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The Circle of Learning: Individual and Group Processes

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Abstract:

We present a paradigm for modeling the processes found in individual and group learning. Using combinations of two dimensions, the first being whether the learner's *activities* are By-Oneself or With-Peers, and the second whether the process *orientation* is toward the Person as the focus of the learning or toward the Group as the focus, we derive four quadrants in Activity-Orientation learning space.

These four quadrants represent: lectures, individual learning, concurrent learning, and collaborative learning. From these combinations of Activities versus Orientation, we can describe many characteristics of these different learning *categories*.

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Introduction

Traditionally, many educators have considered learning to be an individual responsibility, with students accepting the burden of acquiring knowledge and expertise . Recently, the notion of collaborative learning has been strengthened, from a number of sources. These include the push in Kindergarten to Grade 12 and colleges to learn through group projects within a classroom (Felder 1995; Johnson & Johnson 1991), and through communicating with other students across a network, such as KidNet from the National Geographic Society, or interactive video (Rettinger 1995; McCarthy 1995) in the domain of distance learning. Digital communications networks such as the Internet Internet (Vetter 1995; Macedonia 1994), or the use of Lotus Notes, have become the new medium in which group learning is anticipated to take place, and many large businesses have already built internal group learning systems using Lotus Notes.

Organizations and businesses have increasingly moved to an understanding that in a continuously changing environment, the "learning organization" is the high-performance organization (Gordon 1992; Senge 1992). In a knowledge economy, the organization which adapts best through new knowledge by effective learning (Mumford 1993; Vowles 1993) is the one which will take the lead, and maintain it.

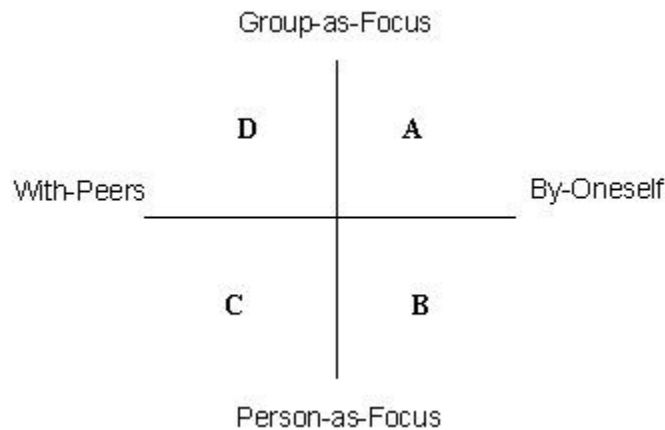
It is the purpose of this article to explore a simple paradigm for individual and collective learning that is inclusive of the many shades of meaning in this domain, and will serve to clarify the relationships between the several inter-related concepts. We will then explore the significance of this paradigm in terms of practical implications for future action.

The Activity-Orientation Paradigm

This is based on the observation that there are two dimensions along which learning takes place:

By-oneself vs With-Peers	Learning Activity
Person-as-Focus vs Group-as-Focus	Process Orientation

When taken together, they form a coordinate system with four quadrants:



These quadrants represent different approaches to individual and group learning across a number of dimensions. We will now explore these characterizations.

The Learning Activity Dimension

By-Oneself means that the learning process is one in which the student acts alone, even if physically he or she is with others. Studying by reading in one's own room or office is the prototypical example of learning By-Oneself. However, in an extended learning-by-being-told situation, such as a lecture, or briefing, the student is, in terms of Activity, still By-Oneself.

On the other end of this dimension is learning With-Peers, in which learning activities involve extensive or continuous interaction with others. The typical university seminar, most junior grades in high schools, the study group, the conference call, or the computer-supported conference are examples of learning With-Peers.

The Process Orientation Dimension

We consider learning as a process within a social context, in which more than one person may be present (by process, we mean a sequence of activities directed towards a specific goal). In this context, the process can be oriented either towards the Person-as-Focus, or the Group-as-Focus. As this process, by definition, involves all participants, the orientation is independent of the perspective of the persons involved. For example, whether from the viewpoint of the student or the teacher, the process orientation in a lecture, in which the teacher stands in front of a class, is that of Group-as-Focus. In other words, the teacher's point of view is that the group is being addressed. The student's point of view, in terms of process orientation, is that the teacher is not addressing the student, but the entire group.

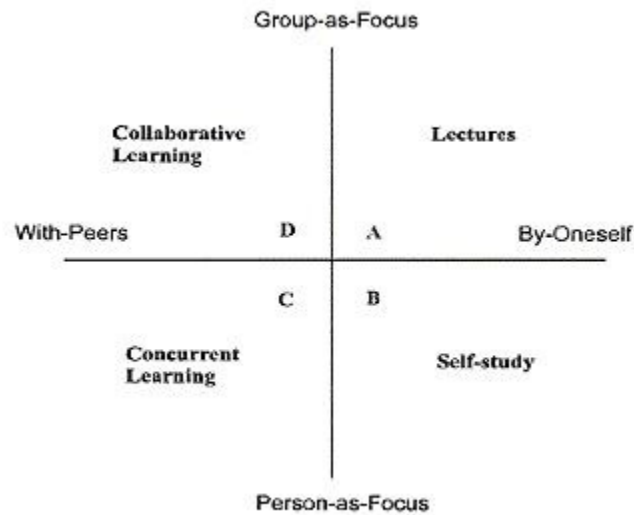
A learning process oriented to the Person-as-Focus is the student studying alone, of course. Another is that of an informal study group, or a typical internet newsgroup, in which the individuals interact with others, but the process is based on each person producing their specific contributions and meeting their individual needs.

On the other hand, if a learning process involves the group, in which some external goal or structure has been imposed, such as requiring the group to make a decision, or to come to agreement on a position regarding an issue, the process would be Group-as-Focus.

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Four Distinct Learning Categories

The distinct learning processes represented by the four quadrants correspond to distinct categories of learning, as shown below. In much of the literature on learning, they have been discussed in isolation, or in juxtaposition (such as group versus individual learning (Brown 1991; Carley 1992; Taylor 1992) or lectures versus collaborative learning (Ransbury 1994; Garko 1994; Johnson 1991) without an analysis of their structural relationships. We will first describe the general characteristics of each learning category, and then discuss the ways in which a number of important attributes differ for each.



Quadrant A: Traditional Lectures

In a traditional lecture in which a person talks while others listen, the student's activity is By-Oneself, while the orientation of the process is towards the group as a whole, ie, the Group-as-Focus. Although the wish is frequently made that students interact more in this process, studies of student questioning (Dillon 1988; Graesser 1994) reported that in the typical lecture situation, the frequency of questions per hour is only 3.0. The process dynamics of this learning category is that of a single person addressing the group as an entity, so it is no surprise that this process does not support With-Peers behavior well.

Where this learning category demonstrates efficiencies is that a single person can place the same information within reach of many. This is the time-honored way of utilizing the scarce resources of experts, reaching back to a time when there was only an oral tradition of passing knowledge from one person to others.

The lecture also has other potential strengths, including the ability to motivate others to certain behaviors, to inspire them to reflect deeply, or to perform logical analysis. By example, a lecturer can demonstrate the synthesis of complex information, or the integration of several ideas into a coherent whole.

Quadrant B: Self-Study

The learning activities in this learning category are those performed by a person By-Oneself (regardless of whether the person is physically alone or not). The process is also oriented to the person as the focus. Thus, solo reading, problem solving, individual experiments are typical of this category.

However, some learning processes in this category could involve more than one person. For example, when a tutor working with a student, the learning is being done by that student, and all the processes are also focused on the student.

It follows, from the above, that the technology support for Self-study includes both electronic media as book (for the activity of solo reading), and as electronic tutor.

Quadrant C: Concurrent Learning

The learning activities in this category are in the character of being With-Peers, in the sense that the activities involve learning together, through shared activities in a collegial manner. The processes are oriented around the Person-as-Focus, in that the goals and outcomes of the social and learning processes are individual in nature, rather than focused on the group as a whole.

Typical of this model of collaborative learning are group interactions such as study sessions, Internet newsgroups, and ad hoc project groups, in which peers express and exchange opinions, values, perspectives and some facts, or accomplish common objectives that satisfy individual goals.

Quadrant D: Collaborative Learning

In contrast to Concurrent Learning, this learning category concerns those processes oriented to groups as entities. The perspective is that of the goals and outcomes of the group, using measures which reflect the group as the entity under consideration. The individual's activities are in the With-Peer framework, in that he or she participates in processes which are highly interactive and collaborative in nature.

The differences between Concurrent Learning and Collaborative Learning are the differences between the collection of goals of individuals, and the goals of a coherent collective culture, which can be viewed as an entity with its own measurable goals, achievements and outcomes. The behavior of both are based on With-Peers activities, in other words, on collegial interactions. With Concurrent Learning, a group of peers interact to achieve their individual learning goals; with Collaborative Learning, a group of peers interact to achieve their collective learning goals.

This distinction may appear to be based only on the difference between having a stated objective for peer interaction or not, but it is more than that. For a group of persons to be oriented to the Group-as-Focus requires an adoption of common goals, values and culture that are coherent and persist over time.

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Multi-Dimensional Attributes of the Model

The four learning categories: Lectures, Self-Study, Concurrent Learning and Collaborative Learning can be further described by a number of common attributes, which serve to additionally characterize them. From these attributes we can draw a number of observations of a practical nature, concerning their inter-relationships and their implementations.

The attributes that will be used are:

- the interpersonal dimension
- the learning environment
- the knowledge content
- technology support
- sociological dimensions

The Interpersonal Dimension

The four learning categories described above differ significantly in the way in which the learner is involved with oneself and others.

In Lectures, the individual is listening to the lecturer, in a passive rather than interactive way; the listener is the recipient, the lecturer is the active dispenser of knowledge. The listener is apart from others who may also be present, and in an interpersonal sense, they may as well not be present. The lecturer often is the source of authority that validates the process.

Self-Study is usually an individual activity, focused on internal cognitive processes. These learning activities often take place in the isolation of one's own room, office or laboratory. Where others are present, such as in a library, special social and interpersonal rules are established which provide virtual isolation. The primary motivator for the Self-Study process is usually the student.

A special situation of Self-Study in which another person is involved in a meaningful way, is that of the Tutor who works one-on-one with a student. The learning activities are all directed at the student's needs, and fit into the Person-as-Focus definition; there are no peers interacting with the student, and therefore the process orientation is also By-Oneself. The interpersonal relationship with the tutor is an interactive one, where the tutor is in a sense, a dynamic extension of the knowledge to be acquired, providing guidelines, highlights, key strategies and motivation.

Concurrent Learning describes situations in which a learner is interacting with peers, but the learning activities are individualized, rather than having a group focus. The nature of the interactions with others is that of exchanges of facts, opinions and values. There may often be a set of individual goals, rather than a common learning goal. Among common examples of Concurrent Learning are the seminar, classroom discussion, hallway or coffee chat at work. Included in this category are distributed interactions such as electronic forums, Internet newsgroups and bulletin boards. Thus, the style of interpersonal relationships may be competitive, confrontational or collegial, rather than consensus-reaching.

It is not unusual for Concurrent Learning situations to have either formal or ad hoc referees, who facilitate the interactions and maintain them at a reasonable level of focus, interest and civility. Electronic forums and bulletin boards use formal facilitators, while informal discussion groups find individuals taking on the role of the facilitator from time to time. The legitimacy of Concurrent Learning sessions are imbued as much in the general sense of acceptance of the process by the individuals, as in the existence and activities of the facilitators.

The Collaborative Learning category describes situations in which a group of persons share common learning goals, and work together to achieve them. In a broad sense, achieving any shared goal is a learning experience. For example, agreeing on a new design for an engine part requires the contributions and assent of different members of the group, each representing

different aspects of manufacturing, materials and operations. The end result is that each person comes away with new knowledge of the topic, interaction process and of the participants. There is of course a narrower sense in which a group of persons cooperate to achieve specific learning goals, such as a group of high-school students studying the composition of soil, and writing a joint report.

From our point of view, the interpersonal dimensions are the same. The flow of activity and thought is not directed by any individual; each person offers contributions to the group, and interacts with the group as a whole rather than with other individuals. The difference between Concurrent Learning and Collaborative Learning, in the interpersonal dimension, are characterized by differences in group process. Concurrent Learning is a forum of individuals; Collaborative Learning is an environment in which each person attempts to be a coherent part of a whole, synthesizing with one another a shared understanding of values as well as facts. The personal behaviors required of each person in such a setting are not necessarily intuitive or natural, and it is not uncommon for Collaborative Learning to be mediated and orchestrated. For example, Robert's Rules of Order is a very formal set of rules that represents one highly structured way of achieving group consensus, among a whole spectrum of other approaches that are available to help a group act and learn collaboratively.

The important point is that Collaborative Learning, like the other learning categories, is characterized by specific interpersonal behaviors which arise from differences in Learning Activity (by-oneself or with peers) and Process Orientation (individual as focus or group as focus).

To summarize, the characteristics of the four learning categories in terms of the interpersonal dimension are:

Lectures	listening
Self-Study	focused on own thoughts
Concurrent Learning	participatory
Collaborative Learning	cooperative

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The Learning Environment

These categories also differ in the environments they provide within which learning takes place. In a Lecture, a person is subjected to a continuous stream of information, with little time to reflect on any specific part of it, at the risk of losing what follows. The Lecture environment constrains the listener to conform to the tempo of the lecturer's delivery, and to diverge from that sequence of ideas minimally.

Learning in the Self-Study category is quite different. The student is in complete control of what is done next, mentally and physically. There is freedom to contemplate the relationship between two concepts, to explore a thought association, to work out something that was not being well understood. This self-directed environment requires discipline and focus, and for some persons who do not have this rigor, is an inefficient way of spending time and effort in learning.

The Concurrent Learning category is one in which the learning process is individually focused, while the activity is with peers. This environment is one in which many participants express their individual opinions, beliefs, and arguments, in an open forum in which the competing ideas of the persons involved shift into and out of focus. The stimulation of receiving many different perspectives from others is offset by the inability to think much about any one

thing before either getting another, or taking some action oneself. The environment is characterized by debate, and the validation or refutation of the arguments and supporting facts of the participants is very different from Lectures and Self-Study.

In the Collaborative Learning paradigm, both learning focus and activity are oriented to the group. The individuals in the group work together to achieve common learning goals, arriving at consensus. The environment is characterized ideally by sharing, openness, acceptance of the contribution of others, and the development of a cohesiveness in which each person becomes aware of the shared achievement of all. In this sense, successful Collaborative Learning among team members in a company is "organizational learning", with the organization having learned if its members have acquired shared knowledge and values in both a self-aware and a group-aware way.

In summary, the learning categories provide different learning environments:

Lectures	constrained to cognitive tempo of the lecturer
Self-Study	self-directed internal and external processes
Concurrent Learning	open forum for competing priorities and values
Collaborative Learning	consensus seeking based on common goals

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Knowledge Content

What is being learned in each learning category? Although one could argue that anything can be learned in any of these processes, and this in fact occurs all the time, we believe that their characteristics lend themselves to different kinds of knowledge. There is therefore a sense in which the learning category has a primary knowledge function.

As we have observed, there is a stream of information that flows from the speaker in the Lecture situation, so that the learner is constrained to follow the sequence and tempo of the lecturer. This reduces the opportunity for extended reflection and integration of new knowledge, while facilitating the introduction of facts, concepts, relationships, values, etc. in a more superficial way. The Lecture is better-suited for guiding the learner to appreciate the framework of a subject, its key concepts and highlights, rather than to a detailed understanding.

This is not to say that a lecturer is unable to lead the student, through a clear sequence of steps, to a more profound and deeper understanding of a specific concept than the learner could achieve by him/herself. Rather, the constraints of the leader-follower relationship lend themselves to the lecturer imparting knowledge to the listener. When there is a group in attendance, the lecturer will tend to address the common level of understanding of the audience, which in general reduces further the complexity of the delivery.

In Self-Study, the learner follows his or her own personal initiative in working with the material. Whether reading a book, watching a video, doing exercises, writing, listening to a tape, the learner is in full control of what next to do or think about. If a concept is not well understood, or sparks a link to a new idea, the learner can choose to pursue the issue further, to whatever extent is desired. This personally directed, potentially non-linear flow of internal events means that the learner can seek to achieve a mastery of the subject matter, in a way that is not possible in the Lecture or the other interactive group-focused categories. The kind of knowledge that is realizable is therefore not only factual, but also the associations, relationships, and use of these facts in linkages to the learner's existing knowledge contexts. For this reason, Self-Study, which includes reflection, assimilation, integration and association of new concepts, as directed by the learner, is essential to furthering a person's learning in most domains.

Concurrent Learning describes an environment in which individuals pursue their own learning goals while interacting with one another. The pace and tempo of this interaction is not determined by any one person, and therefore reflection and self-directed thinking is not the order of the day. Rather, the learner has the opportunity to weigh a number of positions, opinions and arguments proffered by others, and in turn to construct and propose his or her own contributions. This open forum of competing rhetoric provides the learner with a unique kind of learning, in which one's own knowledge is seen in the perspective of others, and in which one can appreciate the same topic from several points of view. In order to participate, the learner has to generate coherent knowledge structures dynamically, which reflect linear traces (because voice and written language is linear) through the internal network of concepts and relationships. The dynamic coherence of this output, relative to the peer-based demands of the current conversational context, is a reflection of the facility with which a person has conscious mastery of specific knowledge. In fact, the dynamic creation of such coherent structures is a generator of expertise.

In Collaborative Learning, individuals work together to achieve common learning goals, which are often declared formally, but may also be implicitly assumed in the process. The consensus that leads to group decisions are based as much on an understanding of shared values as on the set of facts and rational constructs through which these values find expression. This shared awareness is in a very real sense group learning, and is one of the keystones of organizational learning.

To summarize, the learning categories differ in the types of knowledge that are acquired:

Lectures	speaker imparts knowledge to the recipient
Self-study	self-directed reflective integration of subject
Concurrent Learning	generate own knowledge in perspective of others'
Collaborative Learning	group consensus based on shared values

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Technology Support for Learning

There is general concern that traditional learning approaches may be inadequate in the face of many pressures: the increasing quantity and quality of learning demands, the increasing diversity of the student group, and the decreasing amount of time available for learning needed to address changing situations. What technology support offers to each learning category is the opportunity to individualize or make more effective the mechanisms through which learning takes place.

Lectures are limited in physical size by room space, and in audio-visual space by the audibility and legibility of the lecturer's voice and visuals. These can and have been enhanced in many ways: amplification, screen projectors, live video into several rooms, live video over a broadcast, satellite or private network, and recorded video and notes for distance learning in one of its modes.

Self-study is a learning process in which students work at their own pace to acquire, reflect upon and integrate knowledge. Technology support for this learning process enhances this in a number of ways. It can provide the student with more powerful representations of knowledge, such as sounds, videos, and images. More important, learners have the freedom to move in this multimedia knowledge space that is almost as powerful as the freedom of self-directed thought. Facts, ideas, opinions are no more than a few keystrokes or mouse-clicks away. Most of all, technology support can provide an interactive environment in which the learner can find support,

guidance, and responsiveness that is close to what a human tutor offers. In this way, a learner is able to focus on personal learning goals through a supportive, adaptive and guiding process, that is at the same time highly personalized. This kind of technological support for learning in the Self-Study process is highly empowering, promising large potential gains in learning effectiveness and efficiency.

The technology support for Concurrent Learning has been directed at increasing the scope and power of the open forums in which these learning processes take place. To increase the numbers of persons involved, video conferencing or computer conferencing can be used. The storage and processing power of the computer makes it possible for conferences to be either synchronous (at the same time) or asynchronous (whenever one gets to it). The messages between persons can either be documents, text, voice or full video. Many of these conferences are moderated by a coordinator, but this does not necessarily improve their usefulness, depending on one's point of view. Many distance education programs use technology support of this kind as the backbone through which information is disseminated, and discussions are held. As an example, the Center for Innovation and Management of Athabasca University uses this technology, through Lotus Notes, for all of its MBA program, delivered and implemented through distance learning.

Collaborative Learning is an environment in which a group of persons participate in a learning process that has common goals. The technology support that has been developed in support of these processes has been called Group Decision Support Systems (GDSS). Typically, a computer network supports a group of persons who sit in a face-to-face environment, each person their own computer display and keyboard also in front of them. Through the system, individuals move through a structured but flexible series of interactions that serve to highlight the issues involved, the values that are expressed, and provide processes for resolving differences and coming to consensus (Watson 1988, Nunamaker 1991).

The four categories of the Activity-Orientation model of learning differ in their characteristics. Not surprisingly, the need for, and the nature of the technologies that support these learning categories vary:

Lectures	simulcasting; recorded videos
Self-Study	interactive multimedia
Concurrent Learning	computer conferencing
Collaborative Learning	group decision support systems

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Sociological Dimensions

By this attribute, we refer to the relationships between the learner and the elements of the learning process in two ways: first, the basis for the interactions in terms of social validation, and second, the nature of the learning categories in terms of group dynamics.

For the learning process to be effective, the learner needs to believe that the process is a valid one. This validation is based on the student's relationship to the process, and these relationships are:

Lectures	authority
Self-Study	self-respect
Concurrent Learning	mutual respect
Collaborative Learning	shared values

In terms of the dynamics of the group (or individual) process, reflect on how the individual is empowered relative to the process. The categories can be characterized as follows:

Lectures	autocracy
Self-Study	autonomy
Concurrent Learning	democracy
Collaborative Learning	community

The structural relationship of the student to the learning category is therefore along two dimensions. The first is based on social validation, which leads to the second, based on empowerment.

The Lecture, for example, is a learning process in which the student's basis for validation is the authority of the Lecturer; this leads to the group dynamics of an autocracy.

For Self-Study to be effective, the student's must believe that it is a valid process for learning. This validation is based on self-respect. To the extent that the student has a strong sense of self-respect, the effort spent in Self-Study is associated with positive expectations; this leads to highly autonomous behaviors on the part of the student (as opposed to highly dependent behaviors for learning, in which the person only works if directed by the teacher or the group).

Concurrent Learning, at its most positive, facilitates individual learning through an appreciation of the perspectives of others, which lead to growth in one's own values, methods, goals and even concepts. For this to happen, mutual respect must be present; the group dynamics that reflect mutual respect is that found in democracies.

On the other hand, Collaborative Learning is successful when group-decision making is adaptive and leads to increased cultural coherence. This depends on individuals having, not just mutual respect, but a common membership in the collective culture, which we represent in the term "shared values". The type of group dynamics for people who have shared values are those of communities, in the sense that reside in the word "communitas"....a group of people who have shared values and behave coherently, as a group.

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The Circle of Learning

These attributes of the Activity-Oriented model of learning can be summarized in the following diagram, in which the characteristics, as listed below, are shown as layers of the model:

Sociological Dimensions
Technology Support
Knowledge Content
Learning Environment
Interpersonal Dimensions

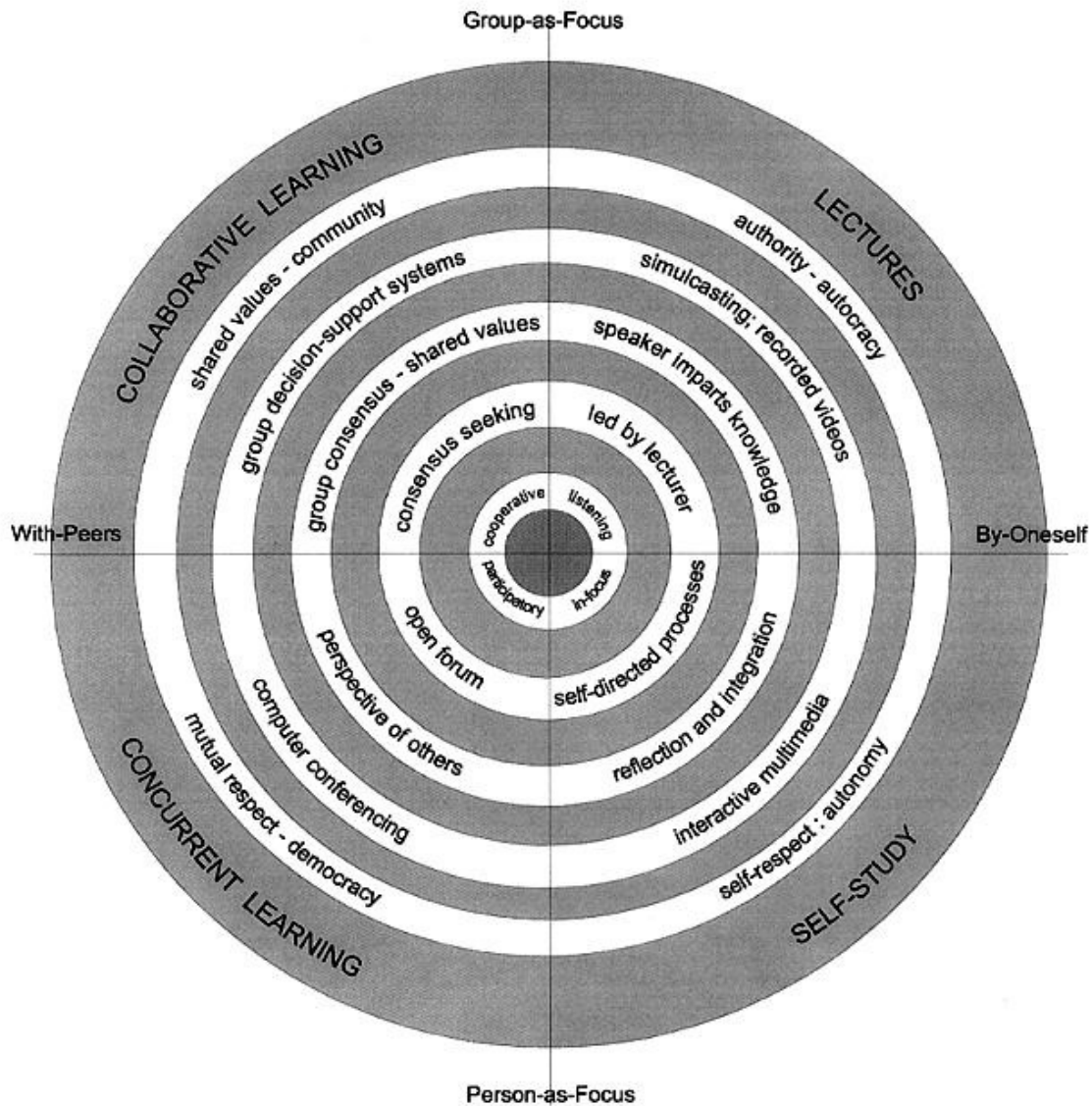


Figure 1. The Activity-Orientation Paradigm

Discussion

The four learning categories developed above originate from a two-dimensional paradigm, which as always is a simplification of situations found in reality. The purpose of the paradigm is to isolate and bring into relief typical characteristics of the learning categories, so that learning processes can be more easily understood within the complex environment in which everyday activities exist.

However, within a specific learning event, bounded by a particular group of people and a particular interval of time, it is very likely that a mix of the processes described in the four learning categories will occur. These will vary in intensity as well as in their order of appearance, depending on the characteristics of the learning event. The following are examples of the application of the paradigm to learning scenarios. Figure 2 shows the processes that would be expected in a typical classroom today in North America, where most of the learning transactions are through the lecture process, and a certain amount of reflective thinking goes on for individuals who disengage from the lecture or group process. The class may include a significant amount of collaborative learning, in which discussion takes place among students, or students

work in groups, either mediated by the teacher as facilitator or independently. Some of the collaborative activity may be in the form of exchange of perspectives between students or student and teacher, but the group or sub-groups may also be working toward shared goals, as in the creation of a single project report, or the development of a common strategy for a business.

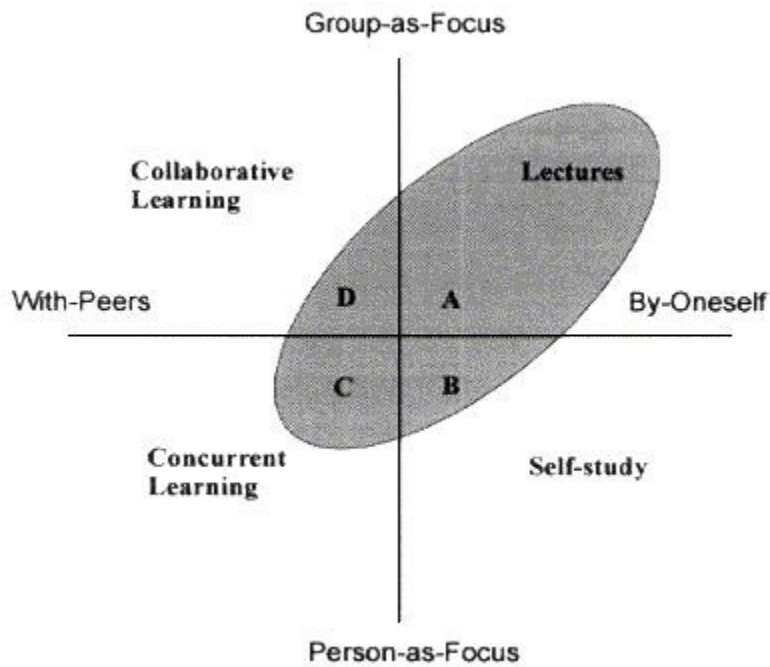


Figure 2. Classroom Session

It is quite easy for a classroom in today's school to move fluidly between Lecture and group learning processes. In many schools, formal lectures are being replaced to varying extents by cooperative learning in small groups, which might be a situation as shown in Figure 3.

There may be an element of Lecture, in which the teacher provides the frame of reference for group activities. Most of the activities are in the With-Peers mode, divided between processes oriented to the self and group objectives. An example of the former is each student discussing his or her research on different parts of a problem; an example of the latter is coming to agreement on the conclusions of an experiment they conducted jointly. There is, within this environment, opportunity for a person to step back from group activities to work or think alone. However, the group usually exerts pressure to limit the amount of time-alone that has not been agreed upon.

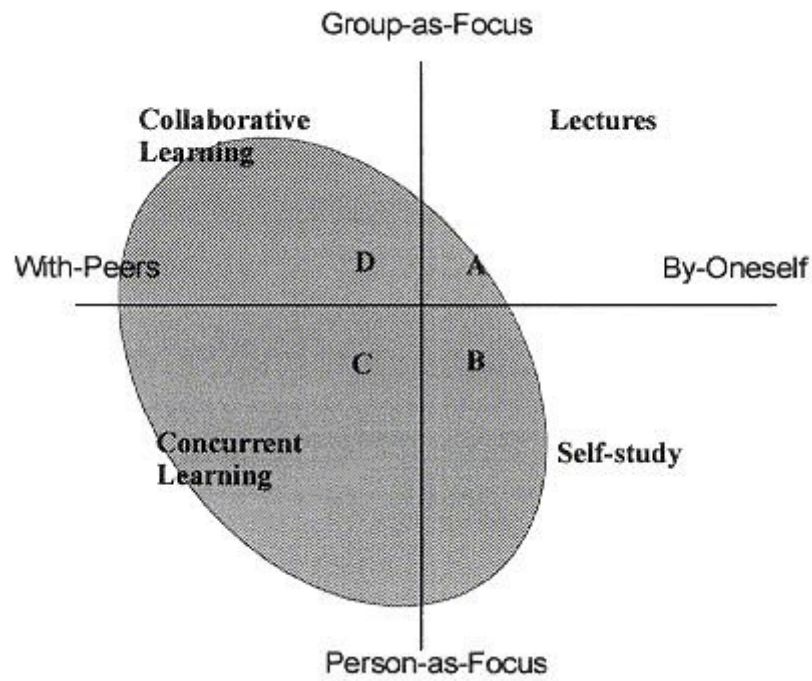


Figure 3. Cooperative Learning in Classroom

In Figure 4, we show the processes that would be found in a typical informal discussion session. Most of the overall effort is in the exchange of perspectives with an individual orientation. There may be some engagement in individual thinking during the session, and in the pursuit of overall group objectives or consensus.

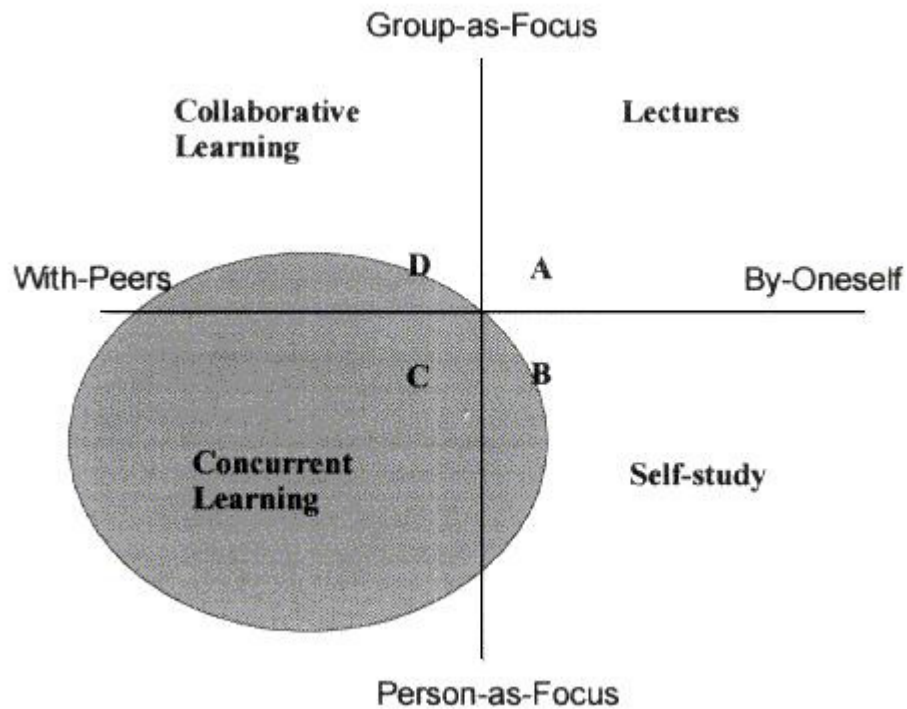


Figure 4. Informal Discussion Session

Figure 5 shows the learning processes that we would expect to encounter in a computer-mediated asynchronous conference over a period of time, such as occurs in the use of Lotus Notes to support courses. While most the effort goes into the exchange of perspectives and opinions (and possibly facts) between students, a good deal of reflective thinking and integration by individual students is made feasible by the fact that messages are read and replies originated off-line. Therefore, this session differs from informal discussion in that more Self-Study processes occur, in which knowledge integration is achieved through reflective thinking.

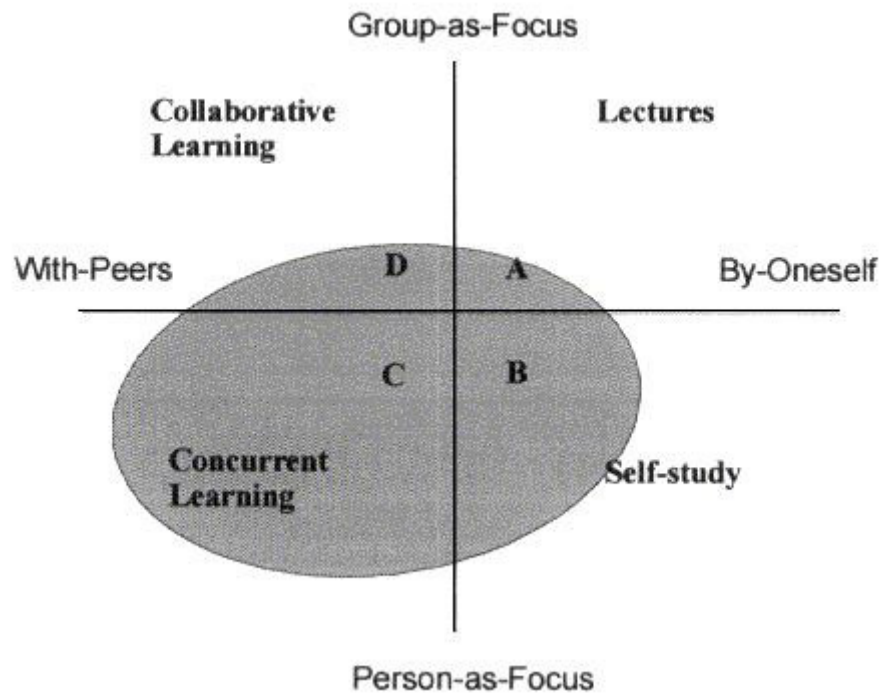


Figure 5. Asynchronous Conferencing

Figure 6 shows the mix of processes that might be found in a typical business meeting, in which peers interact to reach consensus on specific organizational goals. Some didactic information-giving typically starts the meeting off, and then a significant amount of exchange of perspectives occurs as part of the meeting. Members of the group may mentally move into reflective thinking during parts of the meeting, engaging in reading parts of the report. Most of the effort is spent in reaching consensus.

Although the meeting occurs over a period of hours, the time-scale for organizational learning is significantly longer. If the organization is said to learn, then that learning is expressed in the behavior of the organization, which is visible as the changes in decisions over time. Clearly these changes are more apparent over a series of decisions rather than within a single meeting. Thus the time-scale for organizational learning is significantly longer than the hours during which a meeting takes place.

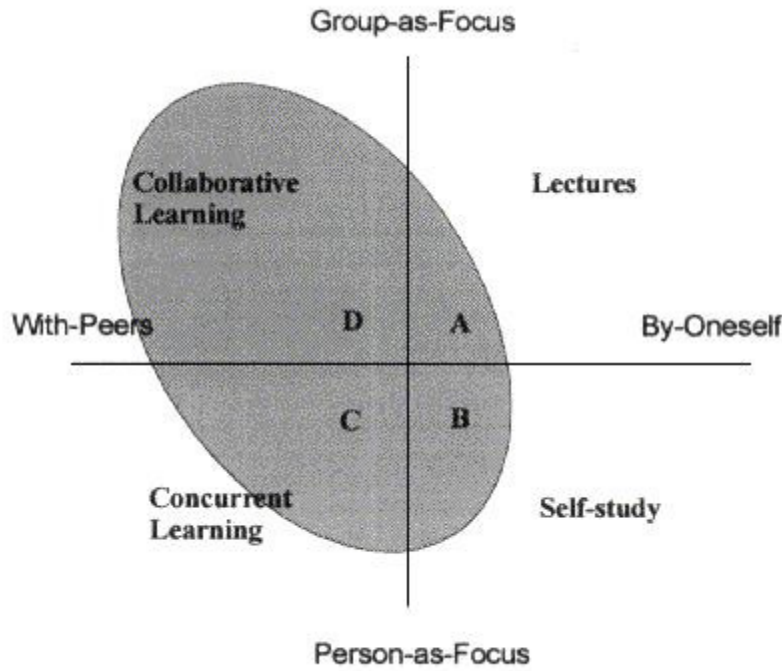


Figure 6. Business Meeting

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Conclusion

We believe that the debate between individual and collaborative learning is based on a false paradigm, that the two are on opposite ends of a spectrum. Instead, we have presented a model of individual and group processes in learning that reflect the singularity of the learning process as well as its orientation to the self or the group. From this model, we arrive at four learning categories, representing different mixes of process activity and orientation. They are: Lectures, Self-Study, Concurrent Learning, and Collaborative Learning.

These learning categories are not mutually exclusive or superior or inferior to one another. Rather, they represent different approaches to individual and group needs and roles, addressing different stages in the integration of information into knowledge for the learner as an individual, and as a member of a social group. In actual learning situations, individuals and groups can and do move between the processes described for each learning category. Specific patterns of these process mixes are evident in a number of examples of typical learning situations.

It is our belief that with this understanding, we can view the resource allocation and technology support issues of education and learning not as taking from Peter to pay Paul, but that these learning categories are all essential and inter-dependent. The questions should not be how we replace one by the other, but how we best use them most appropriately, both as strategies and as processes within learning situations, and ensure that learners are given the opportunity to benefit from each as needed.

A further benefit that we have gained from the model is that it has given us explicit guidelines to follow in the design of new learning products, both in who and what processes are

being targeted, as well as what factors must be taken into account for them to be effective. This understanding spans the spectrum of learning systems as they currently exist, to new learning systems as they evolve, catalysed by developments in communications and information capabilities. What we hope to achieve from this understanding is a set of learning approaches and tools that span the entire Circle of Learning, and are integrated in ways which reflect the different processes and needs in each quadrant.

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