Personal Learning Networks (PLNs) as an approach to understanding the rhizomatic learning connections of 21st century students

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Abstract

Personal learning networks (PLNs) define how learners seek knowledge, pull the knowledge and allow this knowledge be used in a suitable context. PLNs further exhibit that formal and informal interactions and usage of various technologies attribute to the many instances of learning. The learner given a great degree of freedom can mold and control her learning.

The PLN is modeled on the concept of a rhizome, an underground plant stem capable of producing the shoot and new root systems of a plant. This capability of producing new shoots, roots and stems is now simulated in the idea of a rhizomatic learning model taking place in personal learning spaces. Cormier posited that persons finding new knowledge realize the many changes and progress through "participatory, negotiated experiences in rhizomatic engagement." (Cormier, 2008)

This study aimed to uncover the many web and social sources of information and knowledge of the students through the use of personal learning networks (PLNs). The study covers fifty sophomore university students who have defined their current PLNs through PLN diagrams. The study disintegrated these PLNs to categorize the shoots, roots and stems of the students' learning, classify them to school-related or personal interests and identify how these complement each other. This study also analyzed the students' learning priorities through the variety of ways that students drew their diagrams.

It is the desire of this study to contribute to new ways of doing research, analyzing student-defined learning networks and charts, and to open the doors to fresh forms of learning studies. The study came to the conclusion that rhizomatic knowledge-creation in this era of web and information, is the new direction for lifelong learning and requires more in-depth scrutiny and openness.

Keywords: personal learning environment, personal learning networks, rhizomatic education, learning connections, rhizome

Introduction

"There is no beginning or end for the rhizome, it is process as cultural code, multiple and fractal in nature". (Bussey, Bjurstrom and Sannum, 2010) Learning creates a web of multiplicity about how learning is acquired, pulled or absorbed.

In this era, information and communication technologies make it possible for many learners to have convenient access to rich content, major works and information that have not been conveniently available before. In this context, there is a need to reexamine how knowledge is viewed, created or recreated. (Cormier, 2008) More than the formal settings of the classroom or the university alone, there are limitless ways of generating knowledge because of emerging technologies. (Attwell, 2007) The students themselves become producers of knowledge as technologies become ambient. And learning becomes multi-episodic, taking place in concurrence, in multiplicities, different facets, transforming and expanding.

It is because of these instances of metamorphosis in the way individuals acquire information and knowledge that the concept of personal learning environments has surfaced. Attwell noted that personal learning environments

(PLEs) are intended to provide support tools to learning and recognizes the meaningful role of the individual in her personal learning environment. (ibid.)

Learning now occurs in countless contexts as technologies have become pervasive as well. Technologies have encouraged, empowered and have made it second nature for learners to pull and acquire any information to be translated into knowledge for her personal consumption. As learning is continual and interminable, so the opportunities to learn become multitudinous and open-ended.

Personal Learning Networks (PLN) as a new way of understanding the learning process
Fiedler and Väljataga (2011) define a personal learning environment (PLE) as "all the resources (artefacts, natural objects, people) that an individual is aware of and has access to at a given point in time and that s/he can turn into instruments to mediate her actions" for "a particular learning activity". For any learner, a PLE represents the individual's learning process, and is indicative of that learner's personal learning preferences, networking skills and information-gathering abilities. It is important to note that a personal learning environment is not something owned by the learner but, rather, is something constructed out of a set of learning preferences and a network of connections (Väljataga, 2010). Attwell (2008) further explained that PLEs may provide individualized support tools to learning and that, by making them a visible and explicit part of learning, one recognizes the central role of the individual in the development of the network.

There is an abundance of representations that can be created to illustrate a personal learning environment. This could be achieved through a map, a web, a chart or even a table. Also available are mapping tools or software that can be used but whatever context or subject is there in the map, it is primarily defined by the learner herself.

In this study, the personal learning environment is pictured as a rhizome, represented by a network of nodes, with shoots and stems labeled as a personal learning network (PLN) diagram. Two examples were used as base diagrams. The first one is a PLN work of an information science professional (Sitchensis, 2010) and the other one is the PLN of the class adviser (Pineda, 2010).

A personal learning network is modeled on a rhizome, an underground plant stem capable of producing the shoot and new root systems of a plant. The shoots may grow rapidly, create multiple stems, shoots and stems may intertwine, stay longer or get entangled, and many entry points are available for nutrients to be transfused back to the rhizome. (Rhizome, 2011) The rhizomatic representation of the personal learning environment further presuppose that all the contributions are "constructed and negotiated in real-time" by the learner herself. (Cormier, 2008) The PLN diagram is meaningful in itself because it is constructed, defined and designed by the learner herself. Hence, the PLN provides a plethora of intimate ways for what the learner pulls, captures, uses or recognizes as key sources of her learning experiences. It could also exhibit a student's continued, or rich, interests on specific subject matters, be they academic or personal or professional in nature.

Why use PLN diagrams?
While there are many strong and proactive discussions on personal learning environments, new light will be shed on research if data could be constructed or extracted from the students themselves.

In most traditional studies, surveys are used to determine students' profile, access to ICT and perceptions of learning. It is the teacher or researcher who defines the choices of answers for the students. Pineda's (2009) study for example, garnered substantial data for analysis and showed the high degree of technology exposure the students had at that time and how they utilized technology with their time. The students responded to a set of questions in a survey. The set of questions was defined based on the perceived activities of the researcher. The results exhibited that students from DLSU, co-situated in urban settings construct a new form of learning behavior, an offshoot of the natural cohesion of learning and technology among individuals. This scenario commonly takes place in urban settings where there is wide and easy access to technology resources. (ibid.) While this study may be grounded on data it essentially talked about the perception of the students based on the parameters set by the researcher.

A detailed and extensive study by Lieberman (2008) explained that reflective cognition has contributions that cannot be duplicated by the non-reflective side of the human brain. This meant that data that have gone through a longer reflection time would become more meaningful, such as how the students constructed their PLNs. Hence, data in a survey while it may be factual in nature, might consist of non-reflexive answers, very much dependent on the recent activity recollection of the responder rather than on longer-term reflection.

So the approach in the present study was to extract the learning interests from the students themselves. The students were oriented and taught about personal learning environments. Some examples were shown to the students such as a diagram of social connections, a personal learning network diagram and some relevant readings on the topic. The students were given time to create their PLN diagrams. This meant more reflection time for the students to spell out and lay out their shoots and stems of learning interests. They were also in control of grouping or categorizing their knowledge cultivations. Diagram 1 exhibits an example created by a student from DLSU.
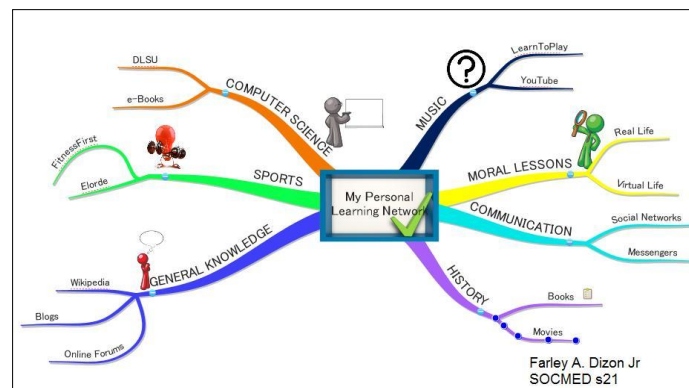
Diagram 1. Example of a PLN as a rhizome with shoots and stems

The PLN diagram mapped not only the web of useful and creative information but also the terminologies that the students used, the types of combined people and online sources of knowledge that they had, and how their shoots and stems of learning complemented each other.

Methodology of the Study
The various informal and social learning theories were discussed in class. Lectures and interactions were delivered in the classroom to further provide the students with a wider perspective of what personal learning networks were. The class adviser provided her own personal learning network as an example and two other references in the class blog. The emphasis was to have a reflective awareness of their sources of learning.

The students who were tasked to draw the PLN diagrams were sophomore students taking a degree in Information Systems. These students were greatly immersed in various web applications and tools, exposed to social networks and with a regular access to wireless internet connectivity in the campus.

The students were then tasked with drawing and creating their own PLN, pointing to the complementing links of the various sources of information, knowledge and learning. The students were given a non-restrictive way of grouping or combining their interests. They were not constrained by strict structures or learning elements to be placed like academic or personal interests. The PLN was designed be posted in a publicly accessible web page with its link submitted in the class blog. This task was not difficult to the students as these students were content creators themselves. Downes (2005) pointed out that one major change in the ways education had been moving was that while there used to be a model of single providers of learning content, there are now many producers of learning content. The students today are not just consumers but active producers of learning content.

There were around one hundred diagrams or charts submitted in the blog. But only fifty diagrams were used in the study. Most of the excluded blogs were posted in a private Facebook or Tumblr page or photo page that had prevented the open access to the diagrams.

The diagrams were analyzed in three ways.

First, the diagrams were studied by disintegrating the shoots and stems of the diagrams to have a wider picture of how a typical sophomore university student allocated her energies and time to different learning interests. The labels of interests and connections made by the students were listed and recorded as tags. The tags were also categorized under three labels-- *academic, social and others*. *Academic* refers to any learning interests that have direct involvement on formal interaction as defined by the student in her diagram. *Social* refers to informal interactions, maybe online or face-to-face as again defined by the student including the tools and social networks she uses. Finally, *general interests* would refer to the self-view of learning interests like sports or cooking including the online support she gets.

The second technique was to quantitatively examine the labels and categorization frequency set by the students. A tag cloud was the primary tool used here through the visual word frequency application TagCrowd (Steinbock, 2008).

Third is the observation of how the PLN diagrams were drawn and expressed in rather creative and myriad ways. The core of the diagram is imagined as a rhizome capable of producing different shoots. The shoots are the learning sets of the student as she had classified or grouped them. The shoots produced different stems and each stem corresponded to a specific learning contributor. There were many learning contributors based on the diagrams created by the students.

Results of the Analysis
1. Disintegrating the shoots and stems of the rhizomes
The shoots representing the major knowledge cultivations or categories of the students were counted and tagged. The stems that serve as learning contributor were also counted. The learning contributor is an entity representing the source of information or knowledge. Examples are web tools or sites, social groups or connections, educational materials and others.

The analysis showed that a DLSU sophomore student would have an average of five (5) shoots and eighteen (18) stems of constructed learning interests and learning contributors. These results further deepen the understanding of PLEs. The students went through a reflective process of building their PLNs and express them in a form and terminology of their choice. The PLN has also become an exuberance of the learning style of the students as some have great dependencies on tools, some would have rich social circles and some creating a balance between their active offline and online engagements.

Figure 1 presents in graph form the popular shoots and stems of the students. It generally shows that most of their activities are tied up at home, in school or online. It is evident that most of the students have close relationships with their families. Aside from Facebook- Twitter, Tumblr, Youtube and Yahoo are the favored alternate communication venues. The students likewise have a great sense of group and collaboration preferences whether these are web tools and/or social networks.
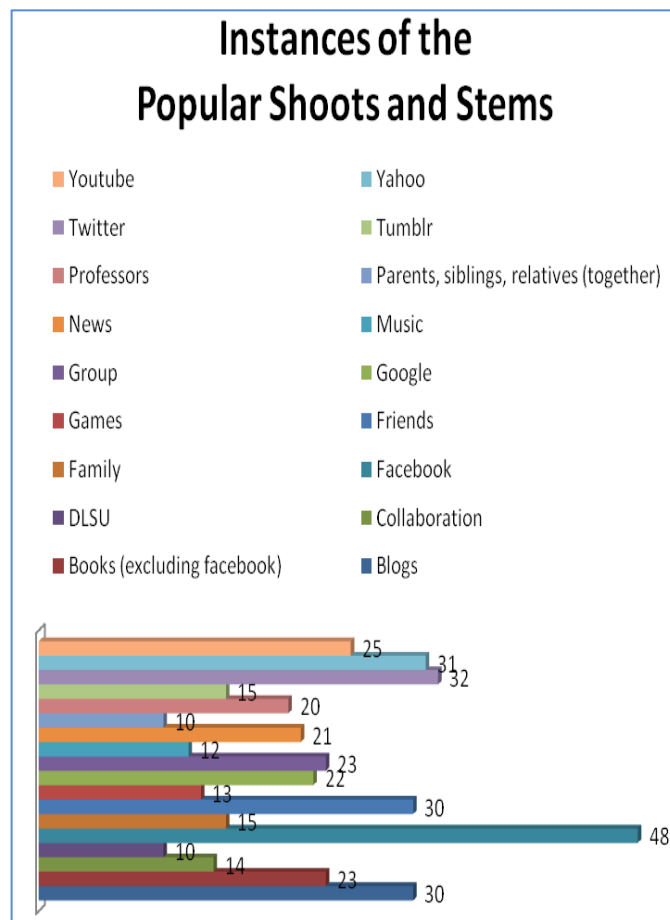
Figure 1. Graph of the Instances of the Popular Shoots and Stems in the PLNs

2. *Tag cloud results*

a. Under the academic category, the tag cloud result was quite interesting.

The example given to the students did not cite or suggest individuals in schools that may have strong impact on the present learning. But in the academic category tag cloud, it showed that students value individuals such as professors (40%); friends (38%); family, siblings and parents (34%); classmates, colleagues and schoolmates (32%). DLSU which refers to the university, including the school, was also significant to 30% of the students.

b. The tag cloud shows that Facebook, Twitter, blogs, Youtube, Yahoogroups, Yahoo Messengers, forums are the mostly sought and used social arenas for interactions. This includes group work and collaboration.

c. There is a high level of variety of general interests.

d. Facebook, yahoogroups, Twitter and Tumblr were some of the popular social network tools used by the students. In Miller's (2009) thesis, it was concluded that high use of social networks for public communication and interactions led to increased learning participation and "development of collaborative and research skills".

e. *Youtube and blogs* have been arbitrary learning systems, moving from academic to social to general interests. On some occasions, these have appeared as shoots in the PLNs. Generally, the students identify these two as very handy and useful support tools for learning.

f. The students made use of Tumblr, Blogger, Mindmeister, Photobucket, Wordpress and Facebook to host their PLNs. Access to Facebook was an issue whenever it had privacy settings. This issue was an oversight on the part of the students.

Figures 2, 3, and 4 show the tag cloud results for academic, social, and general interests. Figure 5 shows the overall tag cloud results. The tag cloud was used to show the frequency of the shoots and stems of the students' rhizome.
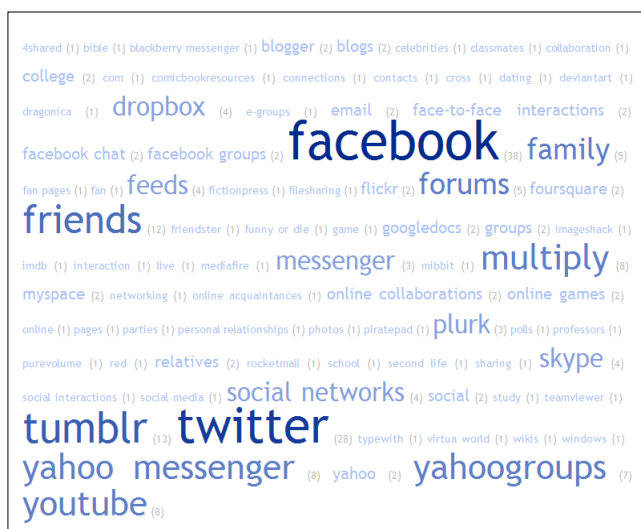

Figure 2. Tag cloud of Academic interests

Figure 3. Tag cloud of Social interests
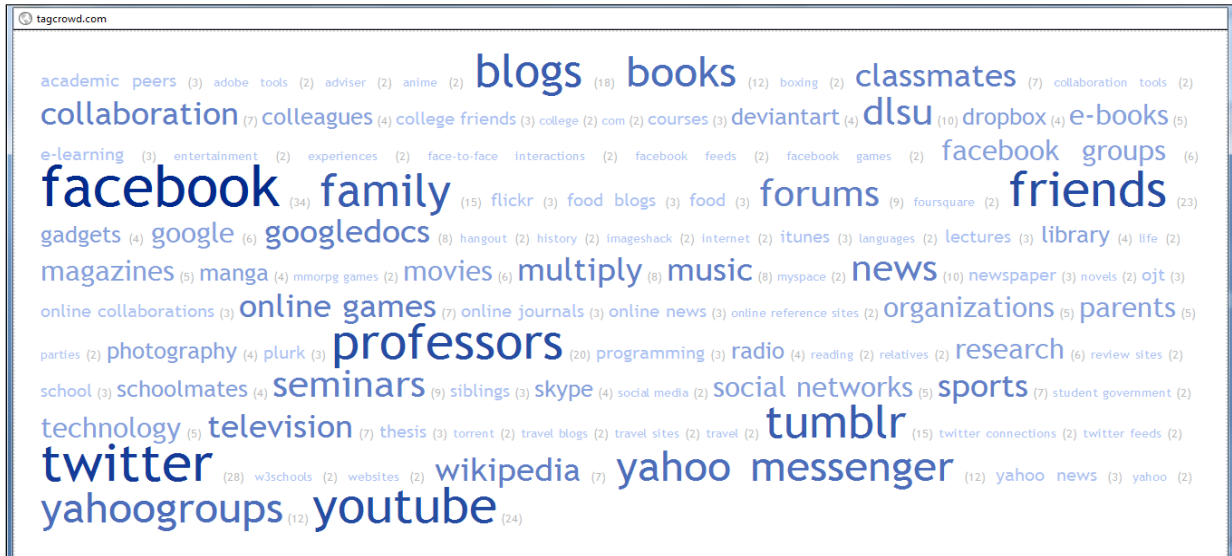

Figure 4. Tag cloud of General interests

Figure 5. Tag cloud of the combined interests

3. Variations in the PLN Diagrams

As part of the orientation on PLNs, an example was provided. The example showed a chart and the yellow core is considered as the rhizome. The rhizome had several shoots, pertaining to the learning interest sets. And each shoot had different stems extracting the knowledge, information and processes to make learning happen. The roots are seen connecting from one stem or shoot to another shoot. The root shows how a learning set has been capable of complementing another learning set enabling more stems to come.

The students were permitted to draw their own PLNs with minor restrictions such as the PLN should be accessible in the web. The PLN must be reflective of their ecosystem of learning. It is also part of the result of this study to see the dynamism of PLNs such that the PLN is a reflection of the way students organize their learning. Below are some examples:
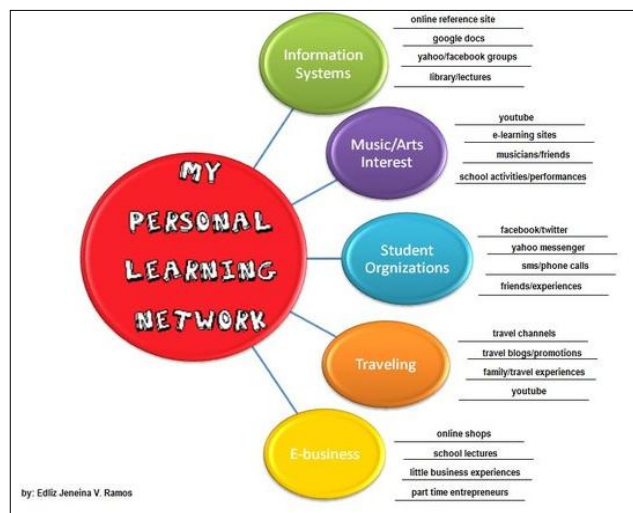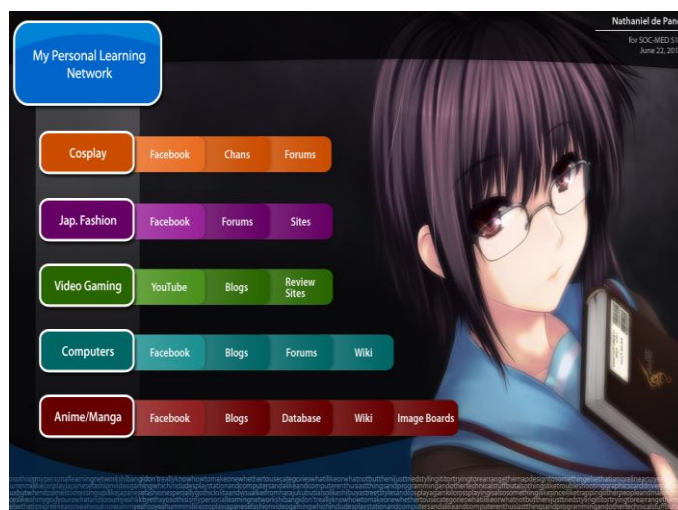

Diagram 2. An example of a typical PLN

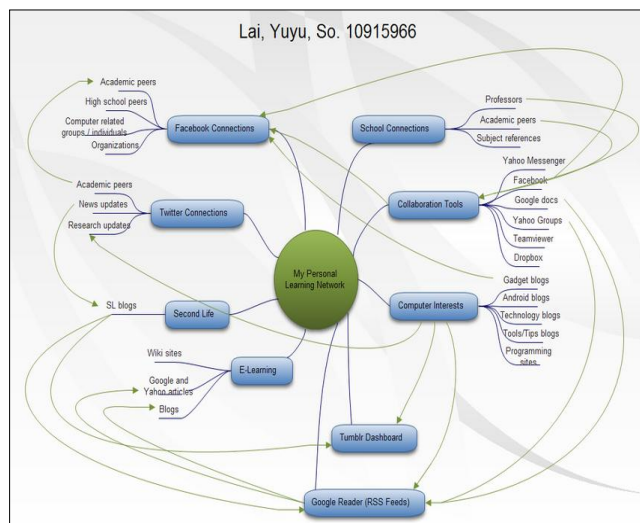**Diagram 3**. An example of a PLN prioritizing Japanese modern culture

Diagram 4. An example of a dynamic PLN

The first example (Diagram 2) demonstrates the typical PLN among the students that consists of academic interests, her social group and other interests. The second example (Diagram 3) illustrates priorities being given to modern Japanese culture. The third example (Diagram 4) shows the dynamic interests of the students with nine (9) shoots and many stems.

Some have used dominant colors like pink or green as if the PLN had a persona. Some have huge webs of interests. Some have numerous stems of social connections. Some have obviously more personal or hobby interests than academic interests. Students with a high level of interest in knowledge acquisition would exhibit many fractals of shoots and stems. Diversity is very evident.

Surowiecki (2005) asserts that diversity is valuable and must be encouraged because differences in perspectives actually contribute to creative solutions. This kind of diversity must be enhanced among students who are constantly immersed in technology and the web while they learn.

Some limitations of the study-- the details of the stems, which serve as learning contributors, particularly the web tools and other not so popular sites were not verified. The rhizome stems wherein the students also contribute their work and other useful information were not captured by the study.

Conclusions

The study resulted in many revelations. The PLN may be considered as the blueprint of a student's preferred learning connections and learning support tools. It is an effective way of knowing if a student does not have balanced academic and social interests; if a student does heavily prioritizes her social connections; if a student is building on her academic interests through the tools she is using; or if a student is able to use her personal interests to complement her academic/professional interests. Interventions may be need if the result of the student's PLN appear to be alarming. On the other hand, school administrators may be concerned as to what kind of online tools or support mechanisms student seek, what social networks they subscribe to and what e-resources they find as most useful and practical.

This investigation has been successful in contributing new ways of doing research, analyzing student-defined learning networks and charts, and opening the doors to fresh forms of learning studies. The study was creatively unique in many ways, qualitatively and quantitatively—it combined the use of statistics, tag clouds, PLN illustrations to comprehend how a learner shapes and controls her learning in a rhizomatic engagement.

The better the learner is able to define and construct her personal learning environment, the more she is capable of increasing the shoots and stems of her learning. The present challenge to curriculum design in the university is to realize how to accommodate for the rhizomatic model of learning happening beyond the classroom walls, in the students' social spaces and through informal interactions. School systems will have to change their rules and develop ways of facilitating guidance so that students could exercise prudence, know-how, and wisdom in the knowledge that they pull, develop better informational skills, and engage astutely in online or offline activities.

It is also recommended that teachers create their own PLNs and allow their interests to complement their teaching. Teachers with a deeper awareness of their own learning environment are more likely to be able to support students effectively as they navigate through the endless possibilities of learning.

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