

A New Learning Paradigm: “Learning More with Less”

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A new learning paradigm has been tested in the delivery of services. It identifies that the act of directing and influencing a vendor or an individual to increase their performance is not effective or efficient. It is based on a deductive logic methodology called “Information Measurement Theory” (IMT) which has been developed over the past 46 years through one of the author’s personal and family life, the delivery of services in the construction industry, and in Barrett, the Honors College at Arizona State University (ASU). IMT identifies that the concepts of influence, randomness, chance, or one person attempting to change another person are inaccurate concepts. These facets occur when one party attempts to forcibly change another party, which is a form of abuse. When tested out in the industry, these concepts returned 5 to 50% reduction in cost, simultaneously lowering owner costs, increasing value and resulting in higher profits for the expert vendor. When practiced in the honors education program at ASU, students were able to learn concepts five times as quickly and understand complex concepts with very little detailed data. In 2015, the IMT author brought the education to his alma mater, Saint Louis High School, and the first full year of IMT concepts were tested at the high school level. The results were consistent with the results from industry tests, the honors program at ASU, and the Kashiwagi family.

Keywords: Education, Best Value, Deductive Logic, Stress, Simplicity, Kashiwagi Solution Model.

Introduction

Education today is facing problems with: student depression, difficulty in meeting federally mandated minimum standards and assisting children from unique environments (single parents, broken homes, inadequate resources or unstable environments) to be successful (Jensen, 2009; McKinsey & Company, 2013; Sandstrom and Huerta, 2013; OECD, 2014; Ray and Kafka, 2014; Accenture Strategy, 2015; American College Health Association, 2015; 3AW693 NewsTalk, 2016). The Wall Street Journal identified that competition for high grades for college admissions and scholarships have resulted in negative student behavior. The superintendent in the Plainsboro Regional School District (New Jersey) identified that 120 middle-high school students were diagnosed with depression, anxiety and suicidal thoughts. In a letter to parents, he stated, “I cannot help but think we may be failing [our students] by reinforcing an educational system that perpetuates grades at the expense of deep and meaningful learning” (Ossola, 2015).

According to the Washington Post, several studies were done in the 1970s-1990s that measured graded and non-graded students. The study showed that students who were graded were not interested in the topic being taught, and when tested, looked for the easiest possible task to be tested on (Oppenheimer, 2016). Alfie Kohn, author of *The Homework Myth*, identifies that when

grades are introduced, the quality of learning diminishes. Employers are starting to understand that grades are not the optimal indicators for assessing talent and competency. For example, a 2012 study by the Chronicle of Higher Education rates GPA (grade point average) number 7 out of 8 (Chronicle of Higher Education, 2012). Higher rated factors included internships, previous employment, and extracurricular activities. It has also been suggested that grades should be removed since they are not uniform from college to college (Kohn, 2011).

An international study comparing different educational approaches identifies that the Finnish approach to K-12 education is one of the most effective in the world because it focuses on eliminating standardized testing and reducing homework (OECD, 2014; Walker, 2015; Biggam, 2016). In turn, the school district in Plainsboro, determined to remove midterms, final exams, and institute a no-homework policy during breaks and weekends. This shift in protocol has caused great concern amongst certain parents because they are worried that their children will be at a disadvantage when applying for some of the elite U.S. colleges. The Plainsboro school district is not alone; one of the largest and highest ranking districts in the U.S., Montgomery County Public Schools in Rockville, Maryland, also implemented similar practices (Goyal, 2016). Numerous other schools are attempting to move further away from rigorous work and grades, and providing students with more opportunities to explore their identities, discover what they enjoy, and allow them to study what interests them most (Goyal, 2016). A report in January of 2016, from the Harvard Graduate School of Education, called for open a discussion on developing a new approach to admitting new students. Over 80 deans, professors, and presidents from various other Ivy League schools endorsed Harvard’s goal. The goal is to decrease the importance of academic rigor, and focus more on criteria that encourage the well-roundedness of a student’s education. For example, they are discussing the possibility of making the ACT and SAT optional along with encourage students to take fewer honors courses in exchange for meaningful extracurricular activities (Goyal, 2016).

This new move to reform education is an attempt to help high school students but does not seem to have much effect on current college students. Many students who enter college are stressed because they are required to memorize and recite detailed information in order to succeed. This leaves very little time for students to focus on personal development. In a study done to show the effectiveness of the current higher education system, researchers assessed exam scores and survey results of 2,322 students over a four-year period. Test results identified that 45% of the students made no significant improvement in their critical thinking, reasoning or writing skills during the first two years of college. After four years, no improvement was shown in thinking skills (Rimer, 2011). These results show the traditional approach of education, to make students think, does not improve their thinking capabilities.

The average college freshman is stressed, overwhelmed, and underprepared for college. Anxiety and depression are now the most common mental health diagnoses among college students, according to the Center for Collegiate Mental Health at Penn State (Center for Collegiate Mental Health, 2015). The American College Health Association (ACHA) recently published the results of their National College Health Assessment, of which approximately 30.7% of the students polled said that at one point in the past 12 months they “felt so depressed it was difficult to function” (American College Health Association, 2010). An estimated 12% of college students plan on committing suicide each year, and while some are prevented, more than 1,000 suicides

occur on college campuses per year (Wilcox, et. al, 2010). One study surveyed 100 students at a major university to examine 12 major stress-causing factors relating to academic demands and personal development. Out of the 12 factors, the top 3 that cause the most stress is academic work load, time management, and making future plans. Interestingly, finances, social life, and body image were amongst the lowest rated factors (Britz, 2010). Another study conducted by Dr. Ed Ehlinger, Director of Boynton Health Services, surveyed fourteen 2-4 year colleges and identified that students with higher levels of stress had lower GPAs (Ellis, 2015).

The authors propose that students in both high school and higher education are unprepared for life after school because education focuses more on memorizing technical information, instead of helping students understand who they are, and where they should best use their talents and unique attributes. According to the Economic Policy Institute, the recent graduate unemployment rate is 7.2% and underemployment rate is 4.9% (compared to 5.5% and 9.6% in 2007) (Davis, et al., 2015). Fifty to seventy percent (50-70%) of college students change their major at least once during their undergraduate program, most will change majors at least 3 times before they graduate, and more than 50% of college graduates pursue careers that are not related to their degrees (University of La Verne, 2015). Less than 50% of recent graduates possess the 17 most desirable skillsets as identified by the majority of employers (Jaschik, 2015). McKinsey and Company identified that 61% of new graduates are unhappy with their careers, and 57% of employers agree that they cannot find enough skilled entry-level workers (McKinsey & Company, 2013). Additionally, the marketing visionary of one of the largest facility management firms in the world, stated the biggest challenge of the firm is the shortage of quality frontline workers (Peter, 2015).

Another study identifies that technical knowledge is not one of the top 10 most important skillsets for recent graduates entering into the workforce. In fact, employers feel that interpersonal skills are more valuable because new hires can be trained in technical skills (Burnsed, 2011). One researcher, Peter Cappelli, author of *Will College Pay Off*, identifies that since the world is changing so rapidly, pursuing a hyper-specialized degree may narrow a student's skillsets and make them a less desirable future employee (Cappelli, 2015). This becomes increasingly more evident as China continues to replace manufacturing floor workers with robots (Knight, 2015).

Problem

The evidence for education reform is clear, but the root of its problem and its solution is not. Students are misaligned because they are not pursuing what they are best at and what they enjoy most. The students who have the most difficult time in life seem to be those who are unsure about their futures and their own strengths that will help them be successful. This misalignment is reflected in numerous types of irrational behavior ranging from stress and depression, to frivolous lifestyles and suicidal tendencies (Ossola, 2015; PBSRG, 2016).

The misalignment of students is prevalent in all forms of higher education and career training. Robert Reich, Chancellor's Professor of Public Policy at University of California at Berkeley, identifies that, despite its benefits, a four-year degree is not the only doorway from lower to middle class living. In fact, he suggests that some students should not attend four years of

college, but rather, develop knowledge in a specific field they are interested in. He identifies that it is detrimental if students fail after being forced to go to college. He further identifies that the traditional education system needs to change its view on university education, and a world-class vocational-technical education must be created as an alternative. He identifies how the emerging economy will need many more people to install, service, and repair high tech machinery for offices, factories, and hospitals. He identifies how it is hard to find a skilled plumber or electrician, because the vocational and technical education available to Americans today is underfunded, inadequate, and viewed as a lower class option to education (Reich, 2015).

According to Georgetown's Anthony Carnevale and Jeff Strohl, less than 10% of lower class children graduate with a four-year degree. Most of these students struggle in school, and are encouraged to attain higher education because it is perceived that it will help them achieve greater success in their life (Petrilli, 2014). According to Micheal Petrilli, executive vice president of the Thomas B. Fordham Institute and research fellow at Hoover Institution, many of these students are being misled by being told to attend college, when according to college-access advocacy group, Complete College America, less than 10% of them will complete a two-year degree within three years, and the rest have an almost certain failure rate (Petrilli, 2014).

The misalignment of individuals may be merely a symptom of a greater problem in life; complexity. Life is complex, and the requirement to become successful in life is increasing as technology advances every year. Logic identifies that a person is more likely to understand who they are and what their purpose in life is at the age of 50 when they have more information and not when they are 15 years old with less information. Yet, the current education system, and society in general, require high school students to figure out their lives at a time when they have the least amount of information. The education system has not done an effective job at creating a structure that can help students develop a sense of identity, discover their purpose in life, and best align themselves with optimal opportunities that can help them be successful (PBSRG, 2016). Instead, students are told that college, more information, and technical details is the key to becoming successful.

This may be the reason why some industries do not have enough employees, while others have too many of the wrong ones (IFMA, 2007; McKinsey & Company, 2013). Many industries cannot fill the need for expert craft and services workers, increasing cost and decreasing quality. In 2020, 25% of the U.S. labor force will be older than age 55 (Hayuten et al, 2013). Over the next 10 years, 40% of employees in the construction industry will retire (PBSRG, 2016). This is a concern for the industry, because a large number of current employers are having difficulty finding skilled employees. Additionally, employers are finding it more difficult to retain laborers. The average pre-millennial worker in the United States remains at their job for 4.4 years. Ninety-one percent (91%) of millennials (born between 1980 and - 2000) have reduced that number by half and are projected to have 15-20 jobs in their lifetime (Meister, 2012). This creates a challenge for employees to maintain stability and develop expertise. This challenges talent acquisition managers because they fear that new employees are more likely to search for new employment opportunities after receiving job training within the company. The industry is faced with the problem of maintaining their competitive edge with an inexperienced and seemingly unstable workforce.

Proposal

The authors propose that implementing methods founded on logic and simplicity might eliminate the misalignment of students caused by the complexity of life. This proposal comes from the testing of the Best Value Approach (BVA) in the delivery of services. The BVA uses simplicity (non-technical, general language) and minimizes the attempts of one party to influence another party through communications and regulations. The BVA proposes that only experts have the capability to identify opportunities to utilize their expertise, and any attempt by non-experts to communicate or influence the experts, result in increased complexity, low performance and higher costs.

The authors propose that any attempt by the education system to direct, control or influence students, will make the students think and stress more, which will lead to poor results. The attempt to direct, control or influence is done by forcing the students to do more work with inefficient and ineffective methods of teaching/learning. Instead, the authors propose to: simplify, allow students to learn more with less effort, and teach students how to use their time more efficiently and effectively. The underlying objective should allow students to find out who they are, what they enjoy, and how to become successful with the talents that they have.

Creating Simplicity

Traditionally, the concept of making someone think or increasing their mental activity was seen as an optimal practice. However, a person, considered to be an expert, can see what will happen before it happens. Their power of observation is greater and, thus, there is less need to think and make decisions. Increased mental activity is not optimal as evident through the following circumstances:

1. Insomnia.
2. Inability to calm the mind.
3. Confusion leading to increased stress.
4. Poor job performance.
5. Athletes who think more do not perform as well as athletes who can make split second decisions.

Research testing at the Performance Based Studies Research Group (PBSRG) led to the following test results (Kashiwagi, 2016, PBSRG, 2016):

1. Experts can see events that they will perform before they do them.
2. When an expert understands their area of expertise, it is simple to them.
3. Experts do not think as much as someone who does not understand. They make fewer decisions. Their stress level is lower.
4. Experts know that most of the stakeholders they interface with are not experts.
5. Experts think less and make fewer decisions, because they know the outcome of an event before it happens. The event is simple to them, and they do not need to think as much.
6. Non-experts, who do not have the expertise to know the outcome of an event before it happens, think more and make more decisions because the event is not simple to them.

7. Experts utilize their expertise to lower costs and improve quality.

The most evident in a case study supporting this idea was shown on a television show, *Stan Lee’s Superhumans*, which aired on the History Channel 2 in 2015 (Stan Lee’s Superhumans, 2010; Flansburg, 2016). The show studied the mind of Scott “The Human Calculator” Flansburg a multi-award winning Guinness World Record holder for fastest mathematical mental calculations. Scott has run hundreds of tests, showing how his mental computing skills are faster than a calculator for both simple and complex operations. On numerous occasions, his competitions included multiple opponents, all equipped with a calculator. On the television shown, Neurologists scanned Flansburg’s brain while he was computing mathematical equations. His brain was compared to the show’s host, who was the control sample, and the results showed that Scott’s brain was less active and used non-mathematical portions of his brain to compute. His brain was more efficient and effective than the normal brain.

Neuroscience has now just figured out that when people are forced to think it causes them stress (Mitra, et al., 2005; Mitra, 2015). Sugata Mitra, a world-renowned professor of education technology at Newcastle University, who created a non-traditional school that empowers students to work together via cloud technology to solve problems, using adults only for encouragement instead of providing instruction, evidences this. He identifies that the brain shuts down in times of stress or fear. In other words, the use of punishment or examinations, threaten a brain and result in a shutdown of the prefrontal cortex, which is the part of the brain responsible for learning. Mitra identifies that the traditional process of overwhelming students with information makes them think more and requiring them to perform is outdated and not optimal.

Other renowned education systems such as Montessori Education and Lumiar, in Brazil, identify that traditional education systems result in poor performance because they mimic the same educational approach for every student by requiring students to meet the same minimum standards (Lillard, et al., 2005; Carlisle, 2009). Alternative educational systems identify that in order to increase the performance of students, it is better to create a structure that accepts them for who they are, practices no influence or control, and helps them align their strengths. In Montessori Education, instructors are encouraged to minimize teaching technical information and focus more on helping the student figure out who they are and what they most enjoy in life. This allows them to move at their own pace, and achieve higher standards (Lillard and Else-Quest, 2006). Likewise, Lumiar focuses on hiring experts in every field who are typically older, more experienced and have a greater understanding of life to educate the students. The students are also able to choose what path they want to pursue in school, based on what interests them and what they are more proficient at (Semler, 2014).

PBSRG identifies that experts enjoyed their line of work. They are highly motivated to add value. Their expertise simplifies the tasks. The authors propose that if students can identify who they are, their strengths and the areas of life they are interested in, they will minimize their stress levels and improve their observation skills, processing speed, self-confidence and skills.

By observation, simplicity is defined when people have to think less, make fewer decisions, and minimize discussion (Kashiwagi, 2016). When education is simple, concepts become obvious to the least capable and least perceptive person in a group. Simplicity is seen when a group of

people, regardless of technical background and level of experience, can all understand the same concept. For example, if a water bottle was held in the air, everyone would immediately know what direction it would move in if it was dropped. Simplicity results in students having the following attributes:

1. Clearer vision of future.
2. Greater perception and understanding.
3. Minimize decision-making.
4. Identify and increase value to society.
5. Reduced stress.
6. Less use of influence or control of others.
7. Less need of details.

Individuals who have expertise in a certain area and can see an event more clearly create simplicity. They, in turn, use their vision to help others who cannot see as clearly, reduce the complexity of life, and align individuals to their area of best fit.

The authors propose that they will use an educational approach that makes things extremely simple. The approach is called Information Measurement Theory (IMT). IMT is the most licensed technology out of Arizona State University. The IMT technology has been tested in the delivery of services, and is the foundation of the Best Value (BV) Performance Information Procurement System (PIPS) that has been tested for the last 23 years. IMT is a high-level, leadership-based approach that has the following characteristics:

1. Minimizes exceptions by using natural laws.
2. Identifies that natural laws govern all events or happenings.
3. All events have a unique initial condition and a unique final condition.
4. Identifies that there is no such thing as chance or randomness.
5. Uses extremes to explain the difference between entities.
6. Minimizes the need to understand details.

IMT simplifies the complexities of life. IMT allows students to understand complex situations of life with minimal experience and knowledge.

Methodology

The researchers will use the following methodology:

1. Identify the success of the IMT concepts in setting up a Best Value leadership education structure.
2. Test the use of IMT concepts to simplify the education of students at the college level in the Barrett's Honors Program. The metrics used will be the understanding of the concepts, satisfaction with the class and the reduction of stress.
3. Test the use of the IMT concepts with one and two-week high school summer school courses.
4. Run a full-year course implementation test at Saint Louis High School.

5. Analyze the results.
6. Identify conclusion and recommendations.

Other objectives of the research include:

1. Investigate the scalability of the Best Value Leadership Education Approach in K-12.
2. Identify if the simple concepts that work in industry can also work in the education of students in college, high school and intermediate school.

Best Value Leadership Technology

For the past 23 years, the Performance Based Studies Research Group (PBSRG) at Arizona State University has researched and developed an innovative technology that transforms complex situations into simplistic situations. The technology is licensed by Arizona State University through AZTech, the governing group for intellectual property developed at Arizona State University. The technology has the following names and characteristics (Kashiwagi, 2016):

1. Information Measurement Theory (IMT).
2. Performance Information Procurement System (PIPS).
3. Performance Information Risk Management System (PIRMS).
4. Kashiwagi Solution Model (KSM).
5. Industry Structure (IS).
6. Leadership based approach based on alignment with no utilization of direction, control, influence or expectations.
7. Language of metrics.
8. The “Event” diagram that identifies that every event in life moves from one unique condition to another and the change is governed by natural laws.
9. Every person is accountable for his or her own life.
10. “Cycle of Learning” that identifies every individual and organization is constantly changing and the perception, ability to process, application of natural laws and the rate of change are related.

The concepts have been utilized to do the following:

1. Assists clients/vendors to optimize their organization and services they provide by creating simplicity.
2. Assists clients/vendors to use logic and common sense to understand reality and better utilize and align expertise and resources.
3. Created a leadership structure that mentors the client/vendor to increase the utilization of expertise and become even more expert in their own area.
4. Assists clients/vendors to add dominant value by doing more with less.

This technology is the most licensed technology (46 licenses) from the most innovative school in the United States (Crow, 2016). It has been tested in the entire supply chain (construction and non-construction). Its developments have been researched and developed, in support of

professional groups like the International Council for Research and Innovations in Building and Construction (CIB) and the International Facility Management Association (IFMA), and has been identified as a more efficient approach to the delivery of professional services.

The BVA results have been heavily documented. Performance documentation are the following (PBSRG, 2016):

1. PBSRG has received a total of \$17M in funding with 300+ grants.
2. 1,800+ projects or \$6 billion (1634 projects, \$4B construction and 235 projects, \$2B non-construction), customer satisfaction of 9.8 (out of 10), 93.5% of projects on time and 96.7% on budget.
3. 98% customer satisfaction / 9.0 (out of 10) client rating of BVA model.
4. Decreased the cost of services on average by 31%.
5. Contractors/vendors were able to offer the client/owner 38% more value.
6. Largest projects: \$100M City of Peoria Wastewater Treatment DB project (2007); \$53M Olympic Village/University of Utah Housing Project (2001); \$1B Infrastructure project in Netherlands (2009).
7. Most audited system with four major audits (State of Hawaii, Corps of Engineers (COE), a Dutch university dissertation, and the National Association of State Procurement Officials (NASPO) (Kashiwagi et al. 2002; State of Hawaii Report 2002 (DISD); Duren & Doree, 2008; Rijt & Santema, 2013).
8. The results of BVA testing has won the 2012 Dutch Sourcing Award, the 2007 Construction Owners of America Association (COAA) Gold Award, the 2005 CoreNet H. Bruce Russell Global Innovators of the Year Award, the 2001 Tech Pono Award for Innovation in the State of Hawaii, along with numerous other awards.
9. The changing of the Dutch model to deliver services from the traditional manage, direct and control to the leadership based Best Value Approach. The movement of this change has spread into Norway, Poland, Denmark and Switzerland.

PBSRG is constantly implementing this technology in the supply chain in different countries (7 countries and 33 states in the U.S.), to hasten the movement to a simple and transparent environment that can accurately align resources to reduce cost and time, while increasing value and performance. It is now being taught in higher education at Arizona State University.

Testing of the Best Value Approach in College Education

Arizona State University is identified as one of the most innovative schools in the country ahead of MIT, Harvard and Stanford (Crow, 2016). Barrett, the Honors College at Arizona State University is a program of innovation and impact. The New York Times identified it as the “gold standard” of honors education, and the Best Value in today’s university education systems (Bruni, 2015). Students pay \$1,500 per year more in tuition than average students (Barrett, the Honors College, 2015) and complete additional honors program required classes outside of their core concentration. Honors classes aim to broaden students’ worldview and help them innovate and impact society. The majority of the honors students are in the top 1 – 5% of the ASU students and number around 5,400 students annually (6% of the ASU students) (Barrett, the Honors College, 2015). In 2009, honors students were given the opportunity to learn the Best

Value Approach by taking a new course titled “Deductive Logic, Leadership and Management Techniques.” This class exposed students to the following:

1. How to learn five times as fast.
2. How to minimize the amount of detailed information required to resolve complex issues.
3. How to provide maximum value to society and happiness in life.
4. Learn a new approach to learning that replaces memorization of details with simple concepts of natural laws, logic and observation.
5. Learn how to know almost everything, without knowing almost anything (understanding of natural laws).
6. Simplification by observation without decision-making, requiring minimal thinking, decision making and work.
7. A new approach to leadership.

The Deductive Logic and Leadership class has identified that each individual is unique and can maximize their value to society by identifying:

1. What they love doing.
2. What seems simple to perform, and therefore identifying their expertise.
3. Ensuring that what they love, and what is simple to them adds value to society.

The course started with one class and has since expanded to five simultaneous classes with 120 students enrolled per semester. It has become one of the most popular honors courses. On Rate My Professor, it is the highest rated class at Arizona State University for a professor who has more than 140 ratings (RateMyProfessors.com, 2016). The class has the following unique characteristics:

1. The professor interviews every student at the beginning of the semester to identify unique characteristics or interests.
2. There are no rules in the class.
3. Students are asked to listen, think about the concepts, and form their own conclusions. No student’s conclusion is wrong.
4. Students are requested to minimize the amount of work that they do, minimize the amount of thinking and maximize the impact of their contribution to the class (which they determine).

Concepts of the Deductive Logic and Leadership (DL&L) course include the following:

1. Intelligent individuals are observant and minimize their thinking and decision-making.
2. Less intelligent individuals have a difficult time observing and accepting reality; they are blinded by their own biases.
3. Less intelligent individuals are more likely to get confused, think more, make more decisions and increase risk of failure in their personal life and in society.
4. Making people think and make decisions is a practice of the non-observant.
5. The non-observant increases stress levels and assume that people can be influenced and controlled.

6. Influence and control of others are inaccurate concepts; they have ended in failure when practiced and increases stress levels and depression.

Because of the course, students become much more logical in their thinking. In the span of one semester, students can understand seemingly complex concepts that are outside of their degree concentration. They become leadership oriented. They understand themselves, their families, their peers, their teachers, and their respective industries in a new light. The instructors document significant changes that the students make in their personal life because of the class (Rivera, 2013; PBSRG, 2016). If the leadership approach can have significant results that are easily observed, the authors propose that the logic can be used to create a new paradigm for people and provide them more value than traditional education. The following have been significant documented results of the class (Rivera, 2013; PBSRG, 2016):

1. A student taking antidepressants for 3.5 years, stopped taking medication, stopped receiving counseling, and became proactive, stabilized, and is now planning on graduate school in counseling.
2. An alcoholic engineering student, identified his genetic disposition to being an alcoholic, ceased drinking, and changed his outlook on life.
3. A Navajo student, who hated her life, and her mother, became a happy and successful nursing graduate.
4. A student on the suicide watch list, became confident with himself, happy, productive, and needs no further counseling.
5. An emotionally unstable, depressed single mother of two kids changed her entire life and became a top graduate from the school of construction management. She received multiple offers from construction management firms and graduated from the Arizona State University Law School.
6. An emotionally unstable, depressed male whose wife left him over numerous issues to include alcoholism, was at risk of failing his undergraduate degree, eventually figured his life out, quit drinking, is now back with his wife and doing well, and graduated on time.

Breaching Secondary Education with the Barrett's Summer Honors Program

As a result of the successful ASU Deductive Logic and Leadership class, the curriculum was taken to the high school level, first, as a three-year preliminary case study test in the honors K-12 outreach program, Barrett Summer Scholars, and second as a full curriculum implementation at Saint Louis High School in Hawaii in Fall 2015.

The Barrett Summer Scholars (BSS) education program was conducted over three summers (2013-2015), teaching students exiting 7th, 8th, and 9th grades. The course instructors were undergraduate and graduate research assistants who previously learned the Best Value Approach at ASU. The case study was divided into three functional phases:

1. Phase I: A one-week class for 7th grade students; taught by undergraduate students.
2. Phase II: Three one-week classes for 7th – 8th grade students; taught by graduate students.
3. Phase III: Four one-week classes for 7th – 9th grade students; taught by undergraduate students and one two-week class for 10th grade students; taught by graduate students.

The course curriculum was based off the same curriculum taught to ASU honors students. Throughout the duration of the case study, the instructors tracked the course satisfaction ratings, the impact on student stress, and student comprehension scores. At the end of the case study, the results were compared to other summer engineering, science, and literature courses offered by BSS. The results of the full three-year case study are shown in Table 1. The results of the satisfaction ratings show that students preferred the Deductive Logic and Leadership (DL&L) course and research assistant instructors over the Barrett course and professors respectively.

Table 1	
<i>Performance Metrics of the DL&L Course Case Study (PBSRG, 2016)</i>	
Case Study Length	3 years
Number of Students sampled	194
Decrease in stress level	-24%
Other BSS Course Rating (1-10)	8.56
Other BSS Instructor Rating (1-10)	8.78
DL&L Course Rating (1-10)	9.06
DL&L Instructor Rating (1-10)	9.60

During Phase II the Barrett Summer Scholars (BSS) staff sent out an additional electronic survey to the students at the conclusion of the program. The courses were rated on three factors: enjoyment, rigor, and instructor quality. The results are shown in Table 2.

Table 2			
<i>Student Ratings of all BSS Courses from 1 – 4 (PBSRG, 2016)</i>			
BSS Course Category	Enjoyment	Rigor	Instructor Quality
Literature and Philosophy Course	3.27	3.56	3.56
Combined Science Courses	3.71	3.85	3.70
DL&L Course	3.93	3.80	3.83

The DL&L course is shown to be more enjoyable, has a higher instructor quality, and less rigor than the other BSS courses. A fundamental principle of this education is that it is simple and easily understood and implementable, this not only plays a part in the effectiveness and ease of teaching, but it makes the course less rigorous compared to other science and engineering courses as shown above.

In Phase III, students were given an exam on the concepts before and after the class. The results of the exam shown in Figure 1 portray student comprehension. Before taking the course, students of all grade levels had an average comprehension score of 45%, whereas after taking the class, students had an average comprehension score of over 80%.

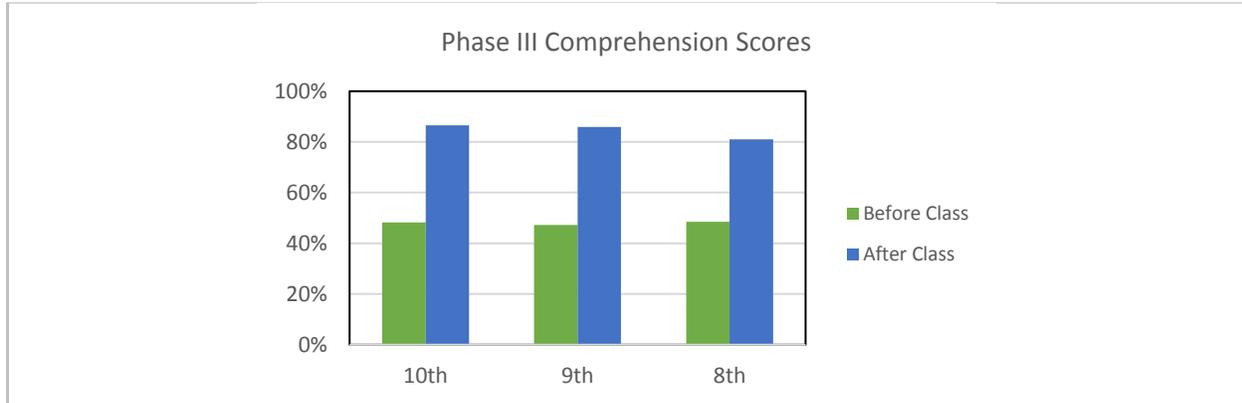


Figure 1: Student Comprehension Scores Before and After the DL&L Course (PBSRG, 2016).

In the comprehension exam, students were asked to provide their feedback of the course. They were asked what they liked, disliked, and any impact the course had on their lives. Students reported to be happier, more confident, and have a better vision of their future after taking the course. Below is a list of some of the most dominant student comments (PBSRG, 2016):

“(The class) completely changed how I view and approach everyday situations. All the information that I learned through this program is completely applicable.”

“I like how this class made life easier and actually happier for me; teaching me how I am in control of my life.”

“I’m always trying to take challenging classes, but this is the first one that challenged me to think differently. I have learned more this week than in any other course.”

Saint Louis High School Case Study

Barrett Summer Scholars program has paved a way for the Performance Based Studies Research Group (PBSRG) to move into K-12 educational research. The curriculum from the college and BSS courses has been compiled into a single class package that can be incorporated into K-12 education programs. In the spring of 2015, Dr. Dean Kashiwagi approached his Alma Mater, Saint Louis High School in Hawaii to identify if they were interested in testing and implementing the Deductive Logic and Leadership (DL&L) course. The goal of the course was to help students eliminate negative behavior, understand who they are, and gain vision for their future to best align their strengths with a career path that they enjoy. The class consisted of young men of whom: 70% had failing grades, 90% had disciplinary referrals, and 80% were diagnosed with ADD and ADHD. Saint Louis High School (SLHS) has made it its mission to help young men become role models in society (Saint Louis High School, 2016). Saint Louis High School, is one of Hawaii’s oldest and only prominent all-boy Catholic schools, covering grades 6-12, and has been educating young men since 1846. The school’s tradition is to enrich young men’s lives by creating a win-win environment that promotes the success of all people, which is in alignment with the Best Value Approach.

When approached with the tenants of the Deductive Logic and Leadership course by Dr. Dean, Director of Faculty and Staff, Mr. Robbie Murakami identified, “Our school became interested in the course because we wished to cultivate leadership in our young men and develop an understanding of self-accountability. We felt that the no rules approach would allow our students to openly discuss topics and learning strategies without fear of reprisal.” When considering which teacher at Saint Louis would best fit the course to teach, Social Sciences teacher, Chris Doyle, was immediately identified. With over 14 years of teaching experience, developing and implementing new course curriculum in Hawaii, he seemed to fit the mold. He was in alignment with the Best Value model, identifying “we are facilitators...you will not be able to control students. However, if you show that you are an advocate for them and are willing to work as partners; teachers can be the “guide” to let students realize their potential.” Along with Chris Doyle, Saint Louis High School identified 20 students to run a test course in fall 2015 to identify impact.

Course Curriculum Comparison

The course curriculum is based off the same curriculum taught to ASU honors students and BSS. The primary difference is that, in the college courses, professors have more time to cover applications and industry case studies. In the high school course, instructors translated the same industry management and leadership principles to the life of a high school student. The following topics were covered:

1. Managing school workload and projects.
2. Managing personal stress and conflicts.
3. Utilizing the expertise of parents, teachers, and other experts.
4. Discovering personal expertise, interests, and goals.
5. Creating plans to accomplish future tasks and goals.
6. Recognizing when to admit a lack of knowledge and seeking expertise.

Throughout the duration of the course, Chris Doyle tracked the course satisfaction ratings, the impact on student stress, and student comprehension scores. In November, Dr. Dean visited the SLHS class and was impressed with both Mr. Doyle and the students. He discovered that the students were very attentive and participated freely in the discussions. A visitor from the Kamehameha Schools (largest land grant and private school in Hawaii), who had also attended the class, was amazed at the openness and maturity of the students. Director Murakami, also impressed with the results of the class, sought out and received approval from the National Collegiate Athletic Association (NCAA), to assign the class as a core philosophy course for all potential college bound athletes. As the results of the course have exceeded expectation, the program is expected to grow exponentially and has been continued through spring 2016.

Saint Louis High School Test Results

In order to gain a more developed perception of how well the students fared in the class, the authors created a 25 question survey that was given to each student to rate on a scale of 1-10 (1 is low and 10 is high). The survey was the same one that is given to the university class students and industry professionals. The survey was given to the high school students before and after the fall 2015 semester. The survey questions were broken up into the following major sections:

1. Six comprehension questions.
2. Six industry related questions.
3. Thirteen personal opinion questions.

Upon completion of the survey, the authors were able to measure the following:

1. Student satisfaction with the Deductive Logic and Leadership course.
2. The impact on student lives through a reported change in stress, personal confidence, and career preparation because of the course.
3. Difference in student comprehension of core course concepts.

Since the focus of the class was exclusively on logic and leadership application, the analysis for the industry related questions were not documented in this paper. Table 3 shows the overall results of the student satisfaction of the DL&L course and impact on student lives. The results are as hypothesized. Students felt the new class added tremendous value with a rating of 9.6/10, and their comprehension of the material increased by 79%. Student stress was decreased by 46%, their self-confidence increased by 51%, and their confidence for their future increased by 44%. The results match the perceptions of their instructor Chris Doyle, who identified the behavioral issues brought into class by students, were nearly eradicated within the first semester.

Table 3

<i>Performance Metrics of the SLHS Case Study (PBSRG, 2016)</i>	
Criteria	Metrics
Total Students	20
Comprehension Score	79%
Change in Stress	-46%
Change in Confidence	51%
Change in Career Preparedness	44%
Class Rating	9.6/10

The benefit of Saint Louis High School was that students had more time in class than compared to Barrett Summer Scholars (BSS). In the BSS case study, the authors were unable to measure the difference in student comprehension of core material, because one week is not long enough for students to fully comprehend the curriculum. The Saint Louis High School survey was the first time the authors were able to measure high school students' comprehension of core concepts. Differentiating between students who understood concepts the most and the students who understood concepts the least, provides a clearer perspective on the effectiveness of the class and its ability to help different students improve their performance.

Table 4 shows a breakout of student comprehension from greatest to least, by analyzing the six comprehension questions. Students who answered 100% of the questions correctly were categorized in Group 1. Students who answered 50% or less correctly were categorized in Group 3. For all others who answered greater than 50% and less than 100% were categorized in Group 2. The authors selected the six comprehension questions because they are simple to understand and closely reflect the core concepts of the course. Prior research has identified that students and professionals who answered them correctly, had a greater understanding of class material.

The six comprehension survey questions analyzed were the following:

1. I believe in influence.
2. I believe that you can control others.
3. I think that the person creates his/her environment.
4. I control my life.
5. Any event has multiple possible outcomes.
6. You can predict the future.

By breaking out each student category, the authors were able to clearly differentiate Table 3 and Table 4. This further illustrates the impact on various student populations, in terms of: stress, confidence, career preparedness, and satisfaction of the course.

Table 4			
<i>Analysis of Student Population (PBSRG, 2016)</i>			
Criteria	Group 1	Group 2	Group 3
Total Students	7	9	4
Comprehension Score	100%	50-100%	<50%
Change in Stress	-54%	-42%	-38%
Change in Confidence	35%	70%	44%
Change in Career Preparedness	44%	60%	18%
Class Rating	9.71	9.89	8.75

The results indicate that all students, regardless of the category, increased in comprehension, decreased in stress, and increased in self-confidence and career preparation. Further major observations were the following:

- Biggest decrease in stress: Group 1 students.
- Biggest increase in confidence: Group 2 students.
- Biggest increase in career preparedness: Group 2 students.
- Higher satisfaction ratings: Group 2 students.

According to a student’s level of understanding, it would be consistent that the students who had a greater understanding of the class applied more course concepts to their lives and decreased their stress, while the least understanding students, began to see how the concepts may help improve their lives and cause them to have a greater increase in confidence. The true value of the Deductive Logic and Leadership (DL&L) course, as evidenced by the results, is how it can help

everyone increase their performance while decreasing their stress. Interestingly, the Group 3 students also perceived that they significantly progressed and were more prepared for life after high school then before taking the class.

Student Impact

Through the Deductive Logic and Leadership course, students were taught the following same fundamental concepts discussed in the college level course:

- All events happen only one way.
- There is no such thing as randomness or chance in reality.
- Everything can be predicted if you have enough information.
- Everything is subject to laws of nature.
- The concepts of influence or control are not accurate. When people attempt to influence or control others, their risk increases, and many times the results are contrary to what was expected.
- People who can see into the future are experts in their area.
- We can create an environment that helps the “blind” or inexperienced people see.
- Everyone is in a silo, and by understanding reality they can remove themselves from the silo and understand reality.

The course environment resulted in students overcoming their shyness, increasing their participation, and becoming more motivated. The students documented their experiences in personal journals, which noted the inclusion and application of the concepts in their lives. On the topic of student utilization of the concepts, Chris Doyle stated, “The biggest take away is that students are realizing that they control their lives. It is very empowering and has given these students a self confidence that was missing in their lives.” Additionally, out of the 20 students, Chris Doyle conducted case studies on five 12th graders. He asked them to fill out an additional survey at the end of the first semester (see Table 5). The questions asked were the following:

1. How has this class lowered your stress levels?
2. After taking this class, do you make more or less decisions?
3. After taking this class, are you happier in life?
4. After taking this class, has your thought process changed (do you thinking differently)?
5. How has this class impacted your life?

Table 5	
<i>Analysis of Student Population (PBSRG, 2016)</i>	
Criteria	Rating
Lowered stress	100%
Minimized decision making	100%
Felt happier	100%
Identified a difference in thinking	100%
Identified positive impact	100%

Additional to the analysis conducted by Chris Doyle, the authors analyzed all the responses by each of the five students and identified three additional patterns in their responses seen in responses 3-5, at the bottom of Table 5. Interestingly, all the students identified a decrease in stress, and that they were happier in their lives. In addition, the students felt their personal relationships had improved, which is a windfall effect of the course that furthers the advancement of Saint Louis High School’s tradition of encouraging community and family values. The most impactful student comments are listed below (PBSRG, 2016):

1. Student 1 realized that he had full control over his life and this has helped him to gain more confidence in himself and his ability to lead others. He states, “This class has made me happier and has helped me to be an effective leader in the community. My effectiveness as a leader is not only found in the school, but also on the baseball field. Be happy and enjoy what you do in life because you control yourself.”
2. Student 2 learned that those who are better prepared in life tend to be happier, less stressed and more productive individuals. He concluded: “It's your choice how prepared you are.”
3. Student 3 realized that the silos of life are in our minds and cause us to become confused and think too much. The concepts we learn in one area of our life can be applied to other areas. He realized the more information he can perceive the less thinking and decision-making is required to choose the most efficient path. He identified as an example, “when I body board, the more I have to think and make decisions, I am more likely to mess up and wipe out. If I just go, then I noticed that usually I make the drop and not wipe out.”
4. Student 4 was grateful for the class because, previously, he did not recognize that everyone in his life has value. He concluded that the best way to help others is by recognizing how to add value. He realized that his pride was only causing him more pain. He identified, “My process before taking this class was downhill, meaning I wasn't humble, I wasn't respectful to others, and it was all about me... There was a particular lesson when we were being taught to think about others before yourself. I really considered this and came out with good results. I found that when you help others you feel really good and pleased about what you did, which causes you to do more good acts.”
5. Student 5 was struggling with the mentality that he needed to know everything. He quickly realized that it was too difficult and never ending. Instead, he figured out a much faster way to get what he needed: “I've learned to utilize experts, and if you do not know something, ask. The big area this affected was my fitness. I have a good knowledge about lifting and supplementation, but I do not know everything, so I will ask experts when I am unsure about a certain lift or a certain supplement. By asking questions, it's helped me to increase my knowledge on any subject.”

Lastly, according to Chris Doyle, he identified that: “This course would be beneficial to our student population and give them more practical thinking skills, to better prepare them for life after graduation. Building more teaching capacity would also serve to integrate more teachers facilitating the course, which would be a positive step in increasing professional development of the teachers.”

Sustainability and Impact

Bringing a college-level course to high school students is part of a major research effort at ASU to identify the impact of a simple and transparent educational approach on the existing structure of education institutions. This approach allows students to quickly identify reality, learn who they are, and align themselves with their talents to increase value in society. Instead of the “one size fits all” approach this will help students align themselves into much needed areas such as construction craft areas of mechanical, electrical and plumbing and piping, facility management, project management, procurement and leadership roles in every industry. The industry has a tremendous need to identify the right people, align them in the right jobs, and give them a structure that increases their performance.

Due to the tremendous success of the Barrett Summer Scholars and Saint Louis High School case studies, junior researchers in the PBSRG have created an innovative approach to reach out and integrate this course and its logic within the Phoenix valley. In 4 months, they have reached out to 117 high schools, given 17 presentations to over 1,800 students and 105 professionals, met with 41 professionals, and have identified two high school districts, Phoenix Union and Tempe Unified, who are looking to replicate the success of the BSS and Saint Louis High School education efforts in their own districts.

High schools across the Phoenix metropolitan area have identified a real need to help students decrease their stress and learn better life preparations tool, but Phoenix Union and Tempe Unified have been the only districts to identify two schools, North and Mountain Pointe High Schools, to run a weeklong leadership education test. The junior researchers have developed, and coordinated, one week-long summer sessions (45 students at North High School, 25 students at Mountain Pointe) as tests to identify student impact and scalability of the Best Value leadership education. If successful, the junior researchers will continue to work with Phoenix Union High School and Tempe Unified School Districts, and other able schools to begin expanding this Best Value leadership education research effort into high school curriculums, after school and summer programs.

Conclusion

The traditional K–12 and college educational approach is encountering problems with student stress and poor alignment of student strengths in preparation for their future careers. A new approach, which has been tested in the delivery of services in the construction and other industries for the past 20 years, has been tested at college and high school levels. The new approach uses the following:

1. Simplicity.
2. Minimal thinking and homework.
3. Helping students to understand quickly complex issues.
4. Teaching without using influence or control over students.
5. Minimal rules, direction, and control.
6. The latest scientific developments and current events.

The test results for college and high school levels have shown a decrease of stress, increased understanding of natural laws and reality, and enjoyment of the class. It also increases the students’ level of confidence and understanding of who they are.

The authors propose this new education approach is the education model of the future. The focus of education is not on meeting the requirements of a system, rather on meeting the needs of each student, by creating an environment that allows students to grow and learn at their own pace and level. The authors propose more research in the testing of this new education approach continue, to help the support and move toward a more efficient education and supply chain management system.

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