**Teacherplex.com**  
A New Style of Website Devoted to Education  

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Abstract: This document describes a working website that was designed for the purpose of driving significant costs out of education, while making learning more efficient and perhaps even a bit more fun. The website is a wiki-style site where good-natured and knowledgeable people provide and organize educational content on a wide variety of topics, which is then available for free to anyone who wants to learn. All the content is provided in the very specific form of multiple-choice questions, along with corresponding explanations. The website brings together a network of smart people who are willing to help others learn.

A strong argument could be made that education is the answer to all the world’s problems. If everyone in the world were proficient in science and math, health and wealth would surely be spread more evenly, and all sorts of critical world-changing discoveries would happen more frequently. The opportunities for improving living standards around the world through education are literally endless. In fact, education and the advancement of technology are the only means for improving worldwide prosperity over the long term.

The promotion of knowledge is, arguably, at the very heart of proper morality. We don’t generally realize it, because our intuitions on morality were largely shaped by evolutionary forces operating in environments that existed long before civilized education became ubiquitous. Consequently, we humans tend to believe that sacrifice and charity for the less fortunate are the pathways to moral goodness. But it is much better to invest time, money and effort into advancing knowledge. For example, the advancement of knowledge flowing from the discovery of antibiotics benefited far more people than the acts of kindness by Mother Teresa ever did, yet few people admire or even know the name of the scientist who discovered penicillin, nor the business that made it widely available.

Another example of how education is fundamental to moral goodness follows from the old saying: You can give a starving man a fish and thereby feed him for a day, or you can teach him how to fish and thereby feed him for a lifetime. Only by promoting and advancing knowledge can we make peoples’ lives better over the long run.

The realization that education is critical to worldwide prosperity prompted the founder and former Chairman Emeritus of MIT’s Media Lab, Nicholas Negroponte, to dedicate his life to the development of a $100 laptop computer. He has almost reached his goal. Imagine, for less than the cost of what was spent on the Iraq war, every child on the planet can now have a laptop computer, complete with wireless Internet access. But what
would all the children of the world do with such power? Would they track the whimsical antics of Paris Hilton, or would they seek out greater knowledge? Unfortunately, there are many websites dedicated to frivolous pursuits, but very few dedicated to easy learning. A new sort of website for easy learning, named Teacherplex, will be presented here. Its time has surely come.

The traditional style of academic learning typically involves a series of long lectures followed by a test. Students often find the lectures boring and unrelated to their life interests. It turns out that there is a simple change to the learning paradigm that earns us a whole lot of benefit. By simply inverting the order of the test and the lecture, we get a learning methodology that is more fun, more efficient in its ability to be individually tailored to each student, and easily implementable as a wiki-style website. This document describes such an alternative style of learning, referred to as Inverted Learning, primarily inspired by the recognition that the most efficient learning takes place when students get their graded tests back. At that moment, students quickly learn what it is that they still don’t understand. That meta-knowledge, regarding the subject they are studying, is critical for efficient learning.

The methodology of Inverted Learning is very simple. For any chosen topic, a student is presented with multiple-choice questions on that topic. A correct answer on any question merely brings the next question. An incorrect answer, on the other hand, brings a brief explanation of what the correct answer is, and why that answer is correct. A string of correct answers, by the student, brings subsequent questions that explore more difficult topics. Conversely, a string of incorrect answers brings subsequent questions that explore easier topics. It is very similar to the methodology that would be used by a good one-on-one tutor. The first thing the tutor must do is to discover what the student does and does not know, by asking questions. The asking of questions is critical for efficient learning.

The idea that efficient learning depends on the asking of questions, as in the Inverted Learning paradigm, is further supported by the celebrated teaching style used by Socrates well over two thousand years ago, and embraced by many educators today. The Socratic Method of teaching has long been recognized by educators as a very effective teaching paradigm. Relying primarily on the posing of questions to inspire one’s cognitive reflection, the Socratic Method of teaching makes a student aware of one’s own ignorance, which then motivates one toward the seeking of new knowledge and further inspires one to want to understand the related concept.

Unlike the presentation of a lecture, the initial presentation of a question poses a challenge to the student: Do you understand this concept? Like playing a board game such as Trivial Pursuit, or watching either of the very popular game shows Jeopardy or Who Wants to be a Millionaire, each question sets up an artificial challenge that engages the participant in a way that makes him or her want to answer it correctly. That desire to answer a question correctly automatically transfers to a desire for acquiring an understanding of the related explanation, for a question answered incorrectly. Most teachers will agree that getting a student to want to learn is more than half the battle.
Another clear benefit of the *Inverted Learning* paradigm is achieved by forcing teachers to break their long lectures into ‘bite-sized’ elemental concepts, which are then linked with individual questions. This concept of lecture decomposition was initially popularized by Harvard professor B. F. Skinner in a self-teaching methodology he called “Programmed Instruction”. The *Inverted Learning* paradigm naturally embraces Skinner’s idea. By breaking long lectures into mini-lectures, and by putting the questions before the associated mini-lectures, students can avoid the boredom they would otherwise get from suffering through the parts of a long lecture with which they are already familiar.

And, since questions are typically structured so as to relate their respective elemental concepts to common life situations, students can immediately appreciate the value of understanding the concepts. The act of constructing a concrete question from an abstract concept necessarily reduces its abstractness, thereby making it more tractable for learning.

In addition to making learning much more fun, *Inverted Learning* is a more efficient mechanism for transferring knowledge. As previously explained, the efficiency comes primarily from the elimination of redundant lecturing on those concepts that are already understood. Even better, by having the system remember the concepts that are understood, by a particular student, the Inverted Learning system can be designed to present future questions on only the material that the student finds difficult. The system is then able to automatically adjust its teaching, just as a dedicated one-on-one tutor might do. Such a tailored system can be much more efficient than a classroom paradigm that proceeds at a pace limited by the slowest learners in the class. *Inverted Learning* allows individual students to learn at their fastest possible pace.

A very simple format for entering a question and its associated explanation, on any concept, allows the system to be easily modifiable and extendible by any teacher with web access (similar to the way Wikipedia is easily modifiable and extendible). Also, the simple and common interface can be applied to absolutely any subject matter. Over time, and the addition of many questions, the system can become a central clearinghouse for learning, on absolutely any subject.

While many styles of online learning already exist, they tend to mimic the old style of learning in a classroom setting. Indeed, many professors are now recording their boring lectures and making them available in video format over the web. But rarely do they ever provide a means for the student to self-assess his or her comprehension of the material. Additionally, many websites are springing up dedicated to the teaching of a specific domain of knowledge. Each has its own style of interface that must be mastered even before the subject matter can be accessed. And again, rarely do those websites offer the opportunity for self-assessment, regarding the student’s comprehension.
It is anticipated that teachers all around the world will embrace this Inverted Learning system website for the following reasons. They will have a very simple web interface for putting their course material online, in the form of questions and detailed explanations of answers. A very simple meta-interface could allow them to collect a given set of questions into password-protected lesson plans, to which only their respective students would have access (although, the questions themselves would be available to all). In addition to designing their own questions, they will be able to use questions designed by other teachers. And they will be able to sharpen their own skills by testing themselves.

As a further means of motivating learning within the classroom, the system could be used by teachers to organize real-time contests between schools. Imagine a geometry class in New York competing against a similar class in Florida, both being simultaneously exposed to the very same questions exploring various issues of geometry. Such a style of competition could motivate the teachers as much as the students.

The Teacherplex website already embodies many of the concepts presented here, with respect to the Inverted Learning paradigm. Its usefulness will be difficult to assess, however, until there are many more question-explanation pages than are currently on the system. Every topic must have hundreds of questions, spanning many grade levels of difficulty, before the system can properly adjust its presentation of questions to a student’s capability. And there must be hundreds of topics, before the system can teach all aspects of a good education. Work is currently underway to seed the system with such educational content, but it is a slow and tedious process. Yet, the system will never get worse. In the spirit of evolution, the system will always get better, over time, as more and more good question-explanation pages accumulate.