**Background**

Throughout history, humans have searched for better ways to gain knowledge and share it with others. This striving for knowledge created the education system searching to share knowledge with everyone in an organized manner. However, the education system has many flaws, most prominently in the lack of individualized attention given to students that are either struggling or excelling in the subject matter. This method used in schools is inefficient and needs a more dynamic and individual approach to ensure better understanding of the subject material. The Digital Aristotlewill cater more towards the students’ needs by developing an individualized curriculum that assists their weaknesses in the subject directly as a tutor would.

The Digital Aristotle distinguishes itself from traditional tutoring by being an online tool which negates the many problems with traditional tutoring. These problems stem from the need of a human to identify the needs of the student and decide the best way for the student to learn. This process is limited in the lack of tutors to fill the need of the students, the expense of the tutor to tutor the student. These problems make traditional tutoring inefficient compared to the Digital Aristotle. The Digital Aristotle bypasses these problems by being an online, free and efficient way of tutoring.

Other online websites have been created to solve these problems with traditional tutoring, one being Kahn academy. Kahn academy takes a different approach to giving students the assistance necessary to understand the subject. They use tutoring videos and online assignments to help students understand curriculum to solve the problem of expense and amount of tutors. This method however good, still has flaws that have to be addressed. For one the individualization of tutoring is not as prevalent as the free aspect of Kahn academy. This is a problem because the way Kahn Academy teaches is not effective to all students. The Digital Aristotle expounds on what Kahn Academy does by adding the needed individualization to more effectively teach students.

Another prominent tutoring system is Aleks. Aleks takes a different approach than Kahn Academy by focusing on the individual aspects of tutoring rather than the human aspects. Aleks uses adaptive questioning to determine what the student is most ready to learn. This process is flawed due to the lack of human interaction which is needed to round out the learning experience. The Digital Aristotle seeks to use both adaptive questioning and personal assistance through the use of forums and human support to more fully teach students information so they can gain a deeper understanding of the curriculum.

**Conclusion**

Education is a key part of society that impacts every citizen looking to excel in life. Currently the approach to teaching students is flawed due to the generalized teaching in classrooms rather than individual attention. Tutoring tries to fill this lack of individualized attention by having a teacher teach the material in what they believe is the most effective to their students understanding. Tutoring still has flaws that can be improved on such as the amount of tutors compared to the amount of students. Other flaws include the expense of hiring a tutor and the time it takes to tutor. The use of adaptive code in Digital Aristotle creates an individualized attention for the students by understanding their strengths and weaknesses. Digital Aristotle impacts the foundation of traditional education by being an easy source to gain a deeper understanding of the knowledge sought. As the first year closes on this project, Digital Aristotle is a base foundation of what is going to be accomplished. The search engine allows for students to search for specific topics within the database and allows them to find relevant information to assist them. The full project solves the problem of students needing individual assistance by using a genetic algorithm to adapt to the students strengths and weaknesses and to have a human element as well. This approach is unique to Digital Aristotle through the use of multiple tutoring methods used in cooperation.

***Discussion***

The Digital Aristotle tutoring system, much like its human namesake, seeks to transform selective areas of knowledge and effectively communicate this knowledge to students. Although the scope for development of Digital Aristotle in the first year of this multiyear project was limited by design, significant progress in planning continuous improvements in Digital Aristotle in the out years was accomplished in addition. The Digital Aristotle tutoring system consists of a database of knowledge commonly referred to as the knowledge-base, an overarching knowledge retrieval subsystem, and a human-computer interface enabling input queries and output visualization of retrieved information. The first year effort created a baseline system comprised of a knowledge-base and search engine that retrieves information from an algebra textbook based on user input queries. Completion and use of the baseline Digital Aristotle system revealed many insufficiencies. These insufficiencies guiding our planning for future improvements and upgrades to Digital Aristotle. Most notably we plan on increasing the content and diversity of the knowledge-base. In addition, the lack of selectivity in retrieved information, and lack of specificity pertaining to the user input query will need to be fixed as well. Future versions of Digital Aristotle will incorporate feedback based on both passive and active inputs requiring sensor-based measurements of physiological (passive) responses of the user and active user response to test questions. These responses will be correlated against knowledge acquisition performance metrics enabling optimization of knowledge transfer between Digital Aristotle and the user. This project will be improved on throughout the next 4 years as it is an ambitious project. This organizational system will better segment the goals of Digital Aristotle.

* First Year:
* Create search engine capable of looking though knowledge database with a plethora of information
* Second Year:
* Add Interactive elements such as tests, homework, and practice problems
* Third Year:
* Add individualization through test, homework, practice, etc.
* Fourth Year:
* Create a way for students to receive lectures