In this chapter, I discuss my learning framework in more detail. My primary inspiration is Ivan Illich’s notion of conviviality, which argues that people need tools to “make the most of the energy and imagination each has” [Illich, 1973]. I have added two ideas in order to build a strong practical ground for the construction of a digitally rich convivial learning environment. First, I emphasize the development of tools following a constructionist approach [Papert, 1993]. This emphasis on “making” and “building” tools gives the learning activities a general theme that resonates with how Illich believes tools should be used.

Conviviality also asks for a methodology that allows learning activities to emerge from learners, as opposed to being prescribed by the teacher. Here, I use an “Emergent Design” framework recently developed by David
Cavallo, which uses the practice of applied epistemological anthropology and an analysis of learning behaviors to both probe the existing skills and knowledge, and to identify the learning potentials of a learning community [Cavallo, 2000]. The following sections discuss each of these ideas and their relationships in detail.

2.1 Realization of the crisis

In the most general sense, Illich uses the term conviviality to create a realization of the destructive side effects of institutions that focus too much on growth and productivity. We live in a society that favors higher outputs, lower cost, and better equity though standardization. According to Illich, this industrial mode of production used in institutions such as education, health care, and transportation appears favorable at first. But over time they will quickly pass a critical point that will begin to create destructive side effects, or even work against its initial goals.

Automobiles

The growth of automobiles is a good example of Illich’s point. The car is one of the most remarkable inventions of human kind.
With this technology, people can conveniently and affordably travel greater distances than ever before. However, when personal automobiles became affordable for most people, it started to overwhelm other modes of transportation. Thus cars gradually became what Illich calls “radical monopoly.” The following examples set the tone of what this phenomenon means.

In Chiangmai city of northern Thailand, personal vehicles (predominantly cars and motorcycles) have precluded city buses and other metropolitan public transportation. Only few bus routes survive and still operate today. Thus, it is not practical for most people to travel anywhere without owning a car or a motorcycle. The suggested solution was to produce more cars and make them affordable to more people by offering long-term installments plane. An economy car in Thailand would cost more than fifty times the standard salary of a person holding a bachelor’s degree. The time it takes to pay off a car installment is often longer that the lifetime of the car itself. This burden does not include gas, tax, maintenance, and other expenses the car owner has to pay. Thus, people have to work harder to own cars. They end up in a vicious circle where a huge portion of their time are spent either working for a car or in the car itself.
With too many cars, traffic congestion becomes a problem. People end up spending more time traveling than ever. Take a large city like Bangkok as an example. In the past four decades, the number of cars in Bangkok has increased dramatically. The traffic congestion causes people to spend more and more time driving. An average driver spends anywhere between two to eight hours on the road each day. Yet driving seems to be unavoidable, as it has become the standard mode of transportation and there are no other preferred choices. Many children have to wake up as early as four o’clock in the morning to get to school in time. People often say Bangkok children grow in cars instead of in their home. Then there are other effects such as nose and atmospheric pollution that cars have created.

The Thai government attempts to solve the crisis by spending large portions of their budget on new highways. These highways not only failed to match the increasing number of cars, they make cars even more necessary, as only the people with cars have the privilege to travel relatively faster. This is an example of a feedback loop that is a result of a society that overly focuses on growth.
The School institution

Similar to automobiles, the school is an institution that has been put into the industrial mode of production [Illich, 1973; P.19]. Schools have become compulsory for most children. School learning has precluded most other possible ways of learning and has been accepted as the only right way to give children the knowledge they need for their future. It is clear that schools have become a radical monopoly. According to Illich, there have been harmful side effects resulting from schools, most of which are unrecognized.

When the modern school was established in the seventeenth century, it was the first time that seven or twelve grades of compulsory learning were proposed. It was believed that a blueprint could be designed so that every child could go through stages of development and could be transformed into a “new type of man who would fit into an environment created by scientific magic” [P. 19]. With this blueprint, schools could be replicated, which would make education cheaper, better, and available for all.

Schools have become an institution that transforms learning into a commodity called “education.” Schools are carefully designed to put learners through multiple stages on an assembly line that is supposed to transform
them into gold. But no matter how hard schools tried, they always conclude that the majority of learners are unfit to be enlightened. Thus, most learners do not deserve the better life that the few good students would gain [P. 20].

When most people fail to be categorized as the elite, the A+, or the top ten, teachers and concerned parents react by imposing the only remedy they recognize: more schooling. For example, it is most likely for students in large cities of Thailand to spend one or two extra hours in special tutorial courses after school. Much of their weekend time is consumed by these tutorial courses as well. Vacations between semesters are becoming shorter. Students are spending more and more time in classrooms, but no matter how hard they try, most of them still fail to become the elite. As children’s life style becomes more stressful, they continue to be blamed for their failures.

One of the worst consequences happens when the school imposes an ideology on students about what counts as learning. Those who succeed get their post docs along with all the glory while the school dropouts learn that they are incapable. Thus, other possible ways of learning are skewed in favor of “school education.” When the school curriculum and its tests are all that counts, students are inevitably put into a role of mere consumers. Self-
motivated learning and exploration decreases. They soon feel they need to be taught in order to learn anything at all. This stereotype is what Illich calls “overprogramming” [P.57].

2.2 Recovery

Defining the crisis of the school institution is only half the picture. Proposing and shaping the alternatives is the true challenge. In this research, I present conviviality as one possible alternative that should lead to the recovery from the destructive effects that the overwhelmingly desire for productivity have created. I will begin by elaborating what Illich means by conviviality. Then, I will narrow the scope down to a practical level that is used in this research.

Illich believes that we must not allow the commodities we invent to shape our society. People should not be forced, consciously or not, to accept any single tool or service as the mean to archive a specific goal. Instead, people must have the freedom to use tools to “make the most of the energy and imagination each has” and to “make things among which they can live, to give shape to them according to their own tastes” [P. 11]. Thus, in the context of learning, schools must reverse their ideology from being a place that shapes the students
according to a predefined blueprint to a place that supports students to discover themselves and maximize their potentialities.

Though Illich has a strong view against school institutions, he does not reject everything in schools altogether. Rather, he suggests a watershed that the industrial system should not exceed. Conviviality provides an alternate route that defines the equilibrium.

Illich defines the necessary changes from two points of view: a political view and a practical view. For any institution to change, the managers and policy makers need to realize the crisis and commit themselves to finding a new approach that will lead to a different organization. In the context of schools, this commitment needs to come from teachers, headmasters, and up to the very top of the organizational hierarchy. This is not an easy request. There have been many attempts in the past that came in terms of school reform. But most schools have not changed (See [Tyack and Cuban, 1995]). This change in the institutional level is beyond the focus of this work. I focus primarily on the grass-root, individual development level.
2.3 Tools for Conviviality

Illich emphasizes that conviviality could be achieved though the use of convivial tools. Tools serve as a medium that a person uses to express and reflect him or herself in their society and “to the degree that he masters his tools, he can invest the world with his meaning; to the degree that he is mastered by this tools, the shape of the tool determines his own self-image” [Illich, 1973; P.22]. Convivial tools are “those which give each person who uses them the greatest opportunity to enrich the environment with the fruits of his or her vision” [P.22].

Illich uses the term tool broadly. It includes not only physical tools like hammers, drills, scissors, computers, telephone but also productive institutions that produce tangible and intangible (services like education) commodities as well [P.20]. The scope of this work is to provide learners with both physical convivial tools and a productive environment that nourishes conviviality.
In terms of physical tools, Ricky Goldman Segall concluded in her thesis that "conditions of a convivial tool are that it be accessible, easy to use, and beneficial to humankind" [Segall, 1990]. I use these definitions as guidelines for my work. However, I emphasize the need to make users fluent with a tool more than making the tool easy to use. Fluency in this context means more than the mere ability to use the tool. A fluent person should be able to transform an intuitive idea into the implementation of that idea using tools [Resnick et al., 1998]. This argument does not mean it is not necessary to make tools easier to use. I consider fluency as a better way of thinking about tools for conviviality than ease of use. A personal computer can be a convivial tool although it is not necessarily easy to use. But when a person is fluent with the computer, he or she could better use it to express himself or herself. Thus, fluency elevates the convivial relationship he or she has with the computer.

Accessibility points to tools that "can be easily used, by anybody, as often or as seldom as desired, for the accomplishment of a purpose chosen by the user" [Illich, 1973; P.23]. Students usually have a convivial relationship with computers that they own at home more than the ones at school. In schools, students are usually bound to use the computers only during computer classes and only for the purposed defined by the teacher.
On the other hand, computers at students’ homes are usually more accessible both in terms of access time and purpose.

In the context of this work, tools that are beneficial to human kind are those that are used with good intentions. Knives can be used both in ways that are beneficial and ways that are threatening to other people. Without this guideline, a murderer’s knife may still be counted as a convivial tool. In this sense, a tool will be convivial when it does not deprive others from their liberty. In a more positive sense, convivial tools are those that are used “in caring for and about others” [P.11].

2.3.1 Constructionism and Digital Technology

Providing convivial tools to learners would mean nothing unless they also work in an environment that nourishes conviviality. It would be silly to believe conviviality would happen automatically when we throw convivial tools to the learners. There is a need for a framework that gives a good grounding that can lead to convivial use of the tool. Here I use Seymour Papert’s idea of constructionism. Though constructionism focuses primarily on how learning happens and how digital technology can enrich the learning process, it
also includes practical grounds for the learning activities that may take place as well. As the name confers, constructionism emphasizes on “making” and “building” personally meaningful artifacts. There are clearly overlapping ideas between constructionism and conviviality. In this research, I leverage the practical ideas along with some digital tools that have been developed and used in constructionist research, namely Logo programming language and Lego construction kits (see more details about these tools in chapter 4).

Computational technologies are particularly well suited for this kind of activity. Students can easily customize and modify programmable tools to serve the functionalities required. Computational tools can also serve as “object to think with” connecting students to ideas and knowledge domains desirable in the context of learning [Papert, 1980].
2.3.2 Making tools

This work has emphasized the construction of tools, not merely the use of pre-constructed tools. I suggest in the case studies that tool construction activities foster learners’ convivial relationship with their tools particularly well.

Similar to Idit Harel’s observation that “the best way to learn a subject is to teach it,” [Harel & Papert, 1990] I argue that the best way to master a tool is to build it. Learners will not only learn the body of knowledge embedded in the construction process, learners will also have the ability to apply and modify the tools to work in different applications as well, thus, maximizing learners’ development of their fluency with the tool.

When developing tools, it is, by definition, assumed that many users would use the tool. Thus, tool construction is a way that inherently makes that tool beneficial to others. In addition, when others use the tools, the toolmaker is likely to receive feedback that creates an intellectual feedback loop preferred in the context of learning. It can also enrich social interactions that further nourish conviviality.
2.3.3 Emergent Design

We now have the tools and the type of projects we want. The final piece needed for the framework is the method by which we can develop the projects. Here, I use “emergent design,” which is “a theoretical framework that emphasizes the practice of applied epistemological anthropology to probe for skills and knowledge that reside in the local learning community. It puts a spotlight on the need to study the conceptual space where the purposeful stance implied by the word design mates with the openness implied by the word emergent” [Cavallo, 2000].

I take for granted that emergent design is necessary and I build on top of it. In Cavallo’s thesis, he focuses on using emergent design to build applications. For instance, he worked with a group of villagers in rural Thailand using Logo programming language to think and visualize local agricultural issues. These issues include agricultural field layouts that take advantage of the topography of the terrain, water conservation and the efficiency of water delivery [P. 126-127].

In this research, I focus more on using emergent design to build tools. For example, students write programs that friends can use, they build computer controlled light switches
that can be used in many applications. By making tools, I believe the underlying philosophies, including emergent design, Constructionism, and Illich’s notion of conviviality, will support each other and become most fruitful.

I propose that the learning framework formed by the ideas above can create a new practice of using digital tools in learning environments which will produce outputs that are much more meaningful for students than the traditional practice of instruction generally used in schools. Students will benefit from the development of self-image from convivial use of tools, the development of self-control from the process of transforming impulses into productive purposes guided by emergent design, and more personally meaningful knowledge gained from the constructionist approach.