack of space and time.

Abstraction

- HTP: Diffusion and lack of focusing create a non-specific collation of unit-based learning that abstracts.
- IFL: Unless hierarchically organized by a unified learning design, nonaccreditable online learning, as well as learning on the go, often lacks all but the focus on the searched for, or incidentally learnt unit of information. This is not in itself abstraction, but neither is it tightly parametered, specific learning.

Metacognition

- HTP: Though not planned into the learning itself, metacognitive processes are persistently at work, for e.g., in both the trial-and-error hierarchical tiering of level conquering in gaming, and in hypertextual navigation on the Internet, utilizing hierarchies of prior knowledge in the process.
- IFL: Motivationally induced learn-to-learn processes are an intrinsic part of independent learning. Skill-building is often not directed by outside sources but independently learnt. Hypertextual navigation, RPG manipulation skills, and other psychomotor processes are persistently enhanced through layered knowledge hierarchies, even if there is no actual formal structuring for the metacognition.

Mindfulness/Automaticity

- HTP: The process from mindfulness to automaticity can be perfectly illustrated by the experimentation with alternatives and the elimination of failures and strengthening of successes inherent in gaming skill acquisition, both within the parameters of each game, and also on a more accomplished scale across similar platform games (and, in the case of expert gamers, even across platforms).
- IFL: Salomon and Perkins' theory of the mindfulness to automaticity process can apply just as easily to both formal and informal, independent and flexible learning.

Disposition

- HTP: Strong, intrinsic motivation accounts for new media technology immersion, at times to the level of addiction. Dispositional adherence to the technologies is at times total.
- IFL: Disposition is one of the main driving influences behind the selection of independent knowledge and information acquisition as opposed to (or along with) a more formalized instructional regimen. Much of what is independently learnt online, unless directed by formal learning, is done through inclinations and/or dispositional instigation. The incidental learner's disposition is to learn, or at least to get specific information at any given time, rather than during time allocated for formal learning.

Confidence

- HTP: HTP induces lack of confidence in traditional organized learning conditions. If learning is self-motivated, immersion emphasizes individual confidence in both substantive and procedural acquisition.
- IFL: Once the independent skill acquisition is gained and instilled in the learner (in the form of procedural schemas), self-motivation, information need, and confidence in the use of new media technologies are what fuel learning in a flexible context.

Proactivity in New and Familiar Situations

- HTP: The very nature of Web site and gaming architecture stimulates exploratory navigation. Hypertextuality is based on the concept of the known leading to the unknown, which then becomes known in turn, in continuous, interlinked layering.
- IFL: Independent learning is instigated through the proactivity of the learner, since there is no predetermined regimen of study to follow through incitement. Background knowledge provides one base for the acquisition of new knowledge

Lifelike Contexts

- HTP: Virtual environments, in the main, mirror reality, infusing a willing suspension of disbelief and bridging lifelike contexts with fantasy-infused elements. In the case of heavy users, this has led to

(well mapped out in the literature) addictive behavior that makes vague the demarcation between the virtual and the real. Albeit socially and psychologically prospectively negative, the potential for transfer from one domain to the other of such situations is quite marked.

- IFL: Independent learning has often been linked directly with the concept of lifelong learning, in that the sources are constantly accessible and an integral part of the life of the user. The contexts from which learning is drawn are life-like in that they are often an extension of life itself, with Web 2.0 (for example) becoming an exercise in continuous, cyclical interaction between the World Wide Web and everyday reality.

CONCLUSIONS

Very little research has been carried out about the specific nature of hypertextual processing motivated independent flexible learning and transfer, so all remains firmly in the realm of speculation based on the researched nature of what instigates transfer of learning, and what actually has been proved to transfer (i.e., very little).

However, this chapter has looked at potential effects of HTP and the resultant preferences for independent, flexible learning by heavy users of social software, and the indications are positive with regards to, primarily, motivationally acquired general knowledge and how this may lead to what the literature determines to be transfer.

Another branch of the literature is full of argumentation about the difficulty of accreditation for independent learning, and many institutions of higher learning are actually treating the rising wave of learning outside controlled regimens as a growing threat to their very existence in the form as we know it. The reality is that there are a number of cognitive and affective gains, many that are socially useful, being made by independent learners. Even more specific in profiting are learners whose integrational interaction with new media technologies, and specifically with social software, has made them adopt the navigational patterns native to the technologies within substantive and procedural processing. In their case, independent learning is not an option, but the only viable route to knowledge acquisition, and though the literature in the main looks at the social ills that are brought about by this type of immersion, there are very few who are looking proactively at how this new state of being and thinking can be used specifically for learning. A lot of the old axioms, including those assessing transfer of learning effectiveness as a result of tightly

designed schooling procedures, will need to be rethought as part of this often ignored, but actually rampant development.

The old C-grade sci-fi robotic cliché "resistance is futile" springs to mind in the face of opposition to social software immersion, that ranges from (albeit valid) arguments about technology addiction, to the decrying of linguistic aberrations stemming from mobile instant message use. The reality is that this immersion and its effects have become an integral part of society as we know it, and it is about time that we also look at what gains can be made from this state of being.

It is a belief stated in this chapter, that transfer of learning can be one of the very important gains that can be made if we look closely at the change new media technologies have brought about in those who use it extensively.

NOTES

1. "The essence of analogical thinking is the transfer of knowledge from one situation to another by a process of mapping—finding a set of one-to-one correspondences (often incomplete) between aspects of one body of information and aspects of another" (Gick & Holyoak, 1983, p. 2).
2. Companion to transfer on the *low-road*. Both are defined thus by Salomon and Globerson (1987): "Two main routes of learning appear to emerge. One route implicates much deliberate effort utilization of non-automatic processes: it is a mentally demanding route to the acquisition of knowledge and skill. We call it the *'high road'* of learning. The other is a route that relies on much incidental practice where skills are employed in an increasingly more automatic manner.... It is a mentally undemanding but practice intensive road to learning ... By necessity it takes much more time than the high road, hence we call it the *'low road'* of learning" (p. 630).
3. *Cognitive interaction* theory, which stems primarily from the work in *social cognitive theory* by the Canadian Albert Bandura (b. 1925), "is the interaction of individuals with their perceived, meaningful environments" (Bigge & Shermis, 1992, p.148). "In cognitive interactionism an individual is considered to be not a passive object for environmental forces to condition but an interactive, intentional subject, continuously participating in an ongoing reciprocal person- and situation-interaction process and acting on the basis of his own reasons, expectations, needs, and motives" (p.148).

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