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***Conceptualizing a Multifaceted Approach of Professional
Evaluation Programs and Educational Outcomes***

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Abstract

Educational outcomes are the infrastructure for the future state competitiveness and cohesiveness. Evaluation has a strong effect on educational outcomes. This paper develops a conceptual framework for a more effective method to evaluate improvement in educational outcomes. The method we develop is based on adjusting Chernoff faces (Chernoff, 1973) to the educational arena. We display multivariate educational outcomes in the shape of a human face. The individual parts, such as eyes, ears, mouth and nose represent values of the variables by their shape, size, placement and orientation. At the preliminary step, we asked 50 Israeli educationalist and educators to indicate the most important educational outcomes (for their opinion). At the second step, we proposed a list of facets (that were generated at the preliminary step) and asked 200 Israeli teachers and experts to rank them from 1 (most important) to 10 (less important). The highly ranked facets were included in our model. The proposed model of evaluation suggests an alternative concept for educational improvement. States that will continue on focusing on a one facet linear approach might not be able to keep their relative advantage in the rapid changed global society. The focus on achievements and gain in achievements might be very costly having a tradeoff between achievements' gain and creativity.

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1. Introduction

The goal of this research is to develop a multifaceted conceptualization of improvement in Educational Outcomes. This study is significant because a state's accountability system governs schools outcomes and thereby affects the state's ability to compete in global era and state cohesiveness. The core assumption of this research project is that educational outcomes are multifaceted, whereas the current accountability systems are uni-faceted. They focus, for the most part, on standardized tests, which is only one facet of schooling, albeit important. They thus neglect the multifaceted nature of schooling (e.g., values, citizenship, solidarity), in turn contributing to a less attuned education system, which in turn diminish states' competitiveness and social cohesiveness. Therefore, we developed an alternative, multifaceted conceptualization of improvement in educational outcomes that can affect accountability policy. We claim that such an alternative approach to improvement in educational outcomes contributes to state's competitiveness and social cohesiveness.

In Section 2, we explore the current approaches for evaluation of improvement in Educational Outcomes most states use from a comparative and international perspective. In Section 3, we review the relationships between education, state competitiveness, and cohesiveness. Section 4 proposes a new approach for evaluating improvement in Educational Outcomes. In Section 5, we discuss the extent and the way in which the study's suggested, multifaceted conceptualization might influence state competitiveness and cohesiveness.

The questions addressed in this paper are as follows:

1. What characterizes the current approach of evaluating improvement in Educational Outcomes?
2. What is the potential effect of a multifaceted approach to evaluate improvement in Educational Outcomes? How would it affect state competitive ability and state cohesiveness?
3. What should be the facets in the multifaceted approach?

2. Literature Review

The following subsection introduces the literature on evaluating improvement in Educational Outcomes with respect to growth models, and this review explains the trends of how growth models distinguished from status models. The commonwealth of Kentucky will be consistently referred to in this review as an example to how both student performance models emerged, featuring how the growth model eventually succeeded the status model.

Not until the age of accountability did most models of student performance analyze outcomes per se. In response to the Effective Schools' literature authored originally by Ron Edmonds and the debate between the James Coleman and Henry Levin regarding whether additional school funding mattered to improve student achievement, most analysis was on the inputs or ingredients that were believed to explain student effectiveness. This analysis never determined the measures or predictors of student outcomes that explained student achievement or school

effectiveness. The widespread state Supreme Court case in Kentucky in 1989 overturned over 700 pieces of legislation on education policy and instituted a state-wide outcomes-based education program which was to be systematically assessed. As Kentucky responded to *A Nation At Risk* and ensuing federal government initiatives to institute accountability, other state education agencies – from a couple of years earlier to several years after – proceeded to reform their systems, especially in response to *America 2000* (1991), *Goals 2000* (1994) and *No Child Left Behind* (NCLB - January 2002). By the time NCLB reauthorized the Elementary and Secondary Act of 1965, the federal government's call for accountability -- through higher curricular goals, testing of these goals, analysis of disaggregated test data by subgroup, and expected student performance based on annual yearly targets -- required together a systematic assessment of Educational Outcomes. Stated another way, with the guidance now of the National Assessment for Education Progress, the prospects for assessing systematically Educational Outcomes began based on essentially an outcome-based curricular program.

To understand how the emphasis of assessing Educational Outcomes emerged during the beginning of national accountability policy, an analysis of monitoring systems assessing Educational Outcomes – and not school, leadership or institutional inputs – necessitates a discussion about the changes in practitioner supervision to evaluation typifying both the Static Model and the Growth Model during this period beginning with the clinical model of teacher supervision.

The clinical supervision model from the 1960s to the 1980s typified a joint effort of teachers and administrators to improve teaching quality. Whether implemented by Ronald Goldhammer or Madeline Hunter, clinical supervision contained at least three elements, featuring a pre-conference, observed teaching, and a post-conference. The goal behind clinical supervision was to produce master teachers. During the 1980s when the clinical model was widely used, *A Nation At Risk* was officially issued in 1983, characterized the mediocrity of public education as a national security threat, and called for widespread reform in all state education systems. As curricular reform movements began during the mid-1980s to late 1980s, a static model of student achievement was gradually introduced (Marzano, Frontier, & Livingston, 2011).

Meanwhile, the mid-1980s witnessed the emergence of developmental/reflective models in teacher supervision that replaced the clinical model. Two key elements characterized this period of teacher supervision stressing developmental/reflective models. The first was a form of differentiating supervision between microscopic evaluation for probationary teachers and macroscopic evaluation for tenure teachers. Microscopic teacher evaluation required the supervisor to provide a thorough and prescriptive evaluation of the probationary faculty to ensure that these teachers matured in the prerequisite areas of sound pedagogy. In contrast, macroscopic evaluation contained a generic assessment and affirmation of a proven, tenured teacher. Nonetheless, effective administrators did not allow the tenure status to preclude the need to conduct a microscopic and detailed evaluation on an ineffective tenured teacher, especially if this meant the need to aggregate evidence for inevitable disciplinary proceedings. The goal behind the differentiated approach to teacher supervision was to improve the school's teacher quality.

The reflective model of teacher evaluation endeavored to supply direct support for teachers through professional development programs, and supervisors instructed teachers to use action-research to rethink ways of enabling teachers to improve intentionally their instructional effectiveness. As teacher quality began to improve through professional development and as teachers became more intentional in their practice from reflective thinking through action-research, practitioners emphasized that the imperative of supervision was to improve student achievement. This emphasis of improving student achievement as an outcome of teacher supervision was expected alongside developing state school reform programs of the 1980s and 1990s. Once gradual performance goals were instituted in these programs, teacher supervision switched to evaluation, and the static model of student performance characterized this evaluation. (Marzano, Frontier, & Livingston, 2011).

As static models were used in emerging state accountability programs during the 1990s and national accountability with NCLB, growth models were only used in specific schools as methodologies of program evaluation, such as in outcome-based or impact evaluations. Nonetheless, several factors would call for accountability systems to consider using growth models in their evaluation programs due to the perceived shortcomings of then existing static models of evaluation. Along with inefficacy of clinical supervision to address the policy-makers' mission to improve student achievement, one major concern was the uncertainty that single performance measures in accountability policies could provide valid and reliable of measures to evaluate student achievement. In response to this concern, policy makers reasoned that schools being complex institutions could not be evaluated by a single target measure. These policy-makers called for multiple-measures of student achievement as well as a 360 degree feedback-loop of both quantitative and qualitative measures to assess school performance more holistically.

A second concern was the assumption regarding the attainment of linear growth that schools sought after when using a static model of evaluation (Elmore, 2007, p. 1). This proved significantly true in Kentucky, which encountered three iterations of state instructional programming: first with performance-based testing in 1990; second with standardized testing in 1994; and third with completely revised standardized testing in 2010. A standardized assessment program called Comprehensive Accountability Test System (CATS) replaced a performance-based assessment program known as Kentucky Instructional Results Information System (KIRIS) in 1994. The Kentucky Department of Education (KDE), then, instituted an accountability index of school performance reinforcing the static model of student and school evaluation. From 1994 to 2014, schools were expected to improve ten percentage points every two years and reach the index of 100 out of 140, which measured an attainment of *proficiency* (Whitford & Jones, 2000, 9-23). But by 2007, it was clear that 63 percent of all Kentucky public schools were not improving every two years with gains of at least ten percentage points. In fact, these schools were not on target to reach the accountability index of 100 out of 140 by 2014.

Not only did schools demonstrate fluctuations in meeting the index target of this static model, but many schools digressed, displaying downward-sloping student performance decline (Council for Better Education; Perkins & Sexton, 2009, pp. 23-29). The fluctuations and downward-sloping movement in school performance compelled KDE to terminate the CATS and the static model of the accountability

index, particularly since its assessments were not directly aligned to NCLB assessments (Innes, 2005). Simply stated, Kentucky's assessment program of static growth proved unreasonable to actualize. This explains why in its third iteration of instructional programming, Kentucky became the first state to adopt the Common-Core curriculum during February, 2010 under a state education reform initiative from its Senate Bill 1 known as Unbridled Learning and to revise completely its accountability system featuring a battery of new assessments and a different practitioner evaluation system which adopted several aspects of a growth model (SB1 09RS, 2009).

The federal government's Race-to-the-Top initiative also caused states to rethink their static models of teacher evaluation. Through Race-to-the-Top, the federal government engaged states in a national competition to improve their accountability programs against formidable school reform guidelines as an incentive to be awarded extra federal monies. This prompted states to revisit the static model in their evaluation systems, and persuaded these states to consider various growth models in their accountability systems (Campbell, 2013, p. 43).

Meanwhile, the Obama administration encountered resistance in Congress to rewrite NCLB. This resistance mirrored the intransigence that members of Congress exhibited in passing promptly the federal budget, which led to Congress implementing a sequestration with the goal of recapturing fiscal constraint legislated in the Gramm-Rudman-Hollings balanced budget act of 1985. Given Congressional intransigence and stalling to rewrite NCLB, the Obama administration gave states the opportunity to obtain waivers to comply with NCLB provided that states developed and submitted innovative accountability plans that the U.S. Department of Education endorsed (Duncan, June 2013). Subsequently, states *fine-tuned* their accountability policies, scrapped static models from their practitioner evaluation programs, and adopted growth models and growth indicators in these programs.

Concurrent innovations continued in teacher supervision as states revised their accountability programs in response to federal government influence and state-by-state adoption of the Common-Core curriculum. Tucker and Strange made one important innovation in teacher supervision when they argued that effective supervision requires the input of both student gain scores and growth scores to provide valid and reliable feedback on teacher effectiveness. In *Linking Teacher Evaluation and Student Learning*, Tucker and Stronge insisted that student growth scores constituted more valid and reliable measures of student performance, argued that other feedback sources assess teachers more effectively than observations alone, and called for various student performance scores and observations to typify teacher evaluations (Tucker & Stronge, 2005). Simply stated, Tucker and Strange established a paradigm shift in teacher supervision to be replaced with program evaluation. As evaluation is to replace supervision, Tucker and Strange argued for the growth model to replace the static model (Marzano, Frontier, T. & Livingston, D., 2011).

When reflecting on how supervision developed in response to the rise of accountability and how evaluation eclipsed supervision when state accountability policy was revised, the underlying theme behind this paradigm shift in the assessment of teachers and school practitioners has been the compelling need to improve the teaching profession. In a nutshell, growth models replaced static models due to a

systemic need to improve the quality of teaching since this profession has not been rated with the quality of integrity and effectiveness of other professions: ie. law, medicine, engineering, etc. This shift does not necessarily prove that growth models constitute ideal accountability programs or that they really improve the profession of teaching. Nevertheless, the review's explanation of this shift justifies the researchers' curiosity to ask questions related to the *real and enduring worth* of growth models in accountability programs.

3. Improvement in Educational Outcomes

In recent years there has been an increment in the quality of performance-related data available to schools to inform school improvement. Yet there remains scope for more refined and intelligent measures that will better indicate how schools are progressing in improving the learning outcomes of students.

Meyer (1997) claims that the indicators commonly used to assess school performance—average and median test scores—are highly flawed. They tend to be contaminated by student mobility and by non-school factors that contribute to student achievement (e.g. student, family and community characteristics and prior achievement). Meyer and Dokumaci (2011) assert that the conceptually-appropriate indicator of school performance is the value-added indicator. The value-added indicator measures school performance using a statistical model that includes, to the extent possible, all the non-school factors that contribute to growth in student achievement. The objective is to statistically isolate the contribution of schools to student achievement growth from these other factors.

3.1 Growth models

Growth models generally refer to models that measure progress by tracking the achievement scores of the *same* students from one period to the next with the intent of determining whether or not, on average, the students made progress. Growth models assume that student performance, and by extension school performance, is not simply a matter of where the school is at any single point in time, and that a school's ability to facilitate academic progress is a better indicator of its performance. Growth models can vary, but in general, they account for the potentially negative spurious relationship between status and growth, for the effect of status on growth, and for the effect of student inputs on growth. The greater the number of occasions (years) used to estimate growth, the less initial performance will be related to growth (Goldschmidt et al., 2005)—this means growth will be less and less related to indicators of school performance that are based on cross-sectional indicators. In general, we would expect all students to demonstrate some academic progress across grades, but some schools will still exhibit more growth than others, on average.

3.2 Value-added models

Value added models are one type of growth model in which student background characteristics and/or prior achievement and other data are used as statistical controls in order to isolate the specific effects of a particular school. Value-added approaches aim to provide a clearer indication of the contribution a school makes to the progress of its students by adjusting for the impact of non-school influences on student

performance. Value-added modeling (VAM) can also be used to create projections of school performance that can assist in planning, resource allocation and decision making (OECD, 2008). Value-added measures have emerged internationally as a means of assessing school performance. The value-added approach recognizes that students have different levels of capability and come from different environments, and that these factors will influence each student's rate of educational progress.

The main purpose of VAM is to separate the effects of non-school-related factors (such as family, peer, and individual influence) from a school's performance at any point in time so that student performance can be attributed appropriately. A value-added estimate for a school is simply the difference between its actual growth and its expected growth. It is important to note that schools can demonstrate positive achievement growth, but still have a value-added estimate that is negative (i.e., the school demonstrated growth, just not as much as we would have predicted given the student inputs available to the school).

The term value-added was initially popularized as part of the Tennessee Value-Added Accountability System (TVAAS) (Sanders, Saxton, & Horn, 1997; Ballou, Sanders, & Wright, 2004; McCaffrey, Lockwood, Koretz, Louis, & Hamilton, 2004; Ballou, 2005). Hayes and Taylor (1996) using Dallas school data, found that the schools' value-added explains 10 percent of the total explained variation in student performance.

Value-added modeling is most common in the U.S. and the United Kingdom. In the U.S., value-added modeling has recently been applied also to measuring individual teachers' contribution to student learning (Loeb et al., 2007; Boyd et al., 2006), revealing that teachers play an important role in this respect (Loeb et al. 2007). In the United Kingdom, value-added modeling is used (1) in Performance Tables, which provide information to parents and hold schools to account; (2) in systems for school improvement, where the data are used for self-evaluation and target setting; (3) to inform school inspections, which are now tied into the school improvement process; (4) to help select schools for particular initiatives; and (5) to provide information on the effectiveness of particular types of school or policy initiatives (Ray, 2006).

However, using VAM for policy initiative needs to be treated with delicacy. Briggs, Weeks, & Wiley (2008), draw attention to the pitfalls of using VAM for policy initiative. They find that the precision of value-added estimates can be quite sensitive to the combinations of choices made in the creation of the scale. They conclude that when VAM are being used for the purposes of high-stakes accountability decisions, its sensitivity is most likely to be problematic.

Nonetheless, this method is also in use in other parts of the world. Smaller regional and pilot initiatives have also been developed in a number of countries. OECD member countries were invited to join the project in July 2006. Thirteen countries chose to participate in the project: Australia; Belgium (Flemish Community); Czech Republic; Denmark; France; Netherlands; Norway; Poland; Portugal; Slovenia; Spain; Sweden; and the United Kingdom (OECD, 2008).

4. Promoting state competitiveness and social cohesiveness

4.1 Education and state competitiveness

The increasing need for state competitiveness in the global market is due to the accelerating processes of globalization, in particular the challenge to many states to sustain their position in the market relative to other states (Green, Mostafa, & Preston, 2010).

The literature linking education and competitiveness views education as an infrastructure for advancing state competitiveness. Reiljan, Hinrikus, and Ivanov (2000) argue that the ability to achieve competitiveness is more important than competitiveness itself, because it guarantees recuperation if competitiveness is lost for some reason. The importance of education accumulated in human capital development is highlighted in the light of this argument. Furthermore, they claim, one important aspect that should be evaluated to predict a country's future competitiveness is education. Their model concludes that an individual's competitiveness is mainly a derivative of his or her education, whereas the competitiveness of a state depends much upon the ability of a nation to create an environment that favors education for development.

Both primary and secondary education significantly contribute to economic development and growth. The literature recognizes human capital development and demonstrates how increased investment in education provides future returns to the economy through increases in labor productivity (Hanushek & Kimko, 2000; Krueger & Lindahl, 2000). Moreover, better quality education increases average earnings and productivity and reduces the likelihood of social problems that, in turn, are harmful for economic development.

Sahlberg (2006) claims that successful economies compete on the basis of high human capital development, which is best guaranteed by educated personnel. He argues that globalization has increased economic competition between countries. Furthermore, Sahlberg highlights the general assumption that, to increase competitiveness, citizens must acquire knowledge, skills and attitudes necessary for civic success and the knowledge-based economy. He concludes that the key features of education reform policies compatible with competitiveness are those that encourage flexibility in education systems and creativity in schools.

4.2 Education and social cohesiveness

A salient argument in the literature linking education and social cohesion is that the distribution of education attainment affects social cohesion. Thus, countries with education systems producing more equal outcomes are likelier to promote future social cohesion than countries in which education is distributed less equitably (Green & Preston, 2001).

Beauvais and Jenson's (2002) review of the literature concerning education and social cohesiveness also indicates that state education is an important ingredient for fostering social cohesion. Moreover, a state's economic and social policies (for example, its investment in children through education) are an important factor for

achieving future cohesion. Additionally, this review points out that UNESCO also argues for the importance of education and education policy for social cohesion. Beauvais and Jenson conclude, therefore, that if globalization produces greater demographic diversity, then public policy can be used to improve social cohesion.

5. A new approach to evaluate Improvement in Educational Outcomes

We argue that focusing on a one (or two) facet to evaluate improvement in the educational process (e.g., students' academic achievements, and instructional practices) is sometimes narrow as the educational process is very complex. One may make an impressive gain in academic achievement and yet "pay the price" (within the tradeoff view) in terms of lower social engagement, or lower level of values. Thus, one may exhibit low gain in academic performance yet lead in innovation and creativity. Focusing on the gain in students' performance and on the development in teachers' instructional practices neglects many issues that educational systems account for.

Table 1 presents the facets and their (averaged) ranking as we generated from the preliminary step of our research. The following table is comprised of facts that we collected from educators and educationalist that were interviewed. The questions were as follows: What facets do educational system accounts for? Please indicate which of the facets (among the facets you have mentioned) is perceived (by you) as the most important and please rank them (the rank 1 is given to the most important facet).

The following Table 1 presents the averaged ranks.

Table 1: Facets and their averaged ranks

Educationalist		Educators					
Facet	(1) (n=20)	(2) Math (n=30)	(3) Scienc (n=20)	(4) Languag (n=30)	(5) Art & Sport (n=20)	(6) Averaged rank	(7) Final aver ranks
Academic Achievements	1	1	3	10	1	3.58	2
Social engagement	3	4	13	8	3	6.17	5
Values	2	8	1	1	2	3.08	1
Happiness	12	6	12	6	12	9.00	10
Leadership	5	14	7	13	5	9.58	11
Health (hunger)	6	5	11	2	6	5.58	3.5
Optimism	4	13	10	7	4	8.00	7
Self-Efficacy	11	2	4	3	11	5.58	3.5
Self-Awareness	7	3	14	14	7	8.92	9
The volition to succeed	8	9	2	4	8	6.25	6
Innovation	9	13	8	11	9	10.33	12
Creativity	10	12	9	12	10	10.83	14
Violence	13	7	5	5	13	8.17	8
Instructional practices	14	10	6	9	14	10.42	13

A total of 120 Israeli educators and educationalist filled in a questionnaire (100, and 20, respectively). They were asked to rank from the most important (1) to the less important (14) facets of education that were collected at the preliminary step of interviews (Columns 2 to 5). They could also suggest other facets to be included or suggest omitting some of the proposed facets. The teachers' seniority is averaged (10 to 15 years of seniority). Most of the teachers that reply are holding bachelor degree and teacher's certificate. We asked 20 more Professors of education to rank the proposed facets (Column 1).

The averaged response of each group is presented in Table 1 (Columns 1 to 5). The final step was to calculate weighted average considering for each group size and to rank these averaged ranks (Column 6) into final ranks (Column 7). To exemplify, the lowest averaged rank 3.08 was assigned a final rank of 1, and so forth. Additional considerations were enacted upon equal averaged ranks. In this case the averaged final ranks were assigned to each of these facets (e.g., the facets Health/Hunger and Self-Efficacy both averaged rank was 5.58 account for the third and the forth ranks, therefore, their final assigned rank is 3.5 and the following rank is 5).

The results from the questionnaires indicates that Values are perceived as the most important facet of education (was assigned a final averaged rank of 1, Column 7). It was also found that students' achievement is also perceived as a very important facet of education. Finally, the facet Instructional practices was perceived as less important and was assigned the rank 13 (out of 14). We moved forward to present the different facets using Chernoff Faces.

Table 2: The components of Chernoff face and their respective education improvement facets

Element in Figure 1	Facet/ time
1. Size of face	Academic Achievements
2. Forehead/jaw relative arc length	Constant
3. Shape of forehead	Social engagement
4. Shape of jaw	Values
5. Width between eyes	Instructional practices
6. Vertical position of eyes	Leadership
7. Height of eyes	Health (hunger)
8. Width of eyes	Creativity
9. Angle of eyes	Self-Efficacy
10. Vertical position of eyebrows	Self-Awareness
11. Width of eyebrows (relative to eyes)	The volition to succeed
12. Angle of eyebrows (relative to eyes)	Innovation
13. Direction of pupils	Constant
14. Length of nose	Violence
15. vertical position of mouth	Constant
16. Shape of mouth	Happiness
17. Mouth arc length	Optimism

Table 2 presents the facets and their graphic presentation. To exemplify, the academic achievement of a student, school or a state is presented by the size of the face. Large face means high academic achievement and visa verse. Improvement in academic

achievement is represented by enlarging size of the face. Happiness is represented by the shape of the mouth and so forth.

The relative representation of Chernoff faces is useful in education because education is often considered as a positional good. Excellent performance of one worsens the relative position of the other. Specifically, improvement in education is relative. This point can also be addressed from the point of view of the state. The rate of improvement of one state is dependent on the rate of improvement of other states. To this end, Figure 1 illustrates 10 faces each represent an alternative state (the first and the last faces, 1 and 12, are only sets as reference point where the first face, 1 represents the worst hypothetical prototype and the last face, 12 represents the best).

Moreover, since improvement in education is not linear, the Chernoff faces are representing improvement better compared with VAMs as they do not assume linearity.

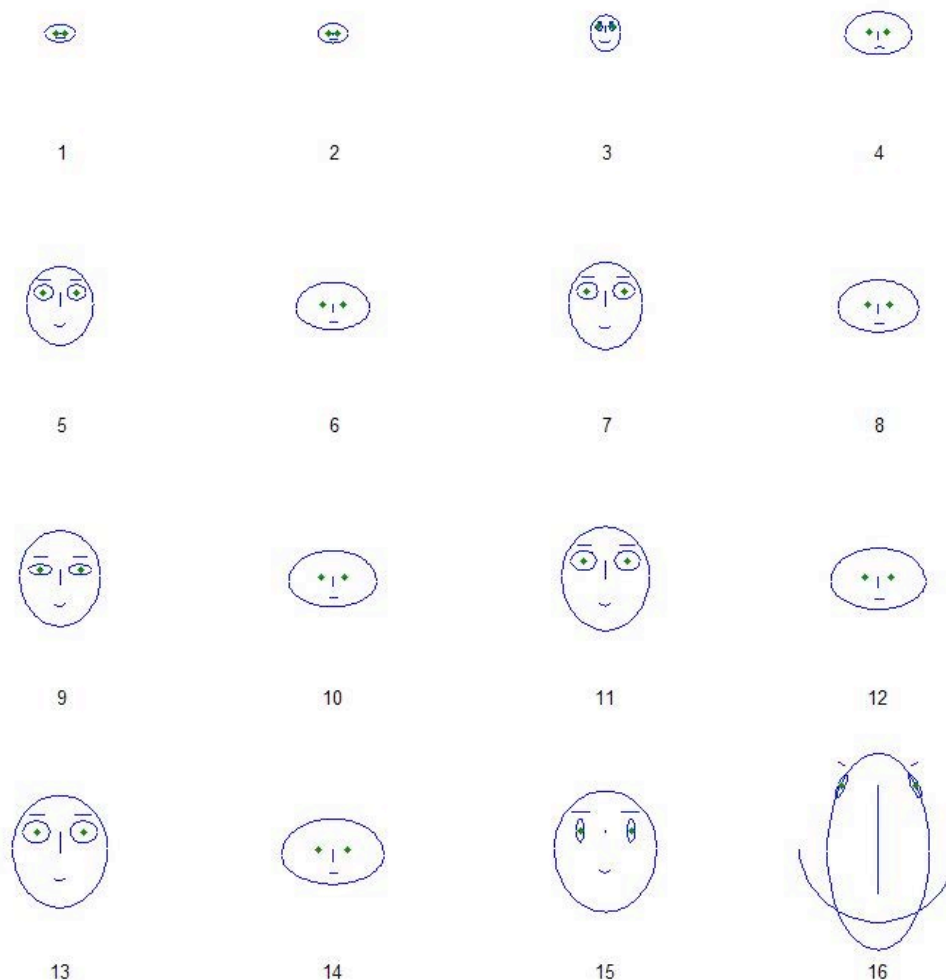


Figure 1: Face charts for students improvement along time

Figure 1 presents a multivariate representation of educational improvement. It shows an example of Chernoff faces of one student along time (or of one school/district/state) using MATLAB statistical toolbox. It can also be used to represent a comparative view on different states.

The argument of this paper is twofold: (a) Education is multifaceted, and therefore, a one facet approach used to evaluate or to measure educational performance is too narrow. (b) Educational improvement is relative and not linear, and therefore, using VAMs to measure improvement in a linear manner is not effective. Chernoff faces are able as to take a multivariate approach towards education and to represent a nonlinear improvement. The 14 "faces" presented in Figure 1 (numbered 2 -15) represent different prototypes of students and their educational improvement.

To exemplify, we further analyze "face" number 14 and "face" number 15. Table 3 summarizes the characteristics of both these prototypes used in our example.

Table 3: Characteristics of two prototypes on a unified scale (0=lowest, and 100=highest)

Facet	Prototype 14	Prototype 15
Academic Achievements	100	100
Social engagement	20	80
Values	0	100
	0	100
Leadership	0	100
Health (hunger)	0	100
Creativity	0	100
Self-Efficacy	0	100
Self-Awareness	0	100
The volition to succeed	0	100
Innovation	0	100
Violence	100	0
Happiness	0	100
Optimism	0	100

Both prototypes resemble in their high academic achievement yet they are opposite to the extreme in all other facets. Specifically, all other characteristics of prototype 15 (e.g., prototype 15 is extremely innovative and happy and not at all defined as a violent student) are high compared with the characteristics of prototype 14 (e.g., prototype 14 is extremely violent and not at all defined as innovative or happy). If we were interested solely in measuring and evaluating teachers effectiveness based on the improvement gained in their students' academic achievement than we would have mistakenly rewarded both prototype 14 and 15. However, the Chernoff faces presented in Figure 1 lead very smoothly to the conclusion that prototype 15 should be rewarded or at least considered more effective. (e.g., large face, smiling mouth, and the tiny nose account for high academic achievement, happiness, and non-violent, respectively).

The above mentioned example uses solely one pair of "faces" however, Figure 1 illustrates 6 more pairs (faces 2 and 3, faces 4 and 5, etc.) each pair differ solely in the facet of academic achievement (i.e., the level of academic achievement illustrated in

faces 2 and 3 is the lowest-0, the level of academic achievement illustrated in faces 4 and 5 is higher-50, the level of academic achievement illustrated in faces 6 and 7-60,... the level of academic achievement illustrated in faces 12 and 13 is 90, and so on) and the rest of the facets resembles our previous example. Again, if we would reward schools based solely on academic achievement prototype 2 and 3 were not differentiated as both represent the lowest level of achievement. Yet, prototype 3 is far more improved compared with prototype 2 in all other facets as illustrated in Figure 1.

6. Discussion

The method by which educational outcomes is evaluated has a far going effect on the process of learning and teaching. It also has a tremendous effect on the state ability to compete globally. Most western states acknowledged education as a multifaceted process as defined by the long list of educational goals (and objectives). Yet, the current method of evaluation focuses on a narrow approach. Many states (see Appendix Table 1) are developing models of evaluation that are focused on two facets of education thus neglect other goals of education.

One can argue that many educational outcomes cannot be measured. Yet, there is a growing consensus amongst educators and educationalist that perceived education as has more than two facets that can be measured.

Others might argue that the goals of education set by policy makers are only rhetoric and therefore focusing solely on measuring and evaluating academic achievement is more than enough as demonstrated by the Israeli case. The reform taken place in Israel recently has put the questions of this paper to the forth. While the U.S. approach is pro assessing sometimes to the extreme, the Israeli approach is very far from that. Up until recently the Israeli system used to evaluate schools using student's performance once at each schooling level (i.e., primary, lower secondary, and upper secondary school levels). After Supreme Court decision demanding transparency of the evaluation reports (both at the primary and lower secondary school levels), policy was reformed. Currently, the national evaluation is taking place once at the upper secondary level.

It is important to acknowledge that the Israeli law of education encompasses many goals (e.g., the goal of education is to encourage initiative and creativity). Yet, the evaluation of educational outcome in Israel is focused on students' academic achievement.

The U.S. law of education also encompasses many goals. Yet, similar to Israel the focus of its evaluation method is on students' achievement and (sometimes) on instructional practices of its educators, neglecting other important goals. In contrast with Israel the focus in the US is on the gain in achievement. However, the essence of education as multifaceted, though addressed in the law, is not translated into practice.

Furthermore, similar to the U.S. and to Israel the leading actors in the education evaluation arena (e.g., PISA, TIMSS) enact the same approach while reporting on educational systems globally, and measuring the improvement they gained.

To conclude, there is a need to change the perspective on educational improvement. States that will continue on focusing on a one facet linear approach might not be able to keep their relative advantage in the rapid changed global society. The focus on achievements and gain in achievements might be very costly having a tradeoff between achievements' gain and creativity.

We hope the nation state policy makers and global actors that shape the future of our societies will reform the policy of evaluating educational improvement to comply with the recommendations of this work.



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***Complexity, Accuracy, Fluency:
A New Paradigm for Language Education and Cross-Cultural Communication***

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Introduction

The question of this (ongoing) research is: can we help language learners (L2 learners) to become more proficient on the basis of the CAF construct (Complexity, Accuracy, Fluency)?

Background

The notion of what it means to be proficient in a language has advanced significantly in recent years, with L2 proficiency seen not as a unitary construct but rather multi-componential and captured by notions of complexity, accuracy and fluency (Housen, Kuiken, and Vetter, 2012). As the simplest level, complexity is characterized as the ability to use a wide and varied range of sophisticated structures and vocabulary in the L2, accuracy as the ability to produce target-like and error-free language, and fluency as the ability to produce the L2 with native-like rapidity, pausing, hesitation, or reformulation (cf. Ellis, 2003, 2008; Ellis & Barkhuizen, 2005; Lennon, 1990). With the cognitive turn in L2 research, the status of CAF as principal and distinct dimensions of L2 performance and proficiency has now been justified both theoretically and empirically. However, the CAF construct has largely been used in L2 instructional settings as a language-performance assessment tool, a means of assessing a learner's language ability or improvement, rather than in a manner that can be considered "instructional."

There are many debates about the fundamental conceptualizations of complexity, accuracy and fluency, both separately and in combination and many research-related questions remain problematic. The questions regarding CAF that Housen, Kuiken, and Vetter (2012) identify include:

- (1) the definition of complexity, accuracy and fluency conceptualized and defined as scientific constructs;
- (2) the nature of the linguistic correlates and cognitive underpinnings of CAF;
- (3) the connections and interdependency of CAF in both L2 performance and L2 development;
- (4) the empirical operationalization and measurement of CAF; and
- (5) the factors that affect the manifestation and development of CAF in L2 use and learning.

While these are important questions, this paper takes the position that the conceptualization of a combinative model of complexity, accuracy and fluency is most meaningful when organized and applied in a means that both contributes to language development in an instructional paradigm while also guiding effective communication. This is a reflection of the potential found in theoretical claims regarding the major states of change in the L2 system that accompany increasingly adept manipulation of CAF as found in internalization, modification and proceduralization. Internalization of new and more L2 elements means that more elaborate and more sophisticated L2 knowledge systems are developed, contributing to complexity. Modification of L2 knowledge implies that learners restructure and fine-tune their L2 knowledge, meaning that they become not only more complex, but also more accurate. Finally, proceduralization of L2 knowledge—which is to say routinization, lexicalization and automatization—leads to greater performance control

and fluency.

Definitions and Relevant Constructs

Complexity as a notion has been used in reference to two different notions: linguistic complexity and cognitive complexity. Linguistic complexity is an objective given, independent from the learner and referring to the intrinsic formal or semantic-functional properties of the L2 elements (forms, meanings, and form-meaning mappings). Cognitive complexity is relative and subjective, referring to the difficulty with which language elements are processed during L2 learning and L2 performance, as determined in part by the teaching approaches and the learners' individual background. Accuracy, or correctness, refers to the extent to which an L2 learner's performance (and the L2 system that underlies this performance) deviates from a norm (usually the native speaker) (Hammerly, 1990; Wolfe-Quintero et al., 1998). Such deviations have been traditionally labeled 'errors.' Questions include the nature of the error and the criteria for evaluating accuracy and identifying deviations. Therefore, Housen, Kuiken, and Vetter (2012) argue that accuracy should be interpreted narrowly on the one hand and incorporate aspects of (contextual) appropriateness and (situational) acceptability on the other. Fluency has been used to refer to a user's global language proficiency, particularly in terms of ease, eloquence, 'smoothness' and native-likeness of speech or writing. A multi-dimensional definition of fluency would also include: speed fluency (rate and density of linguistic units), breakdown fluency (the number, length and local of pauses), and repair fluency (the false starts, misformulations, self-corrections and repetitions). In this sense, fluency is usually viewed solely as a phonological element (as opposed to including lexical, morphological, syntactic, socio-pragmatic, etc.).

The question is how these three components operate together in the area of communicative language production is also important. Two major models have been offered to explain the cognitive, linguistic and psycholinguistic aspects of CAF, based on the role of attention, working memory, automatization, reasoning and other cognitive processing mechanisms. The Limited Attentional Capacity Model (Skehan, 1998) argues that humans have a limited information processing capability and L2 users must therefore prioritize allocation of attentional resources during task performance; attention focused on one area of CAF will lead to a loss in other areas – a 'trade-off' model. In contrast, the Multiple Resources Attentional Model (Robinson, 2001, 2005) assumes no such limits. Rather, users draw on multiple attention pools simultaneously and therefore L2 complexity and L2 accuracy combine and act together – a 'rich get richer' model.

The factors that affect CAF are linguistically internal and external. Internal linguistic factors include: linguistic features (items, patterns, constructions, rules that control or influence various forms of syntactic linking or multi-word constructions and so on). External factors include: learner variables (extraversion or anxiety, socio-affective factors such as motivation, cognitive factors such as aptitude); type of pedagogic intervention (explicit versus implicit instruction, different types of feedback) and other contextual factors. Of particular interest is task variables, such as the conditions under which the task was performed (monologic, dialogic, multilogic, oral or written, task objective and task complexity). Robinson (2005) outlines cognitive resource-directing versus resource-dispersing in such elements as amount of planning

time, reference to ‘here and now’ versus ‘there and then.’ The sheer number of CAF measures available is thus daunting and reflects the lack of consensus on how complexity, accuracy and fluency are defined as constructs. Moreover, questions arise as to computation of CAF metrics and their reliability and validity, as well as comparability, both in terms of measures of performance and development. Norris and Ortega (2009) have called for more organic and sustainable measurement practices and Ortega and Iberri-Shea (2005) pointed to very little longitudinal research – to which might be added approaches that are more instructional. Vercellotti (2012) found that development in an instructed environment yielded similar growth trajectories regardless of differences in starting points.

In terms of learner development, a possible scenario has been offered in the following cyclical overall development sequence: complexity > accuracy > fluency. The internalization of more complex structures leads to more complex interlanguage systems – resulting in greater complexity, followed by modification of the internalized structures – leading to greater accuracy, and finally, the development of performance control – resulting in more fluency. However, this is intuitive, speculative and likely simplistic.

The Present Research

Language proficiency and effective communication, whether as L1 or L2, is multi-componential, manifest in the complexity of content, the accuracy of language and the fluency of communication. It is in the simultaneous regulation and variation of these three components that we provide for different combinations of concentration and focus on content, language and communication, respectively. This paper will define these three fundamental concepts independently and then consider them in combination, contrasting the normative ideal circumstance of high content complexity, high language accuracy and high communicative fluency with various scenarios that necessitate and accommodate different complexity-accuracy-fluency combinations, whether by design or by limitation. It is in this recognition of the variability of communication scenarios that both users and learners can better their communicative use of language, whether as L1 or L2, in its fullest capacity.

While based in an EFL/TEFL environment (Japan), this paper also speaks to the conference sub-themes as well. In terms of identity, language is a significant component of identity for both of L1 language speakers and L2 language learners. In terms of construction of knowledge, the research relates to understanding how knowledge is constructed by a speaker both in its purely linguistic form and through the challenge of communicative exchange. Finally, in terms of transformation, the research accepts the premise of multiple global ‘Englishes’ as well as cultural patterns of communication that act as factors in social and political development.

In the present Instructional Design, operationalization of CAF follows introduction and familiarization (internalization, modification, consolidation and proceduralization) of content through a ‘text.’ The CAF model is expanded to include ‘content complexity,’ ‘language complexity,’ ‘language accuracy’ and ‘various fluencies,’ as below.

The ‘Complexity of Original Content’ is composed of ‘Content Complexity’ in which

the TOPIC and TEXT can have either high complexity (e.g. nuclear power generation or globalization and free trade) or low complexity (e.g. school uniforms or vacation plans). The ‘Complexity of the Language’ reflects the TOPIC and TEXT in either high complexity (e.g. nuclear power as a highly technical topic or multiple justifications for company uniforms) versus low complexity (e.g. nuclear power explained simply or the relatively transparent reasons I liked my school uniform). The ‘Accuracy of the Language’ is similar to the ‘Complexity of the Language and relatively straightforward in TOPIC and TEXT in communicative transformations from complex source to complex communication (e.g. nuclear power: technical source and technical explanation) and from complex source to simple communication (e.g. nuclear power: technical source but simple explanation). Finally, the ‘Fluency of Delivery’ reflects, for example, variations in ‘Time,’ usually in the form of limited preparation time versus abundant preparation time or limited presentation time versus unlimited presentation time, ‘Objective,’ as in an overview versus a more detailed view, and finally, in ‘Sociality,’ as in smooth and eloquent or very clear and highly articulated.

The Research

Objective: identify general instructional activities that combine a ‘text’ with ‘communication of text content’ and will provide for ‘experiencing / experimenting’ with CAF. Multiple and variable CAF activities were undertaken across different classes (five classes; N from 12 to 35 students) over the course of a university academic term. Interaction with TEXT versus TOPIC varied extensively and responses were in written form to facilitate high participation and feedback.

The complexity characteristics were a function of the TEXT (use of original vocabulary and structures) and the TOPIC (detail of explanation and language level). The accuracy characteristics were evaluated on the basis of lexical miss-choices and grammatical errors. Fluency characteristics were a function of time limitations in combination with the resulting complexity and accuracy as evaluated by the researcher and complexity, accuracy and fluency on the basis of self-evaluations.

Results Summary

This data collection and assessment scheme is ethnographically rich and includes quantitative assessments and qualitative implications. It is longitudinal and varied in form and practice. It is outcome-oriented as well as instructional.

DATA SET KEY:

Descriptive Information	1. date/group 2. Text or <i>Extended Reading Aloud</i> (experimental text) 3. Faculty of Education; General Education
CAF Descriptions	CC: Content Complexity; CL: Language Complexity AV: Accuracy: Vocabulary; AG: Accuracy: Grammar FTP: Fluency Time Pressure; FTNP: Fluency Time No Pressure
Assessments	tchr (teacher assessed) versus stu (student self-assessed); high, moderate, low

Data Set No. 1

This exercise used *CLIL Global Issues* (Sanshusha), Chapter 4, which focused on

‘healthy eating habits.’ The activity consisted three steps. The first was listening to a conversation and making notes on the content in Japanese and then rendering these notes in English (a; five minutes). For this section, teacher assessment of complexity, accuracy and fluency was moderate. Then students were allowed to read the transcript of the conversation while listening to it. With the transcript in view, students are again asked to outline the content of the conversation (three minutes). Although all students self-reported that the time constraint was slightly negatively influential, complexity also improved dramatically. The second step of the activity was to allow students to read a long text on the topic written in Japanese. They were then asked to write a brief summary of the main ideas in English (b; 10 minutes), with teacher assessment indicating high content complexity – understandable given that students should have full understanding of the complex content in Japanese – with lower assessments for language complexity and use of accurate vocabulary. Use of a dictionary was inhibited by the time constraint that covered both the reading and the summarizing of the text. The third activity was to read the same text in English, for which a summary was written (c). For this no limit was imposed and the CAF assessments were high (completion was generally 20 minutes). This activity is an example of CAF applied to a multi-modal treatment of content through different communicative genres – a conversation, a Japanese text and an English text. It reveals the power of viewing and the potential for content complexity across languages.

Task	Source	Factors	CAF characteristics
1. summary 5/26 FacEd 2	a. conversation (English; w/transcript) b. Japanese text c. same text in English	a-a. no view a-b. with view of text b. with view of text c. summary 7-12 sent. no time limit	a-a. C mod., A mod., F mod. a-b. C (complexity) improves b. CC very high, CL/AV low c. all CAF high

Implication: repeated exposure to similar texts improves complexity.

Data Set No. 2

This activity involved the reading of ‘content text’ by the teacher, with the students imagining retelling the content to a partner. Preparation time was five minutes. Initial student self-assessment was that their content coverage and complexity was high. Further assessment with viewing of the original text revealed to students that their summary was highly original in terms of accuracy to vocabulary and grammar of the ‘content text.’ This activity is an example of ‘content text’ introduced orally followed by retelling. It also reveals high originality when focusing on content.

Task	Source	Factors	CAF	characteristics
2. story retelling 1 5/30 FacEd 1	a content story (new material; in English)	one oral reading by teacher	CC high, but highly original i.e. AV/AG to original text low	

Implication: there is tension between complexity of individual expression versus adherence to the vocabulary and patterns of the original text.

Data Set No. 3

This exercise has three summarizing/opinion tasks, allowing students to choose three

different units from the *Extended Reading Aloud* text being used in class and, after having time to read the passages, summarize and offer an opinion on the contents under three different time constraints. For each of the three, students were asked to indicate their 'satisfaction' with content, accuracy (vocabulary and grammar) and fluency (time constraints). The teacher then assessed the summaries/opinions. For the first summary/opinion (five minutes), content was judged 'satisfied' by both students and teacher, accuracy was judged 'satisfactory' by the teacher, and time constraint was not a factor. For the second summary/opinion (three minutes), the levels of 'satisfaction' for content and time constraint decreased, whereas accuracy remained at the level of the first summary/opinion. The third summary/opinion (90 seconds) was a speed test, with students generally 'unsatisfied' about content while the teacher was and students generally 'satisfied' about accuracy while the teacher was not. This activity reveals how students react to different time constraints as a fluency control, with students 'satisfied' with their accuracy across the three time constraints (while the teacher was not) but with 'satisfaction' regarding content decreasing with increasing time constraint on the part of students (but not for the teacher).

Task	Source	Factors	CAF characteristics
3. summary/ opinion 6/6 FacEd 1	choice of text unit <i>Extended Reading Aloud</i> (studied content)	3 summaries 3 different time constraints	AG (stu) high both FTNP and FTP for tchr AG low(er) for FTP: stu CC decreases tchr CC mod-high

Implication: time constraints have potential to act as a fluency indicator.

Data Set No. 4

This exercise is similar to that of Data Set No.3, however, undertaken with students in a General Education course and limited to one summarizing/opinion task together with slight changes in the self-assessments. Students were allowed to choose a unit from the *Extended Reading Aloud* text being used in class and, after having time to read the passage, summarize and offer an opinion on the contents. The assessments included 'content complexity satisfaction,' 'time pressure' and 'delivery confidence' (if asked to give an oral presentation using the prepared notes). High 'content complexity satisfaction' was associated with lower 'time pressure' self-assessments and lower 'content complexity satisfaction' was associated with higher 'time pressure' assessments. This confirms the content complexity-fluency relationship. Interestingly, students who self-assessed their content to be high indicated lower confidence in oral delivery and those who self-assessed their content to be low indicated higher confidence in oral delivery, indicative of a self-regulating mechanism regarding the transition from written to spoken performance.

Task	Source	Factors	CAF characteristics
4. summary/ opinion 6/10-11 GenEd 1-2	choice of text unit <i>Extended Reading Aloud</i> (studied content)	5 min. preparation with text; 5 min. writing	FTNP=high stu CC (tchr CC high) lower stu CC (tchr agrees) = FTP

Implication: there is a link between complexity and fluency; either both as high or both as low.

Data Set No. 5

This exercise partially repeated that of Data Set No. 1, with a first step consisting of a reading of a highly ‘content complex’ text in Japanese, with the task being an English summary under no time constraints but a target of 7-12 key sentences. This produced high similarity of content countered by high variability of sentence patterns. The second part of the task was to simultaneously ‘listen and read’ an English text of the same content, after which students could ‘rewrite’ their original summaries. This yielded three different revision patterns. The first was a rewriting of the original in terms of content, but with higher focus on accuracy. The second was a reformulation of the original content, with a focus on the complex language of the English text along a focus on the sentence patterns. The third pattern revealed very little revision of the original text, but rather a focus on adding new content, constituting a focus on complex content.

Task	Source	Factors	CAF characteristics
5. summary 6/16 FacEd 2	a. extended Japanese text (high CC): summarize in English	no time limit target: 7-12 sent.	content highly similar, CC high forms varied, CL,AV/AG
	b. same content in Engl. English text-rewriting	no time limit target: 7-12 sent.	three patterns: (1) original rewritten, focus on AG; (2) reformulation same content, focus on CL/AV-AG; (3) additional sentences, focus on CC

Implication: the combination of a Japanese language source (rich comprehension) to an English language summary (with no time limit) yields both content and language complexity.

Data Set No. 6

This activity involved the re-telling of an illustrated children’s story after the story had been read aloud to students along with being shown on an OHP projector. The content complexity and language complexity of the story was low and the ‘re-telling’ included preparation of notes and an oral performance. Comparing student self-assessments with teacher assessments, the teacher judged the content complexity of the re-tellings higher than students, meaning that the teacher felt the re-tellings were sufficiently complex whereas students did not. However, on all other assessment criteria (language complexity, accuracy, and fluency: performance smoothness and fluency: speaking clarity) found that students assessed their performances higher than the teacher. This seems to contradict the self-regulation assertion from Data Set No. X above, as students didn’t feel their re-tellings were sufficiently complex – whereas the teacher did – while they felt all other aspects were more successful than the teacher’s assessment.

Task	Source	Factors	CAF characteristics
6. story retelling 2 6/30 FacEd 2	children’s story (in English)	one reading (text+pictures) notes allowed	CC: tchr assess higher than stu for CL/A: tchr assess lower than stu i.e. stu thought their language was better, but their content was worse

Implication: there is potential for student self awareness and self-regulation of a CAF paradigm.

Data Set No. 7

This activity used the class text *Extended Reading Aloud*, with all students using the same unit (Unit 9: *Free Trade and Globalization*). The activity involved a silent reading of the text content, followed by reading aloud by the teacher and a brief overview by the teacher accompanied by outline notes on the classroom blackboard. Students then had ten minutes to summary/opinion of the content; there was no student self-assessment in this activity. The teacher assessed the written responses on the basis of volume (length: number of words and number of sentences) and complexity (number of idea units); notes were also kept regarding clarity of the overall passage. Three ‘successful’ groups were identified. The first group was a high volume, high content complexity and content language, and high accuracy group: those who could both effectively and accurately combine the passage content with grammatical accuracy. The second group was characterized by moderate volume and content (both complexity and language) with high accuracy. This group was accurate with limited content capability or focus. The final ‘successful’ group was communicatively successful, but with minimal content and minimal accuracy characteristics. Finally, there was a ‘limited’ success group, where responses lack content altogether and consisted of opinion statements such as ‘I agree with the local farmer.’ These groups indicate existence of a ‘content focus’ group, a ‘text focus’ group and an ‘content-accuracy minimal’ group. The ‘content focus’ group appears to have sufficient CAF capability to generate complex content and opinion while also using text language and ensuring accuracy. The ‘text focus’ group appears not to be able to generate content complexity, but can use text language and ensure accuracy. The ‘content-accuracy minimal’ group appears to be able to communicate CAF minimally.

Task	Source	Factors	CAF characteristics
7. summary/ opinion 7/1-2 GenEd 1-2	text unit (same) <i>Extended Reading Aloud</i> (studied content)	tchr reading to stu tchr outline provided 10 minutes generally: TPNP	three groups: 1. CC high, CL high/mod, AV/AG high 2. CC mod, CL mod, AV/AG high/mod 3. CC low, CL low, AV/AG mod (4. ‘limited success’ group)

Implication: there is evidence of three stratified groups in which complexity and accuracy are linked.

Data Set No. 8

This activity also used the text *Extended Reading Aloud* in a three-part exercise, with student self assessments of ‘content quality,’ ‘grammatical accuracy’ and ‘time pressure fluency.’ For the first exercise, a highly familiar and personal topic (*uniforms and school uniforms*) was chosen, but no text review was allowed and five minutes were given for response. For this topic, despite not having access to the original text, volume as assessed by the teacher was high, while students self-assessment of volume was low. However, there was only limited connection to the source language in terms of vocabulary or sentence patterns. This pattern was true both for those who indicated no time pressure as well as those who self-assessed time pressure. Moreover, the level

of grammatical accuracy was moderate to low. The second exercise took up another topic that was fairly familiar and personal (*use of various media as information sources*), again with no text review, but the exercise allowed for a five minute 'preparation' with other students followed by 8 minutes of response time. The text identified and focused on three possible information sources (newspapers, online news sites, blogs) and students self-assessed their content complexity to be moderate to high (an increase over the first exercise), an assessment supported by the teacher. Interestingly, there appeared to be a logical mis-match between complexity and time pressure: those that exhibited high content complexity reported higher time pressure and those with lower content complexity reported lower time pressure. As above, self-assessed accuracy was moderate to low. The third exercise of the activity allowed for a five-minute partner/group preparation using the text on a highly policy technical topic (*who is responsible for protecting the environment: government, business, or individual citizens*) with an eight-minute response time. Three response groups emerged. The first group exhibited high content complexity that was highly original and not based on the text. However, teacher assessment of the accuracy was low. The second group exhibited high content complexity based either on the content of the text or on use of the language and patterns of the text. Students in this group self-assessed the accuracy of their responses as low in accuracy, which the teacher assessed more broadly, some positively and some negatively. The last group self-assessed themselves a low on all CAF scales, an assessment the teacher agreed with.

Task	Source	Factors	CAF characteristics
8. summary/ opinion 7/11 FacEd 2	text unit (same) <i>Extended Reading Aloud</i> (studied content)	three summaries 1. uniforms no prep / 5 min. 2. news source 5 min. prep w/mate (no text) / 10 min. 3. the environment 5 min. prep w/mate + text / 10 min.	1. simple/personal topic CC high at individual level, but low for source; FTP mod-high; AG low 2. more difficult topic/ three choices stu assessed CC high; tchr agrees. CC/CL high=FTP; CC/CL mod=FTS 3. highly complex topic/ three views and three groups: grp 1: CL=text, low assessment A grp 2: CC=original/high; tchr low grp 3: CC=text; CL/A low

Implication: there are complex patterns in competence between personal topics and technical topics.

Data Set No. 9

This activity was also based on the text *Extended Reading Aloud*, with students free to choose a unit of interest with a 20 minute preparation time and 15 minutes to prepare for what was outlined as an oral presentation. Given the length of both preparation (reading and thinking) and writing time, the variation in responses was broad and self-assessments were not taken; however, four groupings could be identified, discerned on the basis of text influence and content originality. The first group was characterized by high content originality together with high content complexity – the latter a reflection of text influence. However, this was countered by low content language complexity and low language accuracy. The second group was similarly characterized by high content originality, but which was countered by only moderate content and language complexity – reflection of a lack of text influence – and low accuracy. The final two groups were characterized by lower originality, which in one

case was countered by high content and language complexity, together with high accuracy, a reflection of text influence. In the other case, content and language complexity were moderate to low, with accuracy also teacher assessed as low. This exercise reveals a tension between positive text influence, where the learner internalizes the text complexity and accuracy, versus learner originality, where the influence of the text can be quite variable.

Task	Source	Factors	CAF characteristics
9. summary/ opinion 7/15-16 GenEd 1-2	text units (choice) <i>Extended Reading Aloud</i> (studied content)	20 minute prep. 15 minute written response	four patterns: (ORIG: originality) 1. ORIG high / CC high / CL low / A low 2. ORIG high / CC mod / CL low / A low 3. CC high / CL high / ORIG low / A high 4. CC mod / CL mod / ORIG high / A low

Implication: there appears to be tension between ‘content complexity’ versus ‘content originality’.

Discussion

Points of the research:

1. The activities of the research were based on an ‘experimental text’ (*Extended Reading Aloud*, various introduced texts, and a children’s story) that were ‘studied’ rather than on a performance ‘task.’
2. The dominant character of the activities was based on ‘summarizing’ content and offering an ‘opinion statement’ regarding the content.
3. In addition to basing the activities on ‘studied content,’ various ‘preparation’ and ‘activity’ formats were used while advising students to focus on different aspects of complexity, accuracy and fluency.
4. Assessments of the three areas (complexity, accuracy and fluency) were subjective self-assessments and relatively objective (based on experience and internal comparability) teacher assessments.
5. The patterns that were observed focused on Content Complexity and Language Complexity; Vocabulary Accuracy and Grammatical Accuracy; and Fluency as a function of Time Pressure or No Time Pressure.
6. The findings are very generalized (much of the statistical analysis of various aspects of CAF have failed to yield either consensus or statistically valid findings) and based on various combinations of observation, subjective assessments of written samples, student self-assessments of task success given various constraints (character of the text, level of familiarization and preparation, time allowed for ‘written communication’).
7. There appear to be three groups described by their ‘focus:’ learners who:
 1. focused on content as content and content as in the language of the original text: content complexity and language complexity focus
 2. focused on content complexity that reflected an original content based on their ideas or opinions: original content complexity focus
 3. focused on accuracy, with limited focus on content: language accuracy

focus

8. Time - in this research, serving as a fluency factor - was cited as a factor . . .
 1. the relationship to complexity and accuracy mixed
9. Regarding self-assessment . . . self-awareness and (eventually) self-regulation
 1. students tend to self-assess their complexity lower than the teacher
 2. students tend to self-assess their accuracy higher than the teacher

Summary of Language Education and Cross-Cultural Communication CAF Research

Based on use of a 'reading aloud' text, summarizing activities revealed that there are students who clearly focus on language complexity – in the form of the language of the text – and there are students who clearly focus on content complexity – in the form of more original content. In addition, there are students who focus on accuracy, often without completely achieving notable accuracy gains while also suffering some content quality. Finally, in an instructed environment, self-assessments can be used to create self-awareness and self-regulation of differing prioritizations of Complexity, Accuracy and Fluency.

The logo for IAFOR (International Association for Frontiers of Research) is centered on the page. It features the word "iafor" in a lowercase, sans-serif font. The text is surrounded by a large, stylized circular graphic composed of several overlapping, curved lines in shades of blue and red, creating a sense of motion or a globe.

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**Concept Deficiency: Remediation Alternatives for Teachers of
Students working on Masters and Doctoral Dissertations:
Pedagogical Insights from Recent Brain Research**

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Abstract

Teachers have noted experiences of student conceptual formation difficulty in the production of theses and dissertations. The authors evaluated pedagogical approaches used to handle these normal research tasks. They sought research-supported ways for helping students to conceptually frame and shape patterns of refined descriptive and causative associations found within complex subjects. Criticism of a student's conceptual development capacity both within and outside the educational system expressed in both reading and writing challenges continues to be set apart from graduate department remediation efforts. Beyond experienced failure rates and especially the failure found among diverse and lower socio-economic groups, there are reports that over a third of doctoral students fail to cross this "threshold of knowledge" due to these deficiencies. Despite these facts, concept deficiency problems continue to lack teacher response.

Realized insights from brain studies and extrapolations of work done in socio-linguistics, sociological and psychological graduate teachers' responses to concept framing and development continues to be minimal. The insights of J. Paul Gee clarified the socio-economic and cultural nature of the conceptual difficulties problem. Articulations of brain research in the work of G. Edelman, E. Goldberg, and T. Deacon along with the pedagogical insights of D. Siegel and J. Duncan provided the foundation of the remediation method assessed by the authors. This realized pedagogical rationale and remediation involves recognition of brain facilitated abstract pattern making and an intensive refining of association, discrimination, and integration processes carried out within an ambience of teacher student attunement.

Keywords: conceptual formation, remediation, pedagogy, socio-economic

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These remarks may indicate why thinking, the quest for meaning ... has so often been felt to be unnatural, as though men, whenever they reflect without purpose, going beyond the natural curiosity by the manifold wonders of the world's sheer thereness and their own existence, engaged in an activity contrary to the human condition. In all such reflecting activities men move outside of the world of appearances and use a language filled with abstract words which of course had long been a part and parcel of everyday speech before they became a special currency of philosophy. For thinking, then, thought for philosophy, technically speaking, withdrawal from the world of appearances is the only precondition.

Arendt (1978) pp. 78-79

Introduction

During the past decade, revelations of research on the Genome and, more recently, the use of various technologies (most recently of fMRI brain imaging) used to reveal the fact of brain plasticity (Doidge, 2007, p.292; Schwartz & Begley, 2002) have created a new awareness of the meaning of emergence. While these results have significant implications for the core tasks of pedagogy on all levels, cautious hopes for consilience between and even within disciplines has continued to founder far from the carefully stated objectives of teacher's lesson plans.

First, in practical terms, near revolutionary technological and theoretical advances have done little to bring about intra- and inter-disciplinary togetherness. Second, effective melding of theoretical revelations of hard and soft science research were not only *not* actively sought by the majority of the researchers themselves, researchers that laid out clear cut connections to the learning process did not, for the most part, apply them to the daily work of teachers and mentors. Third, when indications of relevant research created new understandings of brain function even more accessible psychological focus on cognition went largely unnoticed and uncommented upon by most educators.

After fifty years of education both inside and outside educational institutions, the authors' experience did not prepare them for teachers' lack of awareness of the term "plastic" in the sense of experience and learning that restructures the brain itself. Symptomatic of this lack of knowledge and/or interest indicates that (a) not only had educators generally not heard of the term, *plastic*, as applied to human thought, but (b) their understanding seemed so far on the fringes of learning and the brain that, for the most part, teachers could not begin to contest its application or implications to the work they do every day. Also, despite the healthy resurgence of the value of "self-work" and self-communication arising out of both fMRI revelations and research extrapolations derived from brain damage work (Damasio, 1999, 2003, 2010) these studies were still identified with those who found "talking to oneself" an imaginatively questionable form of folk psychology. This is a significant distortion of the known fundamentals of self-to-self communication found in much of the basic brain research carried out in the early 1970s and beyond (Damasio, 2010). Referring to the fMRI research of Kalina Christoff, Stein (2007) writes:

"Whereas the PFC [prefrontal cortex] zone are dominant when we process externally generated information...the fronto-polar areas evaluate information

that cannot be perceived from the external world, but is generated from the contents of the mind itself” (p. 91).

Siegel (2007) writes that direct teaching about the brain itself can also support reflection:

When people - children, teens or adults – learn about the correlations between brain function and structure, neural development and the impact of experience and how their lives unfold, a kind of discernment develops in which people come to see their own minds in a new light. (p.273-4)

When we extend this awareness to the kind of self-work necessary for developing refined concept formation, we find even more distance between teacher-constructed courses and brain researchers’ work with the self. Every aspect of communication is a major part of the undergraduate and graduate curriculum; despite this *everyday academic fact*, we find a lack of course work available in the moment-to-moment, intrapersonal communication with the self.

Once engaged, the teacher will find a refreshingly optimistic clarity to be found in the “discovery” of understanding in the material realizations of the self-to-self dynamic and its stunning role in the everyday thinking of all human beings. The weight of this realization:

“...seems to have made an incredible quantum jump. We now experience the totality of these impulses as forming a distinct self, capable of taking charge of the domain of consciousness and deciding which feelings or ideas have precedence over the rest...” (Csikszentmihalyi, 1993, p.23).

This optimism has led to the awareness of the possibilities of mindfulness. Siegel’s (2007) work in the area of mindfulness is so clear: “...we are suggesting that this same social cognitive circuitry is harnessed for the intrapersonal resonance of mindfulness as is used when we have compassion and empathy for others. We can propose that this involves a form of self-empathy...” (p. 354).

Despite the research in biology, sociology, anthropology, let alone such exotics as socio-cultural and socio-linguistics study, these insights are relevant for teachers. Nevertheless, the graduate teacher’s desk affords so little space for ideas of new depth while his or her role is focused on the organizing of one’s immediate classes or the mulling over anxious political speculations about the next curriculum committee. Blame for this anemic response can be found in nearly all quarters of academic effort from hard and soft science research’s narrow focus on “smallness” to teachers all too ready to be impressed with workshops that find statements like, “We want students to learn to learn” to be filled with serious profundity.

The research of Frost (2014) and others found that teachers readily order texts in graduate courses largely untouched by the application of research in management realized in the past two decades. Not only do the texts fail to note the implications of recent research, the teachers seem not well read enough to notice that researchers’ most recent understandings have been orphaned by both the authors and publishers of text books in favor of work done largely in the 50s and 60s. In the end, teachers are

deeply complicit in their lack of active interest in accessing available insights into directly related areas of hard and soft science research and/or in the practical applications of this research to subjects as divergent as medical and managerial studies. All of this “dumbing down” despite the fact that “evolution carved out in the brain design a space for *tabula rasa*, but one empowered by an exquisite neural capacity for processing complexity of any kind and filling itself with content” (Goldberg, 2005, p. 105).

When utilization of this “space” is engaged, on both the teachers’ and the students’ part, more energy is expended as multi-level “scaffolding” of conceptual thought progresses. Deacon (2012) describes the exciting and very human dynamic involved in this elevation of thought toward more refined concept formation. When we “scaffold” conceptual work above the surface thinking of subjects in multiple (more than one) levels, we humans can begin to experience the expenditure of more directed effort:

And the more differentiated the mental content and more present to mind, so to speak, the more elevated the regional network metabolism and the more organized the attractors of network activity. The level of differentiation achieved should be correlated both with sustained high levels of activation and with the length of time this persists. Generating more precise mental content takes both more “effort” and more sustained “focus” of attention. (Deacon, 2012 p. 519)

Whether qualitative or quantitative, descriptive or causative, a review of recently published dissertations and masters theses indicates only episodic instances of teachers and students driving toward progressively refined multi-level discovery. Even more rare is the clear intention to call recent theory or practically established understandings into question. All too often this surface level graduate teaching restricts focus on knowledge in a way that calls for very little beyond a serviceable short-term memory and demonstration of barely-below-the surface abstract knowledge. As teachers go from semester to semester, thesis to dissertation, they are not feeling an expenditure of “effort” and “focus” largely because they are not co-actively working with students to develop the more refined concept development found in new levels of “differentiation ... correlated both with sustained high levels of activation” (Deacon, 2012).

From the first two years of higher education to the first years of graduate school, these students, having experienced as much as 16 years of this kind of surface level mentoring, repeat the sad story of concept formation failure written before the first hours of graduate research methods. Surface level, largely descriptive and only rarely causative concept-formation, is found as the central thrust of the graduate school challenge. However, even with no challenging demand to “go deeper” is made among mainstream educationally privileged teachers and students, the more serious lack of a mentored history of conceptual awareness among non-mainstream students persists through to lower achievement scores. Socio-economically disadvantaged students, after years of social passes, resign themselves to premature withdrawal.

Too often, teachers have translated “terminal degrees” into a role justification for terminating anything beyond the most topically presented interdisciplinary reading.

Pages of yellowed lectures have been replaced with “pre-packaged” modules where a “click” can locate illustrations of materials meant to act as a learning safety net. In those instances where these surface-level courses have not been made simplistic enough, a further “dumbing down” level of “work” and “effort” can be found. Every pedagogical meeting is exerted to make these pre-packaged concatenations of simplex thought more accessible and less effortful for students. In replacing discovery with theses and dissertations that skate over slowly warming but highly structured surfaces, the “quest for meaning” objective and more complex originality are all but forgotten. After almost three years of this structured adherence to the departmental manual, a doctoral student concerned about the supposed need to make some originally discovered connection asks his dissertation mentor “What do I do after chapter four?”

None of this organized and carefully tutored simplification of our increasingly complex world has gone unnoticed. Arendt (1978) has indicated the need for increased shaping of ever more refined pluralistic associations available to those trained in managing and mentoring student attention and concentration. Brain research relating to core objectives in learning and the relationships between teachers and students when engaged in learning have written about the value of thinking and Arendt’s “withdrawing” into the thinking “space.” Geertson (2003) writes:

This reflective, extrapolative thinking involves a broader focus and tends to enlarge thinking; contextualization directs attention to linkages that extend across multiple layers and consequences to human experience. This dimensional judging addresses the multi-dimensional nature of reality; theory building explores logical relationships between broad areas... (p. 12).

This separation of the thinker from his or her every day social “space” must be seen, generally as an entirely normal experience even when this “staring away” or noticeable lack of being engaged in valued work being done seems to teachers and others as being utterly *contrary to the human condition*. Far from a low interest in an interdisciplinary pedagogy, one would expect professors of so-called higher education to be the first to promote the advantages of moving toward this space. One would expect them to be arguing that doing this “effortful” work is natural and normal and so much more than a rarely engaged academic obsession.

More recently, among students faced with serious trouble in refined concept formation and development, there is a renewed effort to introduce students to the familiarity of mental withdrawal in concentration and attentive “reentry” work within this space of focused attention and concentration. Leshem and Trafford (2007) showed that “despite clarifying research questions and reading-around-their-subject *“one third of (doctoral) candidates* [emphasis added] still had problems in visualizing concepts within a framework” (p. 1). They found that “workshops for doctoral supervisors also show some unawareness of the pluralistic function of conceptual frameworks, consequently some supervisors encounter difficulties in guiding candidates on this issue” (Leshem & Trafford, 2007, p.1). In essence, the students inability to progress beyond descriptive accounts of facts to conceptualization of underlying theoretical perspectives restricted their learning and doctoral development (Leshem & Trafford, 2007). Needless to say, their “supervisors” can hardly help remediate a deficiency in pluralistic thought when thesis and dissertation mentors

have some difficulty holding the pluralistic complexity of pattern discrimination and abstract thesis formation in their own minds.

This inability to progress beyond the descriptive accounts of facts is an excellent indicator of a carefully structured but an entirely wrong-headed approach to teaching and learning, and especially reflective thinking in so much of higher and graduate education. Teachers have begun to make a clear but wrong-headed choice between the difficulties of complex thought to be found in discovery sought in masters and dissertation projects and the safety to be found in structuring evidence in the latest academic penchant for columns of analysis of “accepted journals” and “authors of the first rank” underwritten by the recent fad for Evidence Based Management and even more structure (Homes, D., Murray, S., Peron, A., Rail, G., 2006). Despite the normal availability of the brain’s facility to comprehend progressively discriminated patterns and refined concept formation, Damasio (2010) reminds us of the potential of the “environment of the mind”:

For example, as a possessor of extended consciousness, you are probably paying attention to a number different mental contents simultaneously: the printed text; the ideas it evokes; questions it raises; perhaps music or a specific noise somewhere in the house; and you yourself as a knower (p. 201).

Too often, teachers privileged with a middle to upper class socio-economic background accompanied by an above average educational experience underestimate the concept difficulties of a student with a different family and neighborhood, a lower class socio-economic culture and a distinctively different before-college educational experience. Teachers underestimate the K through 12 educational system’s incapacity for grasping student difficulties in understanding and expressing basic pluralistic concepts. Neither can they meaningfully empathize with students who struggle to think clearly enough to do research on subjects barely below the surface levels of most term paper demands. This lack of empathy on the part of the teacher is reinforced by a lack of the teacher’s own development in most recent understandings of learning and the brain. This deficiency leads willy-nilly to the assumption of an intrinsic lack of competency on the part of the student; only in very rare circumstances do teachers question their own competency or even their roles as mentors of concepts or transformative efforts potentially able to remediate student inabilities. Instead of remediation, teachers are satisfied with their efforts to “select out” those students as “just not made for graduate school.”

Institutionalized and ritualistically enacted and affirmed roles of the teacher of graduate school students allows less set aside social and mental “space” within the tightly networked and scheduled constraints of the educational system’s reifying culture. This is a system that year after year trains and demands a surface awareness pedagogy while it only episodically alters— for both teachers and students - anything like progressively refined scaffolding of in-depth, pluralistic knowing even in the minds of mentors of master’s theses and doctoral dissertations themselves.

The management of thought involves repeated reentry into consciousness in ever more refined ways within articulated environments of increased attention and concentration. Establishing associations of seemingly unrelated aspects of one’s research is the core reward for a student trained in refined and progressively

scaffolded concept development. Developing an abstract confirmation of discriminated associations and discovered patterns is a normally available “skill” of the brain. *The teacher need only develop the ability to explain this relationship between located patterns of associations articulated as abstract premises in ways the student finds understandable and creditable.* This is the pivotal point at which and in terms of which this article urges the teacher to step back from the pseudo-profundity of the most recent educator’s catchphrase. We believe teachers can and must penetrate the pedagogical crust of these increasingly reified simplicities with at least a modicum of interdisciplinary reading. This effort must include a serious analysis and review of qualitative or quantitative research and an even more accessible synthesis of research regarding the lack of basic utility of the “learning to learn” mantras of current teaching lore.

Remediation of Conceptual Deficiency

This article only outlines the concept “threshold” problem, its sources in both the teacher and the student and certain suggestions of a basic pedagogical direction for its remediation. Subsequently, the text of our co-authored book on concept formation is expected to be complete in late spring of 2015. At base, our work should be seen as an intense effort to understand the implications of biological, social-psychological and social anthropological research when applied to the remediation of concept work at the graduate level. This research offers significant suggestions for teachers as mentors of students working toward the development of potentially defensible abstract statements of discovered patterns of thought.

Surface Level Discourse

Gee’s (1989) work in *primary* and *secondary* discourse continues to offer fundamental insights for our understanding of the sources of difficulty in reflexive and reflective thought as they might play a role in conceptual framing and formation of abstract, progressively refined higher order thinking. In simplest terms, Gee places significant importance upon the *primary* discourse of the family and immediately available relationships as distinguished from the *secondary* discourses in the surround of formal education. Once understood, “diversity” of thought across all “diverse” groupings – while different in each strata and whether typified as racial, gender, or just lower socio-economic levels – give a renewed focus on the cultural disadvantages of the non-mainstream student in nearly all areas of thinking.

Teachers must confront the general perspective that supports the so-called “unnaturalness” of higher order thinking and abstract, and conceptual thought. This “unnaturalness” is actually the result of the exposure and participation of most students and their teachers to little more than surface-level discourse. This widespread tendency to devalue thought patterns beyond surface level reaction, directly or through omission, necessarily implicates a lack of occasion for experiencing complex pattern formation and exploring multi-level explorations even in everyday discourse.

Some people are more aware of certain layers of information than other people are. For example, the capacity to conceptualize the ‘nature of a relationship’ will vary quite a bit. Some individuals may take a phrase and expound on it for

hours on their pattern of relating with others. Others will hear the phrase and may only be able to respond with it is “good” or “bad.” These individuals may have the ability to form complex representations of relationships but these representations may be inaccessible to translation into words. (Siegel, 1999, pp.168-9)

Known as the “threshold problem” the difficulties experienced in concept development in higher education derive largely from little or no chronic exposure to in-depth concept formation in everyday and, even, to large extent, in common professional discourse. However, even when a student’s education (primary and secondary) affords minimal or episodic demonstrations of conceptual thought, remediation to the point of readiness for graduate work is wide open for “catch up” efforts. Given the brain’s natural inclinations, this normal effort is relatively open to basic pedagogical and recent brain articulated methods. Teachers who see some students as “naturally” not very “bright” and “naturally” incapable of the conceptual abilities demanded by graduate work are not aware of this readiness of the brain to do conceptual formation and expression. Supported by the most recent brain research, the authors of this paper have a strong “natural” bias: given available social space for concentration and attention, student reflective capacity for making associations within and among various aspects of simplex and complex patterns and abstract thesis confirmation is normally available in selectionistic and integrative facilities of the brain (Duncan, 2010; Edelman, 2006; Torey, 1999).

The Need for an Attuned Mentor

Since this “readiness to do conceptual work” is a normal brain facility, with an aware mentor, it is equally ready to be remediated. Successful remediation of these difficulties will most likely occur when using the interdisciplinary work of a transformable teacher. He or she acts as co-acting mentor in an attuned relationship of progressively managed concept transformation (Siegel, 1999, 2007). The suggested method of concept remediation recommends narrative commonly found to be a part of normal reflexive process. The method includes the explication of exercises in attention, concentration, and “reentry” management of an overall reflective process able to embed more conceptual and linguistic functions in the brain than the reflexive component alone. Teachers of graduate students challenged by theses and dissertations will become more effective when they *assume* that a student’s failure – no matter the nature of the student’s background - is primarily a teacher’s failure in the inability or refusal to interpret the student’s problem as a poorly framed pedagogical one. The problem is only as intractable as a teacher’s refusal to facilitate both the teacher’s and the student’s transformation and remediation. As Siegel (1999) puts it: “Systems achieve stability as they flow between these extremes in their movement toward maximal complexity. Within this optimal flow are connections of the processes both within a single mind and between minds” (p. 321).

Once the teacher has a basic understanding of this material, they can creatively grasp and untangle conceptual formation problems to the point of satisficing remediation. When an expertise in managed co-enacting attunement of resonant ambience progressively develops, the teacher will have begun the building of an effective learning platform. When this platform is achieved, a transformative trajectory can be constructed.

In this attunement approach, the teacher must enact the same multi-level model conversation with the student and facilitate the same discourse model they need to teach concept formation. They will be negotiating transference between working within the familiar layers of self-to-self conversation to the less familiar problem solving of interpersonal pattern discrimination. These twin approaches go together. The authors' of this paper's method argue for a concept remediation approach as one that should involve both mental and a cultural sources and resources with an emphasis on visual representation of internal and external communication. This method urges the use of visual modeling of autobiographical "layering" made transparent in the explicit examples of progressively defined scaffolding discourse as developed by Siegel (2007). Articulated in conjunction with the cognitive enclosure model of Duncan (2010) these adopted methods offer promising beginnings toward teaching concept development. Both of these enable the explicit use of "a form of internal modeling" that would "embody a representation of the spatial, temporal, and causal relationships among the events and entities of the situation described by the narrative" (Nersessian, 2008, p. 108).

Beyond Surface Discourse and "dumbing down."

The daunting challenges of teaching and the realization of accomplishing remediating efforts in concept formation and development underwritten by recent brain research offers new pedagogical vistas. The teacher and the student begin with an understanding available to both only very recently. Given this awareness they must comprehend their joint effort as a co-enacting one with a singular awareness. The implications of plasticity are so far-reaching. While all normal people can think, thinking is a gradient activity open to trained and untrained management abilities learned through exercises in the practice of critical, reflexive and reflective thinking. Again, when we learn well or when we learn only poorly, the brain is actively being sculpted. But, as far as we know, the brain is without intention. We are without a lot of evidence supporting some hidden teleological purpose.

While there is a resurgence of interest in the lack of achievement as noted in grade disparity among and between diverse groups identified in racial, gender and socio-economic "divides," that interest, in the graduate school, has accomplished little beyond ritualistic pattern of pseudo-concerns and faculty lunchroom hand-wringing over that divide's persistence. Irrespective of the group being taught, the teacher should be bound to develop the same gradient levels of "effort" and "work" required in the patterning and multi-level construction of concepts; They should take the same "extra" effort to teach construction of abstract premises that comprehend the student's "natural" readiness to locate qualitative and quantitative discoveries.

So much of this "effort" and "work" is facilitated naturally and normally for the teacher who understands and can communicate the facts of pattern association and discrimination and can relate plausible abstract formations in available basic brain function holds the future of mental conceptual performance. Selectionistic and integrative brain function can deliver "abstraction" to the student in more practical and usable ways. The student can learn to see abstraction as a *"key tool that allows human beings to move gracefully from one category to others, [emphasis added] and to perceive the world efficiently and to interact with it profitably"* (Hofstadter & Sander, 2013, p. 255).

Once these basic brain processes are understood by the teacher and are comprehended and found credible by the student, the enterprise of moving “gracefully” among the discovered patterns and levels becomes surprisingly realizable. The amount of effort needed on the part of the teacher is, again, surprisingly little with very rewarding outcomes.

(1) Even in the first stages of dawning awareness, the student will find the results of her work stimulating and motivating while, at the same time, the teacher can feel free to move from working with a “stuck” student to one of expanding first premise discoveries and the management of abstract work well into areas of more refined conceptual development.

(2) When teacher and student work together to attain ever more powerful attunement, they are creating between them the enactment of shared capacities involving “attunement, reflective dialogue, constructive narrative, memory talk, and the interactive repair of disruptions in connection are all fundamental elements of secure attachment and effective interpersonal relationships.” (Siegel, 1999, p. 336)

All of this and more derive from “the capacity for integrating coherence...from dyadic communication.” The promise of this inter-subjectivity “emerges with this horizontal form of integration is a new way of knowing, a bilateral consciousness. Horizontal integration enables us to broaden our sense of ourselves, as often distinct layers of processing of perception and thought, feeling and action, are brought into alignment” (Siegel, 2007, p. 303).

Our method relies on:

- (1) Orchestration of the autobiographical narrative as the fundamental vehicle for transferring the multi-level complexity of everyday pattern-making already a part of the student’s internal conversational history to the creatively attuned interpersonal milieu between a teacher aware of the selectionistic and integrative capacities of the brain;
- (2) Working with a student already on the edge of realizing the normal accessibility of these capacities in their intra-personal life can transfer this experience to an ever more refined and refine-able concept formation.

Use of the method briefly indicated in this short paper is certainly not the only approach for creating effective success in concept formation. But taken as a whole our method relies on the integration of recent understandings of core brain functions into teaching of fundamental aspects of concept formation: integrative functions like narrative; pattern discrimination and formation; iterative reentry into memory and consciousness along with the formation of abstract premises for creating and questioning theory. The brain can readily be implemented for engaged, reflective processes augmented by a knowledgeable, attuned teacher as manager of focused conceptual thought.

Even in these early days of workshop planning and teacher and student assessments, we are mindfully aware of the potential and the limitations of the various concept

formation facilities afforded by the brain and the need to transform traditional educational approaches when working with graduate students. Deacon's (2012) work is fundamental to both our understanding of brain function and our understanding of the thinking "space" demanded by reflective thought and the "self-initiated shifts" to that space required by work in graduate theses and dissertations:

"...self-initiated "shifts" in cognitive activity will require something analogous to work in order to generate, and that stimuli from within or without that are *capable of interrupting ongoing cognitive activities are also doing work what is contra-grade to current mental processes* [emphasis added]. ... Because of the time it takes for non-linear recursive circulation of these signals to self-organize large-scale network dynamics, mental content should also not emerge all or none into awareness, but *should rather differentiate slowly from vague to highly detailed structures. And the level of differentiation achieved should be correlated both with sustained high levels of activation and with the length of time this persists. Generating more precise mental content takes more 'effort' and more sustained 'focus' of attention* [emphasis added]." (pp.518-519)

While the material will be slightly more complex, the substance and direction of instruction will be fundamentally the same. If teachers' desire for more refined concept and theory is to be realized, work like Deacon's *must be made with more serious individual teacher effort*, more readily accessible. The product of this accessibility must be applied in work with students advancing toward serious conceptual development. Students will find the task of generating more precise mental content more effortful and the job of managing sustained focus of attention to be memorable challenges. Students need teachers to be committed enough to creatively relate this material and to teach the management of attention and concentration in concept work.

As the dynamics of the authors' workshops and, through practice, the exercises continue to be altered; the adaptability of these "short courses" in brain and learning is becoming evident. The authors are enthused by the applicability of recent research promising seriously advantageous remediation possibilities. After more analysis, trials, and teacher and student assessments, the authors will have the kinds of training, exercises, and visual representations to make this material more effectively and efficiently teachable for teachers of concept formation. The assessment approach currently being utilized in this work is based on the Sternberg (2010) Kaleidoscope assessment, which has been used at Tufts.

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***Bridging the Cultural-Linguistic Divide in the Standards-Based Classroom:
Storytelling as a Reflective Form of Academic Discourse***

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Abstract

In this paper, I theorize how Bakhtin's dialogism – a sociocultural approach that views learning not as an individual cognitive achievement, but as a social practice informed by the complexity of human interaction – reconciles academic discourse and storytelling in a compelling way. As a literacy approach, storytelling is widely considered as an effective way to bridge the gaps between meeting the demands of the Standards-based classroom and fulfilling the needs of English Language Learners. However, under the current paradigm of education theorizing, personal testimonies were often dismissed as an invalid form of academic knowledge.

Conceptualizing cultural discourse as dialogic utterance – premised upon the mutually conditioning of understanding and responses - Bakhtin's theory of discourse incorporates the vision of inclusion and diversity as a resource for learning and signals storytelling as a template to explore conflicting interests and complex interaction within contemporary life. His pedagogical approach to communication and literacy results in a new form of academic discourse that can be used to bridge the cultural-linguistic divide within the standards-based classroom.

Key terms: storytelling, academic discourse, cultural-linguistic divide, Bakhtin, dialogism

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Academic discourse in the context of the common core classroom

In this paper, I discuss critical challenges facing English Language Learners in developing academic discourse skills in the Standards-based classroom. Privileging academic discourse risks reinforcing the cultural-linguistic divide in public schools, and that, in turn, perpetuates social stratification and class distinctions. Building on Bakhtin's theory of dialogism, I argue that storytelling provides a template that can be used to bridge the gaps between fulfilling the needs of ELL students and meeting the Common Core Standards.

In recent years, fueled by Americans' fear that their children may lose their competitive edge in global economy, there has been a public outcry to raise academic standards in public education (Massell, 2008; Polikoff, Porter and Smithson, 2009; Shepard, Hannaway and Baker, 2009). In response to this crisis in the U.S. education system, in June 2010, the National Governors' Association launched a state-initiated educational reform in which a framework of learning standards was unveiled to set the expectations and guidelines for student performance (Achieve, 2011; Fletcher, 2010; Toppo, 2012). State by state, the Common Core Standards (CCSS) have been adopted as a means to measure student progress. One shift the CCSS make in curricular and instructional focus is the increasing emphasis on academic rigor in students' engaging academic discourse (Massell, 2008; Polikoff, Porter and Smithson, 2009).

Under the Standards, academic discourse is understood as ways of thinking and language use in both oral and writing forms that are practiced in academic settings. The skills that academic discourse requires include:

- Reasoning abstractly and quantitatively;
- Constructing viable arguments and critiquing reasoning of others;
- Constructing explanations and designing solutions;
- Engaging in argument from evidence; and
- Asking questions and defining problems (Hakuta, 2011)

Academic discourse understood as such has been used to measure students' proficiency in content-area studies and is considered as a vital skill for college and career success. Since the rollout of the Common Core Standards, academic discourse has increasingly taken on a new dimension of importance. As students are expected to demonstrate their proficiency in content-area studies through their engagement in academic discourse, teachers are pressured to develop skills to help students engage in academic discourse (Achieve, 2011; Fletcher, 2010; Hakuta, 2011; Toppo, 2012).

Academic discourse in each content area is highly specialized and often involves its own vocabulary, grammar, lexicons, patterns of reasoning and argumentation, and rules of regulation and application. Social studies may have its own terminology and pattern of argument that are specific to that particular domain while mathematics has its own. As a social practice, developing academic discourse skills involves a complex learning process that utilizes a myriad of literacy, linguistic and thinking skills. It involves meeting standards and mastering know-hows through diligent study and practice.

In order to help students develop academic skills/knowledge in highly specialized domains, schools play the role of initiating and apprenticing students into those practices that their future prospect may depend on. The linguistic and cognitive demands of academic discourse call for teachers to model, coach and drill students' basic skills. In an ideal Common Core classroom, students are provided with plenty of opportunities to practice ways of thinking and speaking sanctioned by the educational system, in both small and large settings. Teachers are also expected to provide ongoing feedback to assist students in mastering academic discourse skills.

The fact that academic discourse is embedded in social practices conforming to the standards and expectation of the majority of a larger academic community ensures the technicality of academic discourse. Its reliance on a set of standards, prior knowledge and know-how also makes those who have prior exposure to this form of knowledge advantaged and puts those who don't have at a disadvantage. In the American education system, the achievement gaps within public schools correlate with the cultural-linguistic divide. While academic discourse poses great challenges to most of the students, it is even more so for English Language Learners, who are expected to subject to same academic standards while still learning basic English.

Academic discourse skills as a form of social, cultural, and symbolic capital

Bourdieu's theory of the role of language in mediating power and privileges can be used to further illuminate the potential of academic discourse in reinforcing the cultural-linguistic divide within the United States public school system. Pierre Bourdieu was a French sociologist, anthropologist and philosopher known for his analysis of power relations in everyday life (Bourdieu, 1994). Much of his view on language and its role in mediating power and privileges evolves from his critique of Marxist theories of the role of economic capital in social positioning (Bourdieu, 1994). By expanding the notion of capital to include non-economic capital such as language among social factors that contribute to the perpetuation of social stratification and class distinctions, Bourdieu's work can be used to further address social and educational inequalities (Bourdieu, 1994; Bourdieu & Wacquant, 1992).

In accord with Marx, Bourdieu defines capital as the resource, the command of which enables one to maintain a position in the status hierarchy of society. "Capital" in this sense is capable of ordering the relation between people in any given part of social space (Bourdieu & Wacquant, 1992). The privileging of a form of capital over others is what accounts for the inequality existing within an educational system.

Bourdieu's analysis of educational inequality in terms of the privileging of certain forms of capital finds its echo in the American educational system. In the United States, access to linguistic competency in English can be translated into access to the discursive practices of school curricula. For ELL students who enter mainstream, content area classrooms with limited competency in English, access to the content of school curricula could be extremely challenging.

In societies characterized by a differentiated social structure and a system of formal education, linguistic competency is closely associated with academic success and material reward (Bourdieu, 1994, p.37-38; Bourdieu & Wacquant 1992). Bourdieu stated:

Since mastery of the legitimate language may be acquired through familiarization that is, by more or less prolonged exposure to the legitimate language, or through the deliberate inculcation of explicit rules, the major classes of modes of expression correspond to classes of mode of acquisition, that is, to different forms of the combination between the two principal factors of production of the legitimate competence, namely, the family and the educational system (Bourdieu, 1994, pp. 61-62).

By privileging a language controlled by the majority of a larger intellectual community, schools perpetuate a social structure that maintains power over ELL students who hold the least of linguistic competency in English (Handsfield, 2006; Weininger & Lareau, 2007). The distinction of academic and non-academic languages hence plays an important role in maintaining and perpetuating class distinctions. Since the competency to use academic language is highly valued in schools and other institutional settings, the lack of prior exposure to academic English may put ELL students at a disadvantage and limit their access to the content or knowledge of school curricula that requires the competency in academic language (Handsfield, 2006; Weininger, 2005).

The privileging of academic discourse in the American education system ensures that academic discourse is regarded as a higher form of culture. Academic language serves as a marker that creates social distinctions that sustains and supports the culture and ways of life that it represents. It embodies the standards and expectations that reflect the world-view of the majority group. It possesses the power of representation, by objectifying those who are different from the majority. As a marker, academic language is invisible and is what everything else is measured against. Students are to expect that their opinions and academic practice will be measured against the set of standards embraced by the majority group, those who occupied important posts at the end of their academic or career paths. The demand that shows proof or evidence is coded in the way of social practice that is deployed to perpetuate the existing order (Handsfield, 2006; Weininger, 2005).

Hence in the American education, those who fail to conform to the dominant standards are designated as a problem domain, standing in need of rectification. Their discourse is considered illegitimate, unscientific, and in needs of correction.

Challenges facing ELLs in the Common Core classroom

Academic discourse poses great challenges to many students, but more so for English Language Learners who are held by the same standards and expectations while learning basic English at the same time (Achieve, 2011; Bailey and Huang, 2011; Bunch, Kibler and Pimentel, 2012; Hakuta, 2011; Toppo, 2012). The challenges facing ELLs in the standards-based content-area classroom can be summarized as follows:

Linguistic challenge: The ability to engage productively in academic discourse in the Standards-based content-area classroom is closely bound to literacy skills in the English Language. Since ELL students are expected to master content area subjects while learning basic English simultaneously, they are presented special challenges because the skills required to understand classroom instructions are the same skills required to comprehend and construct knowledge in content area studies. (Abedi,

2004; Ahmad, 2006; Cummins, 2000; Garcia, Kleifgen & Falchi, 2008; Roseberry McKibbin, Brice & O'Hanlon, 2005; Tollefson, 1991).

Cummins (2008) makes the distinction between two differing kinds of language proficiency that are important to the understanding of special challenges facing ELLs in the standards-based classroom. Basic Interpersonal Communication Skills (BICS) are the skills that students need to develop through interacting with native speakers. CALP Cognitive Academic Language Proficiency (CALP) is the language skill to process the information found in textbooks and used in classrooms when content area curricula are presented and discussed and is the basis for student's ability to cope with the academic demands placed upon them in content area classrooms. Academic language is domain-specific. Each content area has its own terminology and rules of rhetorical convention. Mastering academic language is important to all students' academic and career success.

Academic language proficiency, in particular, poses a unique challenge to ELL students. According to Cummins, academic language is essentially cognitive demanding and context reduced and generally takes ELL students five to seven years to develop to a level commensurate with that of native speakers (Cummins, 2008; Thomas and Collier, 1997). Mastering academic language is especially challenging for ELL students since there are no other sources of help than the language itself when ELL students are engaged in a context reduced task such as listening to a lecture, reading dense text, or participating in class discussion (Bailey and Huang, 2011; Bunch, Kibler and Pimentel, 2012; Hakuta, 2011).

Cognitive challenge: Academic discourse is often culturally specific and cognitively dense. It is abstract, infrequently encountered except in textbooks and classroom discussions, and may be unfamiliar to ELLs and confound their understanding.

An example from my own experience as an English Language Learner may serve to illuminate this point. I studied philosophy at a graduate program in 1990s when the American public was obsessed with the imagination of outer space as the other – in a frenzied search of the final frontier of human ideas, ambitions and hopes. A professor who I took a class with, in an attempt to elucidate a difficult theory for his students, often alluded to a thought experiment involving a scenario in which a person was kidnapped during his sleep and transported to Twin Earth in which everything on that planet was identical to what was on earth, except for the fact that water on Twin Earth was composed of XYZ, instead of H₂O. The puzzle posed to students was such: Given the fact that the substance our doppelganger thought as water was not de facto 'water' as we assumed to be – albeit still drinkable – could his thirst quenching behavior be characterized as water-drinking (Putnam, 1973)? The thought experiment deployed an imagery of outer space that was ubiquitous in popular culture in that period of time such as *Star Trek*. Growing up in a culture that did not share the imperialist vision to colonize outer space, the example that was supposed to illuminate a difficult philosophical topic, failed to enlighten English Language Learners like me.

Academic discourse of each academic discipline contains its own specialized language and concepts rooted in both the American historical narrative and popular culture (Ahmad, 2006). Children growing up in the U.S. are initiated into these

themes through their incorporation into American civic life since their early years. The knowledge they have thus accumulated is a form of ‘cultural capital’ that gives them advantages over their ELL peers (Ahmad, 2006; Bourdieu, 1994). In contrast, such prior knowledge is not so readily available to most of ELL students whose parents may also be struggling to make an entry into a new life and can provide no or little intellectual support for their children (Abedi, 2004; Ahmad, 2006; Cummins, 2000; Garcia, Kleifgen & Falchi, 2008; Roseberry McKibbin, Brice & O’Hanlon, 2005; Tollefson, 1991). As the acquisition of cultural capital depends heavily on learning from the early days of life, ELL students’ lack of prior exposure to the culture that frames a context in which academic knowledge is constructed has placed them at a disadvantage (Abedi, 2004; Ahmad, 2006; Crawford, 1999; Cummins, 2000; Garcia, Kleifgen & Falchi, 2008; Roseberry McKibbin, Brice & O’Hanlon, 2005; Tollefson, 1991).

The above example serves to highlight the importance that when providing classroom instructions to ELLs, teachers need to take into consideration the cultural background and knowledge of ELLs and adapt their language to accommodate the special needs of ELLs.

Emotional challenge –Learning academic discourse skills can be very anxiety inducing for ELLs. The fact that ELL students may not be comfortable in speaking English in public in fear of incurring derision and criticism compels them to self-impose silence. The fear can be so debilitating that it discourages them from participating in classroom discussions (Ajayi, 2005; Pappamihel, 2002). Studies show that anxiety can be a serious block to students’ academic development. In order to reduce students’ anxiety in engaging academic discourse, a learning environment that provides scaffolding and supports that address the special needs of ELLs is important.

Social challenge: Most importantly, academic discourse itself risks of reinforcing the cultural-linguistic divide within the American school system. Academic discourse as a social practice utilizes a wide range of skills involving what Bourdieu calls social, cultural and symbolic capital. The emphasis on those forms of capital in classrooms reinforces a hierarchy already existing within the school system, between the teacher as the scribe/gatekeeper of the system and students as the disciples, and among students, between those who have and those who have not. As such, academic discourse controls the access to educational resources and is the primary factor that accounts for the achievement gaps in the public school system.

By upholding academic discourse/language as a cultural climate and norm, the school system in the U.S. sustains and reinforces a hierarchical system of language use that may perpetuate the existing achievement gaps within the American education system (Cummins, 2000; Pappamihel, 2002). It should be evident that an instructional strategy is needed to bridge the demands of academic discourse and the needs of ELL students. Unless such measures are in place, the cultural-linguistic divide in the public school system will continue widening.

Storytelling as a sheltering strategy

Storytelling has been long considered as an effective sheltering strategy in serving the

special needs of ELLs. Since NAPPs (the National Association for the Preservation and Perpetuation of Storytelling) (1974) revived the tradition of storytelling in the United States, storytelling has been widely utilized as a literacy strategy, ranging from preschool through university level classrooms. More recently, storytelling has been promoted as an effective way to teach the English language to English Language Learners and to help prepare for their transitioning to the mainstream classroom (Pedersen, 1995). By tapping into ELLs' prior knowledge, storytelling provides students a way to approach the text that they otherwise find intimidating by bringing in their perspectives to bear upon the understanding of the text. Whether it is about making text-to-self, text-to-text, or text-to-world connections, storytelling conceives students' prior knowledge as an important resource in their construction of new knowledge. The pedagogical benefits of storytelling can be enumerated as follows:

1) Stories are usually thematically organized and have a universal appeal to students. Students like to listen to stories that have elements that appeal to their experience and cultures. Students also like to tell stories, making them feel valued and that they have something to contribute to the collective learning that takes place in classrooms (Craig, S., et al., 2001; Mahala & Swilky, 1996).

2) In accessible ways, storytelling utilizes a wide range of literacy skills that can help ELLs' transition to the mainstream content area classroom. It teaches students the appreciation of the general structure of a narrative – including point of view, plot, style, characters, setting, and theme (Haven & Ducey, 2007; Miller & Pennycuff, 2008). Comprehension, critical listening, and thinking skills are also developed by combining storytelling with questioning, imagery, inferencing, and retelling– which is important for students to understand the historical narratives and other expository essays (Craig et al., 2001; Mahala & Swilky, 1996; Miller & Pennycuff, 2008).

3) Storytelling promotes a vision of inclusion and diversity as a resource. It is instantly multi-genre, multi-literate and multi-modal - by encouraging students to make selections of narrative form based on the anticipated audience, rather than reducing all experiences to the standard format that educators so often use. Students with a wide range of oral and written abilities are more likely to participate in storytelling that can be used to bridge their diverse literacy experience and needs (Craig, S., et al., 2001; Enciso, 2011; Mahala & Swilky, 1996; Miller & Pennycuff, 2008).

However, storytelling has received misgivings under the dominant educational paradigm. The current practice of academic discourse embeds standards and expectations adopted by the majority of a larger intellectual community. It dictates what is considered as evidence, what is considered as legitimate discourses. Against those criteria, storytelling is often considered as not carrying much scientific credential, if at all.

Despite the proved track record that storytelling has established in ESL, storytelling continues to be slighted in K-12 education (Enciso, 2011; Miller & Pennycuff, 2008). In the current Standards-based reform, there is an effort to increase the emphasis on the standard format of academic discourse at the expense of excluding other forms of discourse/knowledge. As reflected in the sentiment of David Coleman - Common Core's architect – “As you grow up in this world you realize people really don't give a shit about what you feel or what you think” (Martin, 2006).

In what follows, I argue that in addition that storytelling can serve as a sheltering strategy that values ELLs' prior knowledge and voice, storytelling represents a higher form of academic discourse when combining with imagining, questioning, and inferencing.

Re-theorizing Storytelling: Storytelling as a form of academic discourse

The current paradigm of educational thinking understands academic discourse as a system of evidence-based reasoning that abstracts away all the vagaries and concreteness of human situations and addresses predominately issues of validity and reliability. While this is a valid paradigm of academic discourse, scholars from the socio-cultural tradition such as Bakhtin (1981), Freire (1970), and others argue that it is not appropriate in understanding human phenomenon to which the use of language and communication is essential. Instead of viewing learning merely as an individual cognitive achievement, socio-cultural approaches regard learning as situated in a broader context of social circumstances, and hence the goal of learning is to reconstruct knowledge in fuller breadth and depth. Bakhtin whose work on literary theory and the philosophy of language signals storytelling as a form of cultural discourse that can further assist us in exploring the complexity of human interaction and understanding (Clark and Holquist, 1984).

Bakhtin's dialogism

A Russian literary critic and philosopher lived under the dictatorship of Joseph Stalin whose ruthless regime suppressed the literary consciousness and creativity of a diverse Russia. Central to Stalin's reign was his vision of creating a linguistically unified Russia at the expense of cultural and language minorities (Clark and Holquist, 1984). Bakhtin, belonging to a broadly defined sociocultural tradition, incorporates a vision of inclusion and diversity within his work to challenge the monolingual, monoglossic discourse of Stalin's authoritarian regime. Known as dialogism, Bakhtin's theory conceptualizes language as inherently dialogic and ideological, taking place in the social context that it is imbedded (Clark and Holquist, 1984).

Bakhtin gives new meaning to our understanding of cultural discourse by focusing on the dialogic aspect – that is, in any given speech and writing there is more than one voice within the object of a discourse. His theory is premised on the understanding that cultural discourse as mediated in and through language is inherently dialogic, its meaning being shaped by our interaction with others - real or imaginary - in response to what has been uttered before and in anticipation of what is to be uttered afterward. When we speak or write we presuppose the voices of others, taking into account what they might have responded to what we have uttered, in an attempt to anticipate future responses by incorporating them into our speech. An effective speech hence is one that incorporates a profound vision of inclusion and diversity within one's voice. This makes discourse a social practice, not passive, abstract but inherently multi-voiced and heteroglossic (Bakhtin, 1981; Baxter, 2011; Clark and Holquist, 1984, Holoquist, 2002). As Leslie Baxter explains, for Bakhtin, "Because all language use is riddled with multiple voices (to be understood more generally as discourses, ideologies, perspectives, or themes), meaning-making in general can be understood as the interplay of those voices" (Baxter, 2011, p. 101).

An example of this theory can be seen in contemporary readers' responses to Abraham Lincoln's *Gettysburg Address* (1865) that still strikes an emotional chord in Americans' mind, outlining for many a vision of a nation America should strive to be (Fesler, 1944). His speech anticipates challenges that America is facing in the generations to come, and still resonates with many Americans when they hear his speech. As Paludan clarifies, "Here is a man not just speaking well-remembered phrases easily recalled and embraced by later generations. Here is Lincoln the lawyer, Lincoln the politician, Lincoln the constitutionalist. And because each of these occupations is grounded in the realities and necessities of time and place, here also Lincoln must be sought, living within his age and fitting ideas into the practice of politics" (Paludan, 1994). The reverberation of Lincoln's words consists in its being a live document that bears witness to the differences and conflicts that divide the United States, baring a conflicted conscience in its ongoing struggle to reconcile "the thousands of different ends that this diverse nation appeals to and symbolizes" (Paludan, 1994).

Bakhtin's valorization of Dostoevsky helps further illuminate his theory of dialogism/heteroglossia. Known for the epic scale of his novels, Dostoevsky's novels comprise perspectives from different walks of life, and reflect the complex literary consciousness of the contemporary society under the Soviet Union, leaving in its wake the marked trace of struggle between different viewpoints, languages, dialectics, ideologies. He successfully incorporates a vision of inclusion and diversity in his narratives, juxtaposing different languages on a single plane. He invokes official/provincial, formal/informal languages all at once and yet retaining the inner struggle or conflict in his narrative (Bakhtin, 1981; Bakhtin, 1986; Baxter, 2011; Clark and Holquist, 1984; Holquist, 2002).

The greatness and depth of Dostoevsky's work can only emerge from a multicultural society already characterized by a vast and complex polyglossia – the coexisting of multiple languages. In deploying literary devices, Dostoevsky skillfully liberates each language from the tyranny of national, unified language under an authoritarian regime. Dostoevsky provides a paradigmatic expression of the highest literary consciousness, by simultaneously reflecting the mutually conditioning of understanding and responses. His work is not enclosed within set boundaries. Instead, he opts for a literary device that is essentially unfinished, and unstable always open for outside influences, ready to acknowledging others, rather than remains passive to the confining restraint of the walls of a national language (Bakhtin, 1981; Bakhtin, 1986; Holquist, 2002).

This act of introducing dialogic utterance into our understanding of cultural discourse provides a counter concept to the popular concept of academic discourse. By highlighting the ever shifting and heteroglossic nature of cultural discourse – bounded by speaking subjects in sociohistorically specific circumstances - Bakhtin's theory counters the excessively abstract concept of academic discourse propounded by the current paradigm of educational theorizing: "For speech can exist in reality only in the form of concrete utterances of individual speaking people, speech subjects. Speech is always cast in the form of an utterance belonging to a particular speaking subject, and outside this form it cannot exist" (Bakhtin, 1986, p. 71).

Understanding discourse as dialogic utterances entails our seeing discourse as involving specific activities that inevitably bring what the speaker is trying to express into conflict with interpretations of others. As Holt elucidates, discourse embodies a struggle, an awakening to the dialogic and heteroglossic nature of utterances, whether of one's own or others', in an attempt to structure the message as a variant on "official" discourse to "reflect the peculiarities of one's own unique place for seeing" (Holt, 2003, p.227). To formulate an utterance, then, is to simultaneously answer the requirements of one's unique place for seeing in concrete situations and the social re-positioning involved in accommodating the vantage points of others.

Building on Bakhtin's notion of dialogue/dialogism, it can be claimed that storytelling provides a rich template through which to observe human interaction and to explore the multi-voicedness within an utterance as ways of expressing the complexity of human understanding. The act of introducing an utterance is merely a moment in the "ongoing stream of discourse", with the utterance depending for its meaning on discourse occurring before and after it is "ushered into social existence" (Holt, 2003, p.226).

Storytelling understood in this sense is not just an inferior form or water-down version of academic discourse for less educated, less informed folks, yet to be developed into a more superior, polished, refined form of discourse. On the contrary, storytelling, in its capacity to address inclusion and diversity, allows different languages, different genres to inter-animate each other in a single text or voice. It can be deployed to challenge, mock, tease the false and forced distinction between academic and non-academic languages, and to reflect the wealth of the enriched image of the contemporary society. It is also more democratic in its openness to different tongues, expressions, dialects, and openness to adaption and change.

To recap, Bakhtin's theory of discourse suggests that the power of storytelling originates in its capacity to reconcile the coexistence of, and the conflict between, different points of view: the speech of characters, the speech of narrators, the speech of authors and the speech of readers simultaneously, in its ability to anticipate responses, in its capacity to incorporate multiplicity within a single discourse. So the art of storytelling consists in the ability of the speaking subject to be able to reconcile the conflicts arising from the coexistence of multiple voices or perspectives within a concrete situation that a discourse is embedded.

Not only storytelling is compatible with academic discourse, it is a reflective form of academic discourse that defies the attempt to ossify, objectify a live, fluid fabric of the civil society, defies the attempt of being reduced to formulaic sterilized expressions that muffle creativity and expression. It recognizes discourse as essentially dialogic, an ensembles of multi-lingual expressions, simultaneously multi-genre, multi-modal and conditioned by and always anticipate others' responses to our words.

Implications for Classroom Practice

Reflecting on the shifting and heteroglossic nature of language helps throw into relief the feigned transparency/objectivity of academic discourse. By privileging personal experience and voice, storytelling can be used to explore the interplay between

humans' individual and autobiographic experiences on the one hand, and larger, socio-cultural discourses on the other. How do we translate this Bakhtinian vision of dialogism/heteroglossia into a pedagogical design of academic discourse?

As was discussed previously, the current paradigm of academic discourse places an emphasis on logical argument with a rigid notion of semantic unity. Following the Bakhtinian notion of discourse, we can turn our desire for meaning making into an inquiry tool: to expose, analyze and challenge the dominant discourse through the art of storytelling.

While teaching high school social studies in a culturally and linguistically diverse classroom, I often implemented instructional approaches that included the use of visual art, drama, storytelling and discussion. I used storytelling in combination with imagining, questioning, and inferencing to assist students in engaging texts in ways that aimed to identify points of contradiction, hypothesize about possible meanings, evaluate their propositions, notice metaphors and their connections with characterization and themes and draw conclusions from what we read. The purpose was to use the art of storytelling as an inquiry tool to recover the context of coexisting multiple languages within a single language by seeing language as dialogic utterances in response to what has been uttered before and in anticipation of what is to be uttered thereafter.

As an example of my practice of using storytelling to assist students in reconstructing knowledge in fuller contexts, we as a class did a writing on the point of view of a female worker living during the age of the Industrial Revolution that took place in England around the 19th century, exploring multi-voicedness within her perspective – her internalizing the society's expectation of her as a woman, her determination to rise above poverty, her desire to become independent and yet bounded by the obligation she felt toward her aging parents, and the defenseless feeling of her dream being crushed under the weight of the reality, etc. In doing so, we were inevitably led to question how we identified ourselves vis-à-vis our historical counterparts.

In these ways we echo Bakhtin's emphasis on meaning making as the encounter between difference, on constructing meanings which keep such difference in play. It indicates that the bringing together of different voices within a single discourse is an effective way of meaning making, and exemplifies the potential creative force of storytelling which are, Bakhtin says: 'pregnant with potential for new world views, with new 'internal forms' for perceiving the world in words' (Bakhtin, 1981, p. 36).

Concluding remarks: storytelling as a reflective form of academic discourse

By jettisoning the notion of semantic unity and by seeing language as dialogic utterances as a part of an ongoing stream of discourse open to constellations of change and evolution, storytelling seeks to recover a richer, fuller context that the speaking subject is embedded, in an attempt to effect a thicker interpretation of history. By combining imagining, questioning and inferencing, storytelling can also help students interrogate their stance toward history, and assist them in developing a critical understanding of the world. Hence storytelling is not only compatible with academic discourse, not only functions as a bridge between the demands of academic

discourse and the special needs of ELLs, but in fact enhances and supports academic discourse by helping students think more richly and critically.



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The logo for IAFOR (International Association for Frontiers of Research) is centered on the page. It features the word "iafor" in a light blue, lowercase, sans-serif font. The text is enclosed within a circular graphic composed of two concentric, slightly irregular arcs. The outer arc is a light blue color, and the inner arc is a light red color, creating a ring-like effect around the text.



The Educator Fraud Prism and Implications for Teacher Preparation

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Abstract

States have been under intense pressure to develop initiatives to detect, deter and investigate educator fraud in response to cries of orchestrated educator cheating on statewide assessments. (Bello, Marislo, & Toppol, 2011). Political leaders appear to be less responsive. Current trends however, indicate a societal push for more stringent consequences of educator white collar crime and corruption. In 2012, a former El Paso district superintendent was sentenced to four years imprisonment \$56,600 in fines, and \$180,000 in restitution for contract fraud and data manipulations. While in Columbus City Schools, the state's auditor found that the district superintendent had presided over a culture of data manipulation that involved changing grades, deleting absences and falsifying the number of dropouts. The Federal Bureau of Investigation joined the case in 2012 in search of possible fraud and misappropriation of federal funds.

These convictions resulting in imprisonment sent shock waves that reverberated throughout the educational community. Teacher certification programs to prepare and warn educators are inadequate for this new landscape.

Keywords: educator fraud, assessment, teacher preparation, test security, fraud prism, fraud triangle, misconduct, corruption, white collar crime, fraud diamond, ethics

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Introduction

Teacher preparation programs are ill-equipped to prepare future educators for the sea of change. A review of the literature illustrates the numerous societal factors associated with increased occurrences for educator fraud. Even so, criminologists have yet to create a model to explain this phenomenon. The primary purpose of this presentation is present a new paradigm called the *Educator Fraud Prism*TM to explain educator fraud, its causes and deterrence to better prepare educator and faculty candidates.

Macroscopic Perspectives of Educator Fraud

Attitudes about Cheating: The Scientific American Mind (2013) posed the question, “Why we Cheat?” and provided a possible rationale that “Everybody does it.” Explanations from microbiologists Fang and Casadevall (2013, p. 30-31) ranged from larger neocortex to cheating helps maintain competitiveness.

Misdemeanor Reform: Even when allegations of educator crime are escalated to the level of the criminal court system, the National Association of Criminal Defense Lawyers (April 2009) recommended a diversion of misdemeanors with little impact upon public safety to lesser penalties (Pew Center, March 2009).

Public’s Perception of Educators: In 2013, Gallup conducted a random sample poll of 1,031 adults to determine the public’s perception of honesty and ethical integrity across professions. Seventy percent of the respondents, when asked to rate the ethical standards of people in different fields using a 5 point Likert scale, rated nurses at the top of the list. Tying in second place were grade school educators and pharmacists.

The high esteem in which the public holds of educators, particularly grade school teachers, run counter to the sector’s placement as the fifth highest industry for reported fraud. Factors that play a role in educator fraud and white collar crime follow.

Microscopic Perspective of Educator Fraud

Poor Economy: Enforcement experts find that increased financial pressures such as personal debts, declining home values, stagnant salaries, and dropping stock prices increase the risk for fraud (ACFE, 2012, 2014). For two years, the education industry has ranked fifth in the top 10 list (ibid).

Secondary Level Education Reform: Increased educator fraud is associated with “high stakes testing” (Kaufman, 2012, p. 1) which occurs when student standardized test scores are factors for teacher and school evaluations. Penalties and rewards are obtained using these indices. Kaufmann (2012) says such practices may have “spurred change, although not in unambiguously positive ways” (p.1).

Variability of Teacher Preparation Program Curricula: There is considerable range of curricula lacking consistency within programs and across settings. Seventy-one percent of newly hired employees entering the teaching profession are prepared at traditional institutions of higher learning, 21 percent receiving their training in

traditional institutions in a non-traditional setting, while 8 percent are prepared in alternative programs located at non-traditional institutions (US Department of Education, 2011).

“Unlike the curriculum of other professions which has some coherence of substance and pedagogy, the teacher education curriculum is widely distributed by rarely coordinated. Many of those who teach teachers do not think of themselves as teacher educators.... And most have little preparation for the task of educating teachers” (Darling-Hammond & Ball, 1997, p. 12).

Randi Weingarten, president of American Federation of Teachers (AFT), a union representing 1 million members, after an address hosted by the American Enterprise Institute responded to an attendee's question indicating preference for a teacher residency program, similar to the practice found in the medical and counseling profession (Weingarten, June 18, 2014).

Lack of Ethics Course work in Teacher Preparation Programs: In 2013, the Association of American Colleges and Universities surveyed 318 employers to identify the skills in demand when hiring. Employers placed the greatest priority on ethics, intercultural skills, and capacity for professional development. Ninety-six percent of the employers identified ethical judgment and integrity as important, while seventy-six percent said it was very important.

In this case, there appears to be a lack of synchronization between the demands of the market and output. Burant, Chubbuck and Whipp (2007) theorized that teacher education programs must emphasize moral sensitivity alongside content knowledge. A year later, Campbell (2008) provided even harsher criticism, “teacher education neglects the teaching of ethics” (Campbell, 2008, p. 372).

Employers aren't the only group to gain from ethical judgment and moral integrity. Students, particularly minorities and the poor benefit also. Gore et al (2007) conducted a longitudinal study of 3,000 students during a three-year period and found that minority students from lower socio-economic backgrounds benefited the most from instructors who held high expectations rooted in sound ethical and moral principles.

Variability of Alternative Pathways to Educator Licensure: In the 1990s, to address a projected shortfall in the nationwide educator talent, alternatives to educator licensure were introduced; many of which provided sparse training and meager support. To meet federal reporting guidelines during this period of rapid build-up, some states included alternative candidates in their definitions of “highly qualified teachers” (HQT) even before these candidates completed their minimal training. (National Commission on Teaching and America's Future [NCTAF], 1996, p. 93; Miller, McKenna & McKenna, 1998; Darling-Hammond, Kirby & Hudson, 1989).

The suspect practice of falsified reporting to imply educators educator preparation and experience did not appear to alarm regulatory authorities. To the contrary, the federal government may have been complicit in misreporting by lowering the baseline previously established for HQT. For instance, the U.S. Department of Education prepared a report to the U.S. Congress that was highly critical of the traditional research-based best practices for certification. Factors known to increase teacher preparation: attendance at schools of education, coursework in education, and practicums in student teaching were presented as possible options not mandatory

requirements for program design. (U.S. Department of Education, 2002).

Variability of Ethical Framework in the Teaching Profession: Opportunities to self deal, tamper with grades and exams, and falsify applications for federal funding have not been counterweighted by the industry. Professions with fiduciary responsibilities such as securities dealers, stockbrokers, psychiatrists, physicians, social workers, certified public accountants, and attorneys, have banded together to form national ethical standards to guide professional behavior (Hutchings, 2014). Conversely, individual educators must school themselves on state and municipal codes to maintain career mobility. Without a uniform, national and standardized code of ethics, Hutchings reasoned, decision making threatens to become spontaneous and capricious. Hutchings warned that the absence of national standards as not in the best interest of students and poses grave risk to educators.

Growing Trend Toward Lex Loci Arguments: An educator may have an increased risk for litigation; particularly if ineffective. In fact, it has been postulated that educators and institutions have a fiduciary responsibility to students in their care (Rumel, 2014). If one were to consider the educator to student relationship to extend beyond the act of imparting knowledge by way of classroom instruction, to assessment, motivation and pupil behavior management to role modeling and ultimately fiduciary obligation, then the education profession is wholly unprepared for such responsibility.

It is clear that educators greatly impact student outcomes. Evaluators found that there was a 52 percentile point difference of student scores when instructed by either a high performing or low performing teacher for three consecutive years (Sanders and Horn, 1998) . Impact extends beyond the classroom walls. Dr. Raj Chetty conducted research and determined that students with one year of ineffective teaching can lose \$1.4 million in lifetime earnings (Chetty, 2012).

Reductions in Oversight Due to Shifts in Employer Profiles: Shifts in employer profiles have resulted in government oversight reductions. According to Brewer and Hantschke (2009) the speed with which charters has entered the market constricts the reach of government; entities that have traditionally protected the public from abuse and self dealing with regulations and compliance.

“Because of the coupling of public operation with powerful ministries, employee unions and so on, the creation of privately-operated public schools enables governments to bypass these intransigent forces that make change from within so difficult. U.S. charter schools have been used as a vehicle to reduce stifling effects of over-regulation and union contracts, without directly challenging the constituencies that benefit from these” (p. 232).

Researchers Severns and Glueck (2014) point to Washington, DC, Chicago and New York City districts where billions were spent to embrace charters. These districts oversee schools that have been called ‘holding pens’ with large percentages of failing students, drop outs, and truant heading straight to jail; not higher learning institutions. The autonomy and increased decentralization proffered traditional schools results in the de-prioritization of policies and procedures to deter occupational fraud. This void leaves an educator class without specific direction, and an industry more prone to fraud.

Shifts in Teacher Demographics: Twenty-five years ago, the number of years experience in education most often cited by educators was fifteen years, according to the National Commission on Teaching for America's Future (2010). By 2007, a colossal drop to one to two years occurred and has held steady eight years later (Headen, 2014). The implications of inexperienced classroom teachers populating public schools, particularly those serving Blacks, other minorities and the poor were not realized. Researchers now show that inexperience undermines stability, hinders reform and threatens student progress.

As the more inexperienced are employed in education, the requirement for job-embedded training in content, pedagogy, ethics, and appropriate interaction become critical. The study "Beginners in the Classroom: What the Changing Demographics of Teaching Mean for Schools, Students, and Society" explored why new teachers leave education. The answer? Lack of support. This lack of support may translate to lowered student achievement. For instance, Hanushek (2010) found that an ineffective teacher can cost a student as much as six months of learning every year. Or re-stated in another way, "in a single academic year, a good teacher will get a gain of one and a half grade-level equivalents, while a bad teacher will get a gain equivalent to just half a year" (pg. 84). Ineffective educators may be at a greater risk or more prone to participate in appropriate, illegal, unethical misconduct.

Shift from Tenured Professor to Adjunct and Part-time Faculty for Post Secondary: The Association of Governing Boards (2013) reported that 70 percent of higher education faculty nationwide are adjunct or "contingent faculty." This is in stark contrast to almost a half century ago, whereby approximately 78.3 percent of higher education faculty were tenure-track and 21.7 percent were non-tenure track. Poor orientation, lagging recruitment schedules, job insecurity, low benefits, and inequitable salaries are employment conditions faced by adjunct faculty. An adjuncts' lack of orientation, professional development, and access to formal assessments to identify instructional deficiencies and develop corrective actions cannot be overstated and can grossly effect student learning. Kezar and Maxey (2013) write "from the moment they are first hired and continuing through their employment, they do not have access to resources such as funding to attend training and conferences to support their professional development" (p. 4).

Industry Denial of Potential for Fraud and Corruption: The education industry is not immune to risks associated with occupational fraud. According to the 2014 Global Fraud Study (ACFE, 2014), the education industry ranked fifth for reported cases of fraud, followed by retail and insurance.

In spite of its ranking, the American Educational Research Association (AER), highlighted scholarly inquiries into education and best practices at its annual convention. More than 13,000 k-12 and post secondary educators participated in 1,600 to 1,700 sessions based upon a telephone interview with Kimberly Ricks, Meetings Associate (T. Foust-Mead, September 2, 2014). In this regard, a search of the terms: fraud, crime, misconduct, cheating, illegal and corrupt yielded just 16 scholarly papers. Of the sixteen presentations, 6 emphasized student misconduct; not adults.

Even beyond the ivy tower of academic research, on-the-ground educators can be found to express, “There are no ethical dilemmas in public education... because there are no ethics. There is no right or wrong. See nothing, hear nothing, report nothings, punish no one. Ethics does not exist,” research participant (Hutchings, 2014, p. 34). This finding is consistent with earlier research undertaken by Fusco (2005) and Segal (2005) in which it was found that the industry appeared to deny the existence of fraud and corruption.

“One impediment to reform that no one is seriously studying in the debate over how to improve public schools is systematic fraud, waste and abuse. This missing is surprising because a number of school districts particularly large urban ones have compiled impressive records of fraud and waste.” (Segal, page xxi)

Educator Fraud

“Occupational fraud occurs when an employee abuses the trust placed in him or her by an employer for personal gain.” (page 6, 2012 Global Fraud Study: Report to the Nations on Occupational Fraud and Abuse, ACFE). Even so, educator fraud has yet to be defined with specificity such that the causes and risks are fully explored. There were futile attempts in the early 2000s to present an expose’ of corruption occurring in education by Segal (2004) and Fusco (2005) but failed to convince.

This article emphasizes fraud, white collar crime and corruption committed by educators internally and/or educational programming service providers who most often possess educational credentials and use inside access to commit fraud and white collar crime within the education sector. Schemes carried out by outsiders are not included in the analysis.

Image 2. The Fraud Diamond



Criminal behavior is learned (Sutherland, 1955) in association with others who have criminal attitudes and values. How are these attitudes developed? One must consider the literature which draws heavily upon the ‘Fraud Diamond’ indicating that there are four factors involved with occupational fraud: (1) rationalization, (2) incentive, (3) opportunity, and (4) capability (Wolfe, D.T. & Hermanson, D.R. 2004). Wolfe (2004) coined the term “The Fraud Diamond” to summarize the concept, the perpetrator’s

rationalizations that the act is not illegal or that ‘everyone is doing it’, an incentive element present the motive, a perceived opportunity, and the potential criminal has the skills or capability to commit the crime.

The Educator Fraud Prism

While the Fraud Diamond, and its predecessor, the Fraud Triangle, is a universally accepted concept for describing fraud, it is insufficient for analyzing fraud perpetrated by educators in an educational setting. The prism is three dimensional and is viewed through an enforcement risk lens which has the power to bend one’s perception of rationalization, incentive, opportunity, and capability.



Image 3. The Educator Fraud Prism™

Enforcement risk, or the political will and enforcement power a regulatory body has to exact criminal penalties and sanctions, prior history of enforcement, and the perpetrator's assessment of the enforcement risk ultimately determines whether a fraudulent act will be committed once

and whether it will be continued throughout his/her educational career. This a new term and concept. "When people have the opportunity to commit a crime, they weigh the downside such as the risk of getting caught and punished and being stigmatized by society against the upside" (Segal, p. 41).

Current Trends for Stiffer Penalties: A former educator was indicted on 45 counts for mail fraud, fraud related to identity documents and identity theft for his role in leading a ring of proxy cheaters in three states. Further, 140 educators in the Atlanta Public School System were implicated while 35 were charged with 65 criminal counts of false statements, theft by taking, and racketeering. A former El Paso district superintendent was sentenced to four years imprisonment, \$56,600 in fines, and \$180,000 in restitution for contract fraud and data manipulations. Five Philadelphia School district educators were arrested and accused of "perpetuating a culture of cheating" on state exams (Graham, Woodell, & Vargas, May 10, 2014). They were charged with tampering with public records, perjury, forgery, and criminal conspiracy. After an 18 month investigation at Columbus City Schools, Ohio, the state auditor found that the district superintendent had presided over a culture of fraud involving changing grades, deleting absences and falsifying the number of dropouts (Bush & Richards, January 28, 2014). To express the gravity, the Federal Bureau of Investigation joined the case to investigate (ibid).

Historical Perspective: Traditionally, educator fraud cases often resulted in disciplinary actions such as reprimands, suspensions, loss of license and job (Olson & Fremer, 2013). For instance, Jacob and Levitt (2003) while conducting a study of educator cheating in Chicago, predicted that if the allegations were substantiated, the educators suspected cheaters would face disciplinary action.

Rationalization

Although any illegal act is a considered a crime to be prosecuted and punished accordingly; society has viewed white collar crime as a victimless. Academicians specializing in legal policy de-emphasize the harm caused by fraud and endorse lenient sentencing (Podgor, 2007). "Fraudsters view their crimes as being victimless, not dangerous to society and causing no visual or physical damage to anyone or anything" (Perri, 2011, p. 44). Other rationalizations include poor working conditions and low salary levels.

K-12 Salary: The National Education Association (NEA) reports that teachers have a lower starting salary than other professions requiring similar skills and

responsibilities. As teachers invest more years into teaching and gain experience, the pay gap widens. (NEA, n.d.).

The annual pay for teachers “has fallen sharply over the past 60 years in relation to the annual pay of other workers with college degrees.” Further, in a review of salary data, they argue that “the average earnings of workers with at least a four year college degree are over 50 percent higher than the average earning of a teacher.” (NEA, p. 1.).

Teachers and educational support personnel “often work two to three jobs to make ends meet” (pg. 5). The Center for American Progress, posted similar findings (2014). Teacher heads of households with ten years experience qualify for federal assistance. In addition to welfare, more than 20 percent of teachers in eleven states hold a second job to earn more money (ibid).

This conclusion conflicts with the those rendered by the U.S. Bureau of Labor Statistics (USBLS) in its annual National Compensation Survey (NCS, 2013). Lawrence Mishel, President of the Economic Policy Institute explained that the method by which USBLS calculates teacher salary is based upon the days worked (190 official school days divided by five, resulting in a 38 week work year) in comparison to the 48 to 52 work weeks non-educators are expected to work annually. Therefore, the NCS data grossly underestimates the hours teachers work each year and significantly overestimates annual teacher salaries based upon a hypothetical hourly wage rate.

Contingent Faculty. Part time, contingent and/or adjunct professors represent 74.7 percent of US faculty. (April 28, 2014, The Atlantic). The America Federation of Teachers interviewed 500 part-time and adjunct faculty members. Fifty-seven percent indicated that their salaries were inadequate while 41 percent said that job security was not meeting their expectations (March, 2010). What specifically does ‘not meeting expectations mean?’

The Association of University Professors compared salary data for contingent and tenure track professors. Based upon \$2,700 pay per three-credit course and calculated to \$21,600 annual salary (four course per semester) in contrast to the average \$66,000 starting salaries for tenure-track professors (2010). Segrán of *The Atlantic* cited *New York Times* whereby an adjunct “has been reduced to sleeping in her car, showering at college athletic centers and applying for food stamps” (The Atlantic, Adjunct Revolt: How Poor Professors Are Fighting Back, April 26, 2014, p 1).

Incentive

A common incentive to commit a crime occurs when a person’s earned income is not adequate to meet the desires, wants or needs of an individual.

Bonus and Rewards; According to Eckstein of the International Institute for Educational Planning (2003), global educational reform “are frequently submitted to abuse and even systematic corruption”(p. 34). “The prevalence of cheating is shown to respond to relatively minor changes in teacher incentives” (Jacob and Levitt, 2003, p. 846). Such pressures include the threat of punishment for low scoring schools and the opportunity for reward in high performing schools.

These findings were mirrored by the Atlanta Public Schools Special Investigator's Report (2011) and cited in Kaufmann (2012):

“intense fear of failure to meet annual performance targets for student achievement, culture of fear, retaliation and intimidation, failure of principal and administrative leadership and the use of an incentive's policy,” (p. 6)

Teacher competitive pressures and working conditions, considered secondary incentives were cited by Kaufmann (2012) and included the desire

“to be first and nobody wanted to be last’ and to move up to older more prestigious grade levels, teaching lower grades were perceived as a demotion. Educators who participated in fraud and corruption were awarded after-school posts and preparatory periods if participated and conversely, were assigned to problem classes or not given the opportunity to move to teach students at higher grade levels, if refused to participate.” (p.7)

Poor Qualifications and Experience to Meet Aggressive Goals: While reform introduces myriad forms of incentives, it has simultaneously liberalized the certification requirements and lowered experience levels of teachers. A U.S. Department of Education survey cited in the *New York Times* found that 25% of teachers in secondary public schools “lacked academic qualifications in the subject they teach, particularly in poorer school districts.” (Jerald, C., Ingersoll, R. 2002: *New York Times*. 2002, August 22. In: *New York Times*, A12). This is striking considering that younger, less experienced teachers were more likely to cheat than teachers with more experience (Jacob and Levitt, 2003).

Opportunity

A key aspect of white collar crime, particularly in the education sector is the pressures caused by perceptions that (1) ‘everybody does it, so I will too, (2) there is no one to judge me critically and (3) no one to stop me.’ How is this criminal behavior likely in an educational setting, considering that the general public holds the highest regard for educators, particularly grade school teachers? (Gallup, 2013).

Differential Association: Edwin Sutherland (1978) reasoned that when a law-abiding person interacts socially with criminals in an intimate setting, this person, as a consequence of the social interaction can make poor decisions leading to criminality. With increased frequency of the illegal act, the more skilled the person becomes in committing successive crimes. This theory became known as ‘Differential Association’, developed in collaboration with Donald Cressey.

Management's Unclear Messaging: How is it that in some educational settings, crime is committed and in others it is not? Jeffrey (1965) concluded that there are incidents in some settings because such sites lacked positive social reinforcers and role modeling in comparison to similarly situated places with correspondent populations and workforce, who used positive social pressures and role modeling to deter fraud.

Within the literature, executive leaders situated at the pinnacle of an organization are expected to use communication and role modeling to support ethical decision-making (Brown et al, 2005). “These top managers create and maintain an ethical culture by consistently behaving in an ethical fashion and encouraging others to behave in such a manner as well.” Ardichvili, et al 2008, p. 2). The Association of Certified Fraud Examiners adds, “employees will do what they witness their bosses

doing” (Tone at the Top, ACFE, n.d, p.1). Creating and enforcing clear conduct codes, acceptable behaviors, and expected procedures and paramount for management (Trevino et al, 1999).

Weak Internal Controls and Lenient Oversight: The failure of top managers to model ethical behaviors, identify impermissible conduct, clearly communicate acceptable acts and to enforce them place an educational institution at grave risk for fraud. According to the Association of Fraud Examiners (Tone at the Top, n.d.),

“there are many different forms of misconduct that go on in the workplace and are observe by employees every year. Yet, many employees do not report this unethical conduct. Only 55 percent of employees said that they reported misconduct they observed in the workplace; a 10 percent drop from the previous survey conducted in 2003” (p.4)

Reasons given for not reporting: employer failed to take corrective action, disclosure of complainant identity, retaliation, and uncertainty of whom to contact. “Employees who witnessed their company actively following its code of ethics were the *most* likely to report misconduct in the workplace, according to the 2005 National Business Ethics Survey (Tone at the Top, n.d., pg. 4).

Capability

Possession of certain skills and tools are a requirement for committing fraud. Another aspect of capability; access is often overlooked. While automated internal control systems mechanisms do much to deter educator fraud; inadequate supervision by an immediate supervisor greatly increases the threat.

Poor Management Training: School leader programs are wholly inadequate to meet the needs of candidates. Reference materials are outdated and are not aligned to generally accepted practices of leadership (AACTE, 2001; Copland, 1999; Elmore, 2000; Lumsden, 1992; McCarthy, 1999; Murphy & Vriesenga, 2004).

Poor Classroom Supervision: As some educational leadership programs may provide training in labor law, negotiations, personnel policy; finding the time to supervise employees has been a challenge. Chait (2010) found that “many schools currently lack the staff capacity—both in terms of expertise and staff hours—to observe all of their staff and write up their findings throughout the year (p. 9).”

Top Level Access and Authority: Capability within top management involves using one’s inside knowledge, access and authority for controlling resources and directing subordinates to commit illegal acts. In separate cases, school district superintendent leaders in El Paso, Texas; Atlanta, Georgia; and Camden, New Jersey were alleged to have either awarded themselves unauthorized performance bonuses, manipulated student enrollment, participated in a grade fixing scheme, falsified student transcripts, tampered with state standardized assessments and/or instructed subordinates to do. (Sanchez, 2006) (Zubrzycki, 2012). The former executive director of a public charter school in the District of Columbia was sentenced to 9 months in prison for embezzling \$29,000 of federal funds. (OIG, April 24, 2014).

Deterrence Landscape

The Educator Fraud PrismTM considers the traditional assessment of the enforcement risk as relatively low. Therefore, this section discusses the manner by which the perception will be elevated in coming years.

Increase the Certainty of Punishment: The probability that a crime will be discovered and the length of time from discovery of an investigation, to court proceedings, due process and ultimately punishment, greatly impacts a potential criminal's assessment of risk (Albercht, 2014). The lack of clarity regarding what constitutes an offense considered in an administrative, civil and or criminal proceeding may fester an environment ripe for fraud.

Further, the industry is moving toward penalties and sanctions that are so dreadful that the wrongdoer will not commit the offense in the future (Jeffery, 1965). Further, the industry has gradually raised educator awareness about the negative consequences of committing an offense by showcasing (as appropriate) the actual infliction of the punishment upon the wrongdoer (ibid).

Community Outreach and Confidential Informants: Segal (2005) notes that the effects of fraud can be devastating. Segal concluded that "the most academically beleaguered school systems tend to be the ones with the longest most serious, most systematic investigative records" (page, xxii). Likewise, the same detrimental effects can be found on a global scale. Ferraz et. Al (2011) examined federal education misappropriation data from Brazil's local government and determined that fund leakages impact educational attainment. Based upon evidence from 56 countries whose students participated in the Program for International Student Assessment (PISA), reductions in educational resources resulting from funding misappropriations can reduce educational quality and that "there was a strong negative association between a country's corruption level and its performance on the international standardized exams." (Kaufmann, Kraay, & Mastruzzi, 2009, p. 24). This author has proposed an aggressive public and community outreach program to inform the public that educator fraud is not victimless and has a negative lifelong consequences for students persist.

Policy Development and Laws: The knowledge of the consequences of illegal acts are unnecessary for most law-abiding people (Packer, 1968; Zimring and Hawkins, 1973; Andenaes, 1974, Wikstrom et al 2012). McCabe (1999) U.S. Department of Education, OIG (2013) however, when addressing educator misconduct recommended the establishment of clearly written and interpreted institutional policies, laws, regulations, and sanctions to address fraud and is slowly becoming the norm.

Visibility of Enforcement Personnel: There is substantial evidence that increasing the visibility of enforcers responsible for the prevention and detection of crime can significantly heighten the perceived risk of apprehension and may deter crimes in the process (Nagin, 2013). To change the perceptions of lenient oversight and to formally impose societal pressures at the district level, three of the largest school districts, New York City, Chicago and Los Angeles, established independent enforcement agencies known as inspectors general to provide oversight for educational programming. (Segal, 2004). This author has proposed similar enforcement agencies across the

nation. The primary purposes of these offices would be to detect, deter and investigate fraud, waste and abuse and would be manned by professional auditors and investigators independent of state and local school management.



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Impacts of Educational Macro-Policies on Developing Creativity in Iran

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Abstract

Many educational and training approaches aim at improving creativity in students. In today's world, tremendous need for individuals who can adapt to rapid changes, and also help bring rapid developments into their societies have made educational systems place more importance on creativity. However, developing creative minds may lead to criticism of the status quo, which is considered a threat by ideologue governments. Hence, to ensure their survival, ideologue governments tighten the scope for individuals' creativity by implementing uniform education systems that can be directly and strictly controlled. Violation of academic freedom is one of the methods implemented by such governments in order to narrow the space for creativity. The stifling educational environment suppresses creative and critical thinking. This paper examines how educational macro-policies affect creativity development process in Iran. The main objective of this study is to identify the factors resulted from educational macro-policies, which suppress creativity development process and critical thinking in students. The results indicate that lack of freedom in educational system of Iran leaves long-term devastating impacts on individuals' creativity development process. The research methodology is qualitative, and observation and in-depth interviews are used to collect the data. The research sample includes teachers of four schools and faculties of three universities in Tehran.

Keywords: creativity, education, academic freedom, creative thinking, critical thinking, educational environment, Iran

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Introduction

Education has always aimed at increasing the community's knowledge. It has also sought to help individuals with utilization of their knowledge in their day-to-day life. In the process of its expansion and evolution, education has regularly been reformed and has become more efficient in order to comply with the society's current requirements. In the recent years, the increase in accessibility to education and educational resources has had a major impact on education and its structure. One of the main changes is that education is no longer seeking for the mere transferring of knowledge. Instead, educational systems are trying to find the best ways of developing creativity in individuals. In other words, easy access to the various sources of knowledge has changed the main role of education from transferring knowledge to developing creativity and innovation.

Tremendous need for individuals who can adapt to rapid changes, and also help bring rapid developments into their societies have made educational systems place more importance on creativity. Moreover, creativity improves individuals' ability in developing new knowledge and gaining new achievements. It has also been realized that increasing the level of knowledge without developing creativity does not lead to contribution to the existing knowledge, but to reproducing it. Creativity can also help remove barriers to conception and recognition of the latest issues in different fields. The need for specialization in today's world is another reason for placing more importance on creativity.

However, education may play a very different role in some countries. In many societies where educational systems are under the direct and strict control of the government, especially in the countries with ideologue regimes like Iran, government uses education as means to reproduce and institutionalize the dominant ideologies (Monfared & Khayati, 2011). In fact, the ideologue regimes' efforts to strengthen and stabilize themselves lead to such an approach to education. Developing creative minds may lead to criticism of the status quo, which is considered a threat by ideologue governments. Hence, to ensure their survival, ideologue governments tighten the scope for individuals' creativity by implementing uniform education systems that can be directly and strictly controlled. In fact, the implementation of the methods and techniques that help improve creativity in the educational system is not only prevented but also considered a threat and a barrier to the institutionalization of the ideological values.

This paper studies how educational macro-policies negatively influence creativity development process in Iran. The main objective of this study is to identify the factors resulted from educational macro-policies, which suppress creativity development process and critical thinking in students.

Literature review

Creativity is probably one of the most studied topics of the last twenty years (Pisanu & Menapace, 2014). However, most of the research studies on the lack of creativity have targeted the educational methods and structures, and attempts have been made to suggest different mechanisms and methods of teaching and developing creativity as a solution. Hence, the fact that some systems do not implement these methods

purposely and prevent developing creativity systematically has been ignored in the relevant studies.

In the present study, a wide search for publications on the topics related to creativity has been conducted. As Pisanu and Menapace (2014) argued, the study of creativity can be put in four theoretical dimensions that are: 1- organizational structures, 2- individual characteristics, 3- training methods and pedagogical practices, and 4- training content. Many studies have been done in all these dimensions and many methods and techniques to help develop creativity have been recommended. However, the literature review shows that how and why some obstacles are deliberately placed in the way of developing creativity have not been studied.

The influence of the Islamic Revolution on education in Iran

Education has gone under dramatic changes since the Islamic Revolution (1979) in Iran. Educational system was the first target of the fundamentalists who believed that it had to change totally and thoroughly. In Iran, educational institutions are under direct government administration. Government has significant control over the education system.

The Cultural Revolution (1980–1987) that followed the Islamic Revolution (1979) in Iran, was aimed at purging academia of Western and non-Islamic influences. Directed by the Cultural Revolutionary Headquarters and later by the Supreme Cultural Revolution Council, the revolution initially closed universities for three years in 1980 to 1983, and, after reopening, banned many books and purged thousands of students and faculties. More than 40% of university professors were expelled from Iran's academic institutions in a very short time (Paivandi, 2012).

The “Committee for Islamization of Universities” carried out the task by ensuring an Islamic atmosphere in all institutions. With the help of theological schools, the curricula were Islamicized, especially in the social sciences and humanities (Kamyab, 2014). Ideological and Islamic subjects were added at all levels of education. Since then, the council has been controlling the affairs of educational institutions through supervising the selection of faculty and tertiary students, controlling the formation of institutions, and in many other ways.

Training faculties and teachers who were loyal to the government was the Islamic regime's first priority. Therefore, universities were the first institutions that underwent radical changes. After the ideological policies were stabilized in higher education, the second priority i.e. primary and secondary education were targeted. Since then, the school textbooks undergo changes every year to comply with government's ideology and views.

The ideological changes were first applied to organizational structures, training methods, pedagogical practices, and training content. The next step was to ensure that the recruited teachers and faculties have the individual characteristics considered ‘desirable’ by the government. Thus, as a result of all these changes, creativity development was negatively influenced in all the four dimensions discussed earlier.

Statistical data indicating the outcomes of suppression of creativity

In recent years, Iran has taken wide strides in science and technology, particularly in medical and medicinal fields. According to the latest statistics released by several international scientific centers in 2013, Iran ranked 15th in the world, and 1st in the region in terms of science production (Fars News, 2013). In the same year, the number of articles by Iranian universities and research centers indexed in Scopus scale was over 39,000 (Iran Review, 2014). Iran has the world's fastest-growing scientific output, measured by the number of peer-reviewed papers published in international journals. In addition, Iran ranked first in scientific growth in the world in 2011 (Akhondzadeh, 2013).

However, the statistics show that the rate of knowledge production in Iran, in the disciplines of humanities and social sciences is not compatible with this fast scientific growth. The global statistics indicate that social sciences and humanities comprise only 1.5 percent of all Iranian scientific papers published worldwide (Aminpour & Kabiri, 2009). According to the experts, humanities and social sciences are in a sorry state in Iran. Hassan Rouhani, the new president of Iran, believes that political 'red lines' that prevent both the students and faculties from expressing their opinions candidly are the reason behind this problem (Adib, 2014).

It can be concluded that suppression of creativity in social sciences and humanities, in addition to lack of academic freedom have led to such a low knowledge production in these fields.

Research methodology

This research is a qualitative one, using in-depth interviews and the observations of the researcher- as a former faculty in Iran, for the primary data collection. The research has covered three levels of education i.e. primary, secondary and tertiary. The study covered two primary and two high schools, as well as three universities in Tehran. Fifteen teachers and faculties were purposively selected from both the sexes and the age group of 30-50 to be interviewed. Due to the stifling educational environment in Iran and lack of freedom of speech, any other type of research might affect the reliability of the findings. Hence, this research methodology was the only one found appropriate for pursuing the study.

Findings

The main findings of this research are as follows:

- The result-oriented or exam-oriented education in Iran has a negative impact on creativity. This approach makes students view education as nothing more than merely passing examinations. Result-orientation has stifled students' imagination, creativity and sense of self-qualities crucial for their ultimate success in and out of the classroom.
- Since exams are based on the material given by the educators and the textbooks, students depend highly on the teachers and the faculties. They are followers rather than participants in the educational process.

- Some boards that are assigned by the Ministry of Education and Training, and the Ministry of Science, Research and Technology design most of the exams and the questions. This is one of the ways in which government controls the pedagogy directly and strictly. The questions are based on textbooks; hence the students have to follow the information provided in these books, without using their creativity to respond to the questions in different ways or their critical thinking to analyze different issues.
- Ideological subjects like religion, and Islamic studies are taught across every grade and at all levels of education. The content of these subjects must be learnt and followed, giving students no right to ask any question that is in conflict with the beliefs, or even analyze the material. This can be considered as another barrier to students' creative and critical thinking development process.
- The boards of authors present the syllabi and the contents of education to the Supreme Council of Cultural Revolution for its approval. The council checks the contents thoroughly to make sure that they comply with the Islamic ideology. In this way, the ideological values are reflected in the contents of education. It also limits teachers and faculties from bringing creative ideas to the class.
- There is a filtering process in selection and recruitment of teachers and faculties that is based on the ideological values. Those who are selected either believe in the dominating ideological values, or have to pretend it. This recruitment policy is purposely adopted to suppress academic freedom and to prevent criticism of the status quo. Teachers and faculties selected in this manner are less likely to encourage creative and critical thinking in their classes.
- In the selection process, teachers' and faculties' ideological beliefs and their loyalties to the regime are given much more credit than their scientific and academic qualifications. This may lead to recruiting candidates who lack enough knowledge for the teaching positions. It is less likely that a teacher or a faculty who does not have a vast knowledge gives enough opportunities to the students to discuss on different issues or ask different questions. This can be considered as another factor hindering creativity development among students.
- The government's efforts to ensure an Islamic atmosphere in educational institutions and to islamize the curricula, as well as its strict control over the affairs of all institutions have resulted in an environment of fear wherein educators engage in self-censorship. To insulate themselves from charges of subversion, educators usually avoid using creative teaching methods, or even providing opportunities for the students to be creative or practice critical thinking in the class.
- Publishing research or opinion that contradict the views of the government or question government policies is banned. Besides, the research projects are often assigned to those who take the 'official line'. Hence, there is very little scope for conducting research on creative topics that usually does not fit into government's guidelines.
- Ideological values play a very important role not only in selection and recruitment, but also in performance appraisal process. As a result, to be employed and promoted, educators are directed to reproduce the dominating ideologies even if they personally do not believe in them. On the other hand,

creativity is considered as a less important factor to be assessed in teachers' and faculties' performance appraisal.

- Religious and political affiliations influence who is able to teach and research. Many educators, especially faculties, are affiliated with the government. Their presence has created an environment of intimidation for both their colleagues and students. This is also a serious obstacle to creativity development and critical thinking.

The main educational macro-policies affecting creativity

The government's macro-policies have negatively affected creativity in different ways. One of the policies has been intensifying the result-orientation approach as discussed above. The scores obtained by students are usually considered as the most valuable achievement. This is a factor demotivating students to be creative because the exam questions are only based on the textbooks. They do not see any reason for engaging in creative activities other than what is taught to them, as creativity is not assessed in the education system.

Exam-centric means a system that controls what students do and do not know (Kirkpatrick & Zang, 2011). In general, teachers and faculties are viewed as the main provider of knowledge and information who should often be obeyed by the students. Such education that holds examinations as its core component downplays the ultimate purpose of education i.e. critical thinking.

Another policy having adverse impact on creativity is centralization of faculty recruitment under the direct and strict control of the Ministry of Science, Research and Technology. As it was discussed earlier, in the recruitment process candidates' religious and political affiliations, as well as their political and ideological views are more determinative than the level of their knowledge. As a result of this policy, many candidates who are not qualified enough in terms of knowledge get the opportunity to be recruited. Lack of enough knowledge causes them to avoid providing students with the opportunity to discuss about different issues other than the syllabus. It ultimately leads to creativity being hampered.

Since it was founded, the Islamic regime of Iran has been trying to give legitimacy to its actions and policies. The government tries to build an image of a modern and updated system that gives freedom of speech to the intellectuals and the scholars. To build this image, the government has created platform for research and academic publications, and tries to facilitate increase of the number of such scholarly activities. However, the political and ideological control over educational institutions tightens the scope of such activities. As mentioned before, research projects are also often assigned to those who have political or religious affiliations. In addition, there are restrictions on certain research topics, research works that contradict views of the government are banned, and government policies cannot be questioned or criticized. That is how the scope for creativity among faculties is restricted. Obviously, this prevents scholars to use their creativity in developing new ideas and contributing to the knowledge in social sciences and humanities. Most of the publications lead to reproducing, rather than producing science.

The government appoints all who occupy managerial and decision-making positions at schools and universities. This is another policy that creates an environment of fear and ultimately suppresses creativity in educational system.

In Iran, creativity has been especially suppressed in the domain of social sciences and humanities. It has always been attempted to create scientific conflicts in these fields. The ideologue regimes in general, and Islamic regime of Iran in specific, have always endeavored to hinder different alternatives in social sciences and humanities by developing and providing ideological social sciences in parallel with Western social sciences. These efforts have been made in all of the four dimensions that were discussed earlier. Among all four dimensions, organizational structures, and training methods and pedagogical practices have been more affected by these efforts. By devaluing any alternative other than what is imposed, the educational system indirectly hinders the path to creative thinking. On the other hand, by publicizing the quantity of the research and publications that are mainly reproducing the existing knowledge, the government tries to show dynamicity on the local sciences.

Conclusion

In the past, the ideologue regimes' policy was mainly concentrated on limiting access to education. However, the growth of access to educational resources and the expansion of educational interactions have made these regimes update the forms of suppression in order to comply with the recent changes. Violation of academic freedom is one of the main methods implemented by such governments in order to narrow the space for creativity. The stifling educational environment suppresses creative and critical thinking.

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***Using DNA Barcoding as a Pedagogical Tool to Teach Genetics
to Undergraduates at Queensborough Community College***

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Abstract

Over the past five years, the author has noticed that students who take the Biotechnology (lecture/lab) first, do better in the Molecular Genetics course than those who do not. This is especially true for the part that explains the central dogma of biology, DNA, Restriction Enzymes, PCR amplification, Gel electrophoresis and DNA sequencing. The author strongly believes that this is because those students who have not conducted hands on experiments cannot fully understand these complex concepts from a textbook alone. To provide her students with a better learning experience, the author changed her pedagogical strategy. She incorporated a DNA Barcoding lab, developed by Cold Spring Harbor (CSHL), in the Genetics course as an honors component. Her Biotechnology students will serve as mentors to Genetics students while being closely supervised. A detailed curriculum and assessment strategy was developed for the DNA Barcoding. Grades for students will be compared before and after the implementation of this project, along with pre and post surveys taken by the students. Student gains made will be discussed.

Keywords: Undergraduate Research, Genetics, Pedagogy.

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Hypothesis

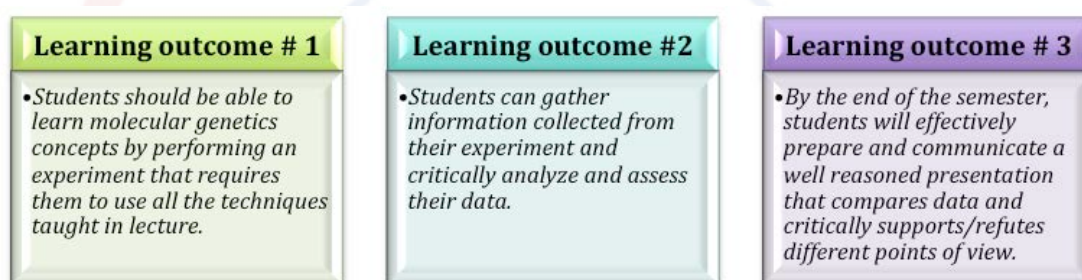
We hypothesize that if Genetics students are exposed to a hands on lab with a hypothesis driven experiment, they will have a better understanding of molecular biology concepts and techniques related to DNA i.e. Gel electrophoresis, Restriction Enzyme digests, PCR, DNA sequencing etc. than those not exposed. This will be reflected in their grades for that particular exam during the semester as well as their attitude towards Molecular Genetics. This will be demonstrated by the post surveys given to the students. We will also compare grades from previous semesters.

Specific Aims of this study:

Specific Aim 1: Genetics students better understand the concepts of molecular biology after hands on DNA Barcoding experiment.

Specific Aim 2: Biotechnology students involved in supervising the Genetics students will reinforce their techniques and skills that they learned in class.

Anticipated student learning outcomes:



Background

Throughout higher education, there is a general agreement that strengthening the teaching-research approach will benefit students, faculty and institutions (Osborn 2009).

Research indicates that students will learn better if they can relate their learning to actual research (Seymour 2004). During the Spring semester of 2013 Queensborough Community College (QCC) has decided to institutionalize and fund undergraduate research as a high-impact pedagogical activity (Kuh, 2008). The PI is a member of Faculty Initiative Group on campus who is responsible for integrating research in curriculum. DNA Barcoding Lab developed by Cold Spring Harbor Laboratory (CSHL) is an excellent tool that can be used to incorporate a high caliber research experience for students.

We know very little about the diversity of plant, animal and microbe life on our planet. Thousands of species go extinct each year without ever having been identified. DNA barcoding is a state of the art technique that can unambiguously identify an unknown species by amplifying, sequencing and analyzing a portion of the genetic material. The genetic source doesn't even have to be a whole organism; samples can be obtained from ancient decomposing material

underground, fossils and even undigested tissue from the stomach or waste. This revolutionary technique has identified new species, detected food fraud in the fish industry, analyzed the food sources of elusive animals, and assessed the quality of drinking water.

DNA Barcoding relies on a short, highly variable region of the genome to identify species. For plants, a region of the chloroplast gene *rbcL* (RuBisCo) is used where as for animals, a region of mitochondrial gene *COI* (cytochrome c oxidase subunit I) is used (Source: DNA Barcoding 101 CSHL manual).

Research Question

Do students exposed to hands on lab experiments understand molecular concepts more than when only provided with a lecture from a textbook? Since our Genetics course at QCC is only a lecture, the regular class does not experience any wet labs. This project will provide a unique wet lab experience to the students who are learning molecular techniques (Genomic DNA extraction, Gel electrophoresis, PCR, DNA sequencing and analysis) solely from textbook and lectures. Students will need to spend club hours outside the regular class time to gain the experience that will enhance their understanding on molecular genetics.

Students who opt to take Genetics for honors credit will sign an honors contract for the DNA Barcoding project in collaboration with Cold Spring Harbor Lab.

Project Description

Students worked in groups of three to do the following:

1. Develop a hypothesis driven project on the Biodiversity in and around campus or anywhere in New York City.
2. Collect a sample of tissue from a plant or an animal and log it correctly using CSHL protocol.
3. Students performed the following experiments:
 - Genomic DNA Extraction
 - Gel Electrophoresis
 - PCR amplification specific to a Mitochondrial or Chloroplast Gene sections
 - DNA sequenced
 - Align sequences using NCBI BLAST
 - Analyze the gene sequence and make phylogenetic trees using DNA Subway software developed by CSHL – DNA Learning Center
4. Students work in groups of 3 to share their projects in detail and discuss their results in a Power Point presentation conducted at the end of the semester either at the QCC Honors conference in the spring or at STEM Research Club event in the fall.

Timeline for completion of the project during the semester:

<i>Timeline</i>	<i>Benchmark</i>
<i>Week 1</i>	<i>Students agree to the honors contract and sign honors contract</i>
<i>Week 2</i>	<i>Faculty shares the project details on Blackboard</i>
<i>Week 3</i>	<i>Students research background information and post that on Blackboard</i>
<i>Week 4</i>	<i>Scientist from CSHL visits QCC and gives students details about the project</i>
<i>Week 5</i>	<i>Students start the first wet lab phase of the project DNA Extraction</i>
<i>Week 6</i>	<i>Students start the second wet lab phase of the project PCR, Gel electrophoresis</i>
<i>Week 6</i>	<i>Instructor mails DNA samples out for sequencing and get the results</i>
<i>Week 7</i>	<i>Students submit their abstracts for Honors Conference or other relevant local conferences</i>
<i>Week 8</i>	<i>Students analyze DNA sequencing results using NCBI database</i>
<i>Week 9</i>	<i>Students upload their results in CSHL database</i>
<i>Week 10</i>	<i>Students make phylogenetic trees of the sample/species analyzed</i>
<i>Week 11</i>	<i>Students make Power Point and show to the instructor</i>
<i>Week 14</i>	<i>If accepted, students present their work at Queensborough Honors conference</i>

Methodology

For Wet Lab: Students need all molecular biology instruments required to complete their project. All equipment is readily available in the QCC Biotechnology Lab. The lab is well equipped with all molecular biology instrumentation required to accomplish the project. Also available in this lab are computers with internet access to complete the bioinformatics part of the project.

For Analysis of Student Knowledge Gain: PI compared the grades for Exam IV in the course that covers all the topics learnt by completing this project. These grades were compared two ways: One Genetics students who signed up for this barcoding projects vs. those who didn't. Second, overall grades for these students vs. previous semester students who were never exposed to this experience.

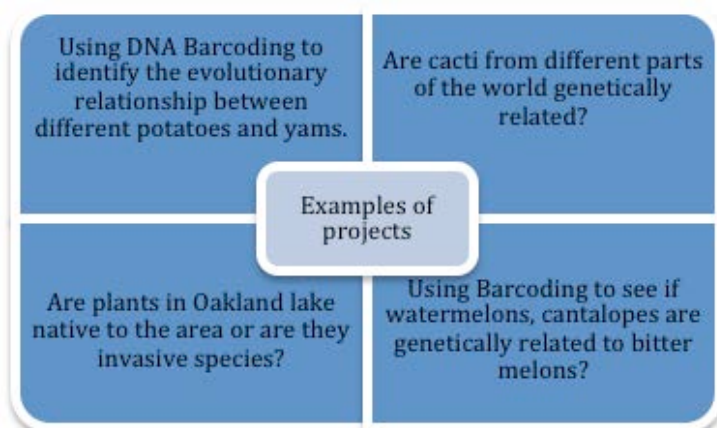
Online Pre and Post SURE surveys were developed by CSHL. They have already agreed to allow our students to use those surveys which will demonstrate student gains made at the end of the project; not just in skills, but attitude towards science in general. These surveys have been well tested and implemented by CSHL for thousands of students who are involved in this project all over New York City. This undergraduate research project will be repeated in the class in the future when and the number of students involved is significantly larger, the survey data will be collected on a long-term study to understand the impact of undergraduate research in curriculum.

Currently, the investigator created a Reflection Activity survey for the students at the end of the semester and the results are shown below.

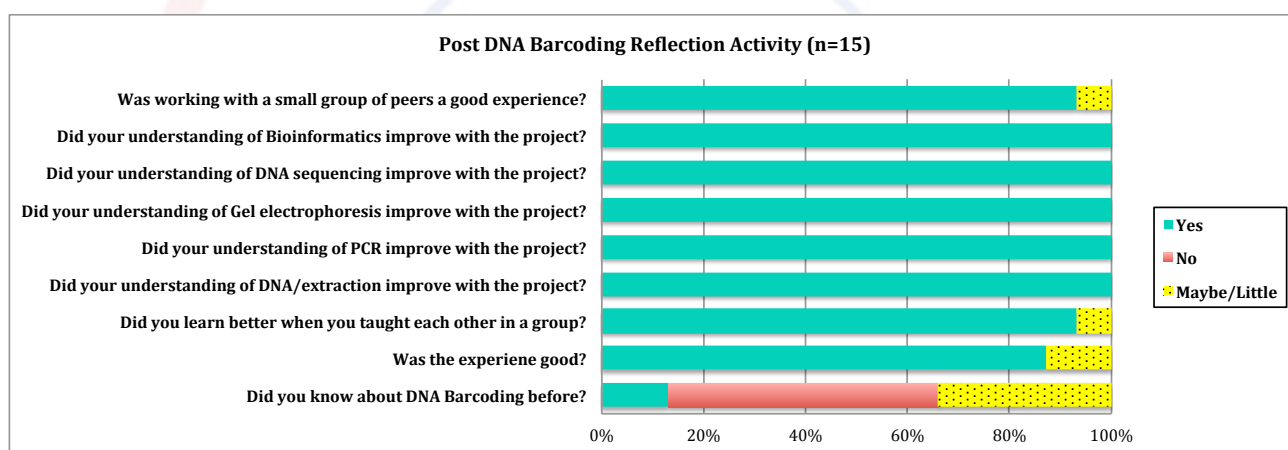
Results:

1. Types of experiments done by students varied significantly. Since it was a hypothesis driven project, students were at the liberty to form a group

consensus and to come up with their own, projects. Here are a few of the examples of projects students came up with:



- Results from the DNA Barcoding Reflection Activity survey given to students at the end of the semester.



- Data from the lecture exam that covers the topics done by the students as part of this experiment.

Before: (n = 44)

STATUS – degree to which students have met the specific learning outcome	Excellent (15 points)	Good (12 points)	Minimally Acceptable (9 points)	Poor (5 point)	Insufficient evidence (0 points)
No. of students	7 (44%)	4 (25%)	3 (19%)	1 (6%)	1 (6%)

After: (n = 16)

STATUS – degree to which students have met the specific learning outcome	Excellent (15 points)	Good (12 points)	Minimally Acceptable (9 points)	Poor (5 point)	Insufficient evidence (0 points)
No. of students	12 (22%)	9 (20%)	15 (40%)	5 (11%)	3 (7%)

RATIONALE - The assessment question is a critical thinking, multi-step, three part question a) b) and c). Each part is weighed equally 5 points each. If everything is answered perfectly a student can earn 15 points or Excellent. If one point is lost in each section the rating is still good at 12 points. However if student earns 3 points in each section then minimally acceptable at 9 points however anything less than that is poor understanding of the concepts and therefore not acceptable.

Student Quotes:

- *“Best lab experience I had at QCC!”*
- *“It was really nice to work in a group, even though we didn’t agree sometimes but it was nice to work together on a final presentation.”*
- *“Most fun I had working on a project!”*
- *“We didn’t want our project to end.”*
- *“I had never given public speech before, I was inspired by my daughter to make a presentation, I practiced with her.”*

Analysis of results

Only a hand full of students knew something about the DNA Barcoding while most of them had never heard about the project. The reflection data collected from the students indicate that they enjoyed the experience and most of them felt that they learned a lot in a group setting when they taught each other. As was hypothesized by this project, the experience of the project increased their understanding of DNA extraction, PCR, Gel electrophoresis and DNA sequencing. These concepts are otherwise really hard to understand in lecture alone.

The author learned that a lot of students have a hard time mastering this multi step, critical thinking problem because it requires student to have knowledge of 7 different techniques learnt in class and use it to complete one problem. Those students who have done these techniques hands on in a lab have a better understanding of the concepts compared to students who learn these concepts in lecture alone. Even though the numbers are small at this point, the data clearly indicates that undergraduate research in curriculum can have a high impact on only the grades on the exam but overall deeper understanding of the material. It also builds critical social skills of working in small groups and professional skills of making Power point presentations and delivering them in front of audience.

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A large, faint watermark of the IAFOR logo is centered on the page. It consists of two concentric, slightly irregular circular arcs, one in a light red/pink color and the other in a light blue color. The word "iafor" is written in a light blue, lowercase, sans-serif font in the center of the arcs.

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***Sustainability in the Curriculum and Teaching of Economics:
Transforming Introductory Macroeconomics***

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Official Conference Proceedings



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Introduction

Present models of economic growth primarily focus on the role of expenditures as captured in the commonly cited economic indicator, gross domestic product (GDP), where GDP is defined as the sum of final goods and services sold within a country's natural borders. Noting that a country's expenditures are referred to as "aggregate expenditures" and that the majority of spending is specific to consumption or consumer spending, especially in the United States where this spending category is nearly two-thirds of annual GDP (other expenditure categories for GDP include investment spending, government spending and foreign spending as proxied by net exports), there exists a significant relationship between consumer expenditures and macroeconomic growth, justifying the standard acceptance of consumption-based expenditures as being a significant driver of economic expansion. Given the consumption and growth relationship, consumption values and behaviors have a significant impact on economic outcomes as well as other parameters including the environment and social and economic equity, where the latter are defined as relating to disparities between groups within a country, as well as across countries.

Following a discussion of the impact of consumer-led growth on sustainability parameters: the environment, economic and social equity, this paper provides an explicit linkage between the measure of economic progress in universal use, GDP, and the degradation to common global resources, connecting the endogeneity present between the modeling of economic growth and the values and behaviors that support the outcome of the very same growth. A discussion of the present teaching methods specific to introductory macroeconomics provides the foundation for an innovative, replicable, and grant-funded case study for introducing sustainability. The curriculum variants discussed are not in widespread use and at present, there are no standard textbooks for the instruction of Principles of Macroeconomics that explicitly include sustainability and provide sustainability-based economic parameters for alternative evaluation to standard economic growth as presently and singularly enumerated in GDP. The value-augmenting outcome of the sustainability inclusive curriculum case study is captured in a qualitative assessment of student reaction and absorption of sustainability as a value and behavior catalyst and provided in summary form.

The Present State of Introductory Economics Instruction

Principles of Macroeconomics is typically taught as one of a two part introductory requirement leading to the formal study of Economics and other undergraduate business majors. The course focuses on the aggregate factors that define economic progress as this concept relates to the "standard" expenditure-based variable of quantifying growth: gross domestic product (GDP). The course incorporates elements of Microeconomics to establish the foundation for the assumptions of individual and firm behavior where such behavior is guided by a "rational" agent assumption and the underlying premise of rational decision-making is defined as maximizing return while minimizing cost.

Costs are assumed to be priced through efficient market assumptions and are therefore simplified as being indicative of market pricing with limited consideration devoted to the potential for systemic under-enumeration of costs resulting from informational, regulatory, or exploited variations. Additionally consumption is not evaluated as a

value that is enabled through pricing distortions, rather consumption, along with other expenditure components, investment, government spending, and net exports, are discussed as “given” parameters of economic growth.

As Nelson (1995) points out, economics evaluates efficiency with respect to the “use of resources to maximize production and consumption, not by the moral desirability of the physical methods and social institutions used to achieve this end.” Therefore sustainability does not enter standard economic thinking. Reduction in consumption in the current period is only addressed through the lens of an increase in consumption in a later period. Nelson notes, “The possibility that consumption should be reduced because the act of consumption is not good for the soul, or is not what actually makes people happy, has no place within the economic value system.”

In their analysis of the teaching of the Principles of Macroeconomics, Knoedler and Underwood (2003) found that “the myopic teaching style of economics is attributable to both economic instructors and to the leading texts in use for the instruction of Principles of Macroeconomics courses.” Furthermore, they state that the standard teaching of economics did not provide access to alternative approaches, for example, normative economics was found to be “demonstrated by a quick example as something to be avoided at all costs, unlike the exercise in positive economics.”

The seeming lack of attention to values and behavior as captured within standard expenditure based macroeconomic modeling has distanced students from the tangibility of economics, limiting their understanding of the explanatory potential of economics and the application of economics as both a cause and a remedy of unsustainable practices. As noted by O’Hara (1995), understanding of economics is essential to sustainability and an understanding of the social and ecological context related to observable sustainability issues is requisite in the evaluation of a solution, “sustainability challenges us to recover the links between social and ecological contexts.”

To the extent that economic growth has been and continues to be a national goal both within and without the United States, there is an inherent endogeneity between the current expenditure-based teaching of Principles of Macroeconomics and the observable natural resource degradation, and economic and social inequities. The focus on implicit consumption-led growth limits the potential for sustainability, as myopic consumer-led, immediate gratification-oriented growth (utility and profit maximization) as captured in the modeling of economic activity is inconsistent with the quantified evaluation of the externalities caused by production to meet consumption demand (Czech, 2000). Boran (2006) points out, albeit subtly, economic modeling is limited in its ability to adequately assess and address inequities that may arise as a result of standard economic analysis. Specifically, the increase in pollution that arises due to an inability to properly quantify the environmental burden of ambient emissions at a specific point in time.

The practice and teaching of economics, implicitly influences and reinforces consumption-led growth while contributing to the development of economic agent behavior. In turn, this learned economic literacy, in essence, contributes to the scientific approach to evaluating economic outcomes. Therefore, if the discipline does not include values and behavioral outcomes related to sustainability, it can be stated to

be a contributing element of the present-day outcome of a lack of sustainability.

Rationale for Explicit Integration of Sustainability in Economics

The present multi-disciplinary emergence of sustainability is a result of anthropogenic attribution of the increasing speed of climate change and environmental degradation (Lovejoy, 2014). Adverse impacts to global resources may not have been properly noted or addressed during the most recent period of human-led environmental modification as defined by the period from the late 17th century to the present. Further, the environmental impact presently observed, can be attributed to the myopic desire and attainability of human-centric, higher quality of life standards accessible through changing economic structures as addressed by early economists and political philosophers, Adam Smith and Jeremy Bentham. As noted by Nelson (1995), “the present shift from efficiency to sustainability no doubt reflects in part the moral disappointments of the twentieth century, relative to the hopes for economic progress that were widely shared at the beginning.”

Efficiency has been simplified in economic modeling to account for “process efficiency,” which through the most recent period has been evaluated as present costs relative to revenue generation. Costs articulated in standard evaluation have rarely been holistic or inclusive of non-quantifiable components to production; therefore, costs as described have not included items that were not readily quantifiable or were created as a result of natural resource utilization, degradation, or replenishment. Common assets such as water, air, and land were not included in production assessments; furthermore, damages resulting to any of these common elements were not articulated unless indirectly addressed as being a part of social and governmental regulation.

Anthropomorphic impacts related to production and consumption, inclusive of profit and utility maximization have been significant. To a large extent this is attributable to the lack of inclusion of the inter-relationship between the environment and human activity, as is captured in the concept of sustainability. Explicit attribution of sustainability in economics serves to increase awareness of the consumption and production linkage to the adverse externalities being currently faced, by also promoting, within a classroom setting, the endogeneity of values to economic outcomes. By focusing on the economic, social, and environmental outcomes from an expenditure-based view relative to the quality of life outcome attributable to a sustainability value paradigm, students are able to evaluate their own values, including the attribution of their personal values, and to then develop awareness of alternative value structures that promote balanced growth along the lines of economic equity, and social and environmental justice, all of which comprise the concept of sustainability.

Principles of Macroeconomics: Sustainability Integration Case Study

As part of a semester-long Principles of Macroeconomics course and following student introduction to basic macroeconomic concepts and related market mechanisms (movement along, shift of supply and demand; general understanding of consumption led growth, and the behaviors or values embodied within the framework of growth as it is currently defined and evaluated through GDP), students were

introduced to the aggregate expenditure function¹ and the explicit need for consumption in the evaluation of economic growth.

Following the introduction of the foundation of macroeconomic variables and concepts, students were asked to fill out a questionnaire, where the questionnaire focused on the student's understanding of the relationship between behaviors and economic outcomes through the lens of the values that were of significance to the student. Students were provided with the opportunity to comment on the rationale for the values expressed in their actions. The questionnaire did not directly address sustainability, though students were asked if they had taken a course in sustainability or that incorporated sustainability. Additionally questions were asked to assess the conspicuous consumption and social basis for consumption and expenditure behavior. The questionnaire as provided in the Appendix, provided a baseline for reviewing any changes in student value orientation as a result of the explicit introduction of sustainability.

Students were then introduced to the concept of consumerism and were made aware of the endogeneity between marketing, advertising, consumption, credit access, and GDP growth through detailed discussion of the aggregate expenditure function, as well as monetary and fiscal policy mechanisms. Using standard aggregate demand and supply models, students were introduced to the impact of excess demand on natural resource utilization, exploitation, and development; and were provided with an understanding of non-articulated and under-enumerated costs and asked to assess the benefits and costs of trade from both a profitability and environmental-social welfare perspective. Further, students were introduced to the role and purpose of the central bank and the government in the target goal of monetary and fiscal policy to maintain full employment as defined as the employment level consistent with the maximum aggregate expenditure level found at the optimal economy-wide production capacity (full production capacity) at a given point in time.

The process of instruction and assessment of sustainability factors related to the dependence of consumption on credit; trade and exploitable, quantifiable cost differentials; natural resource use and cost of degradation and replenishment; marketing and consumer demand; and the tragedy of the commons as related to the exploitation of common resources. All of the mentioned topics were addressed and evaluated as a class and on an individual student basis.

Weekly readings related to a macroeconomic topic and its sustainability correlate were assigned from a variety of sources, including popular press articles and a grant sponsored non-academic text selected specifically due to its retail target audience and its tangible examples related to predicted zero GDP growth levels due to both the lack and future need for sustainability practices.

Each week, four students were selected to be discussion group leaders, with a responsibility to facilitate weekly in-class sustainability focused discussion related to an aforementioned macroeconomic topic and corresponding readings. The group

¹ *Aggregate expenditure function:* $Y = C + I + G + (X - M)$; where Y identifies the total amount expended in a given economy on goods and services over a given period; C is consumer expenditures, which in the United States accounts for two-thirds of Y; I is investment spending attributable to businesses; G is government spending; and $(X - M)$ is net exports and is reflective of foreign spending on domestic goods and services.

leaders were required to develop at minimum two questions (selected weekly questions are provided in the Appendix) specific to the macroeconomic and sustainability-based reading assignment for the week and the questions were distributed to all students one class period prior to scheduled class discussions. Students were expected to address all questions prior to class and to formally submit answers for two questions via an electronic journal. The questions, discussion, and journal entries were meant to provide students with an assessment of the role that implicit values have in individual decision-making and to increase awareness of how implicit social values impact individual consumption behavior and thereby eventually culminate in economic outcomes.

The integration of sustainability overlapped the standard course curriculum. Weekly sustainability topics followed and countered implicit values within the subject matter of the course, giving students an ability to understand the present macroeconomic phenomenon and then evaluate the same through a sustainability lens. The focus of macroeconomic and corresponding sustainability discussion was consumer-based consumption as an integral and targeted component of aggregate expenditures and corresponding GDP growth.

The students' weekly journals, discussion participation, and initial questionnaire submission provided a qualitative capture of the students' individual evolving and static economic values and behaviors. The responses detailed in these vehicles though the course of the semester were compared against the exit essay, which asked students to describe what change if any did a greater understanding of macroeconomic principles in conjunction with implicit consumerism and understanding of the need for sustainability values have on their individual consumption behavior and likely future behavior. The essay along with the chronology of responses was used to assess the impact to decision-making and economic rational agent creation, resulting from taking a course in introductory macroeconomics that incorporated sustainability.

Values, behaviors and economic outcomes: The case for integrating sustainability

The integration and assessment process described in this paper provides one example of explicit integration of sustainability in the introductory economics curriculum. Though not exhaustive in the mechanics implemented, the curriculum revision shared reflects an innovative approach to the introduction of sustainability in introductory economics curriculum. As noted the curriculum introduced in this paper incorporated a required self-assessment based journal. Student tracking of own-value led consumption behavior and the evolution of the value/behavior relationship through the course of the term, provided a qualitative assessment of the outcome of the introduction of sustainability to both values and related behaviors as well as the development of the student into a sustainable rational economic agent.

The results of the grant-based project indicate what would be expected, understanding of implicit values in conjunction with the global issues resulting from the same values fosters modification of behaviors, potentially culminating in the development of sustainable values and modified economic outcomes, as well as the potential for the establishment of revised and universally adopted metrics to assess economic growth.

Student discussions and responses provided clear evidence that as awareness of environmental issues including waste disposal and plastic use increase, modification of behavior in conjunction with an increased awareness of economic drivers such as, marketing, to both promote and align with consumption behaviors, and access to consumer credit, to promote inter-temporal consumption, can be augmented.

Concluding course student commentary included a cessation in the purchase of plastic bottles and use of recyclable and reusable containers, to reduction in the use of water for showers and daily hygienic activities, to an awareness of the adverse environmental, social justice, and credit impact of the purchase of excess clothing as a result of marketing induced need or want.

The underlying rationale for the introduction of sustainability in a Principles of Macroeconomics course was the premise that most individuals are not rational economic agents; rational economic agent behavior is created or taught through economic literacy, which can be considered as an implicit outcome of the introductory economics course objective. Rational agent behavior is defined as including an understanding and conscious incorporation of cost-benefit analysis (utility maximization) and other economics-based parameters in individual decision-making. As a result, most decision-making is fostered by limits that are consciously imposed, awareness of sustainability in consumption decisions can therefore, modify utility decisions by including the impact to the greater environmental good in consumption decisions. For example, in a consumer-oriented society, marketing and advertising as well as convenience drive behavior, where as, when the concept of holistic evaluation in decision making is presented, such that the individual thinks beyond just immediate consumption to incorporate the waste of consumption and the externalities resulting as a by-product of production—both of which are often either neglected or under-enumerated in price, consumption behavior can be augmented. Integration of explicitly stated sustainability-based alternatives influence values and resulting behaviors, culminating over time with societal traction to result in a modification in economic outcomes. The latter is the subject of the author's present research interests, which are focused on market inefficiency as a result of inappropriate categorizations of environmental resources as *abundant* rather than *scarce*.

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***Transformative Education:
A Tool for Sustainable Educational Development in Nigeria***

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Abstract

Education is the key to human development and progress; an indispensable tool for a nations' growth and overall development. In order to proffer workable solutions to some contending issues in our educational sector; this study examined the concept of transformative education for sustainable development and the role it plays if properly implemented in our educational system. The researchers opined that the Nigeria educational sector is in urgent need of transformative pedagogy in line with the transformation agenda in the nation's polity. A survey research design was adopted for the study and data were collected using a questionnaire and interview method. The population for the study was about 6000 thousand stakeholders in the education sector comprising of school principals and high ranking personnel in the ministry of education out of which a sample size of 361 respondents was randomly drawn in line with Krejcie and Morgan (1975) formula for determination of sample size. Data analysis using simple percentages and Chi-Square statistical analysis techniques showed that to a low extent; information is easily accessible and curriculum reforms are speedily implemented while to a high extent entrepreneurship innovations is perceived to enhance development. Even though particular emphasis was paid to the Nigerian context; the findings in this article is reflective of some other Africa countries. Feasible recommendations for sustaining development in education and the actualization of the nations' vision for her educational sector by the year 20/20/20 were made.

Keywords: Transformative, education, tool, sustainable, development.

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Introduction

In today's multicultural societies, it is crystal clear that teaching in any classroom situation is a cross-cultural reality as teachers and their students differ remarkably in terms of race, ethnicity, gender, class, language, and other variables. This reality has necessitated the need to require diversified courses that are designed to help pre-service and in-service teachers develop the knowledge, skills, and competencies needed for successfully working with diverse student populations, as well as prepare all students for effective citizenship in a multicultural democracy (Ukpokodu, 2009).

Transformative education globally refers to a learning process that brings about deep and significant changes in an individual and ultimately culminates in similar changes at the societal level principally brought about through innovative and creative teaching-learning, curriculum reforms, and appropriate policy at the school level. It is a development paradigm which meets the needs of the current generation without compromising the ability of future generations to meet their needs (UN, 1989). More so, according to Dewey (1933) transformative learning is when a person comes to see some aspect of the world in a new way and finds new meaning as well as values to it. It is a process whereby "we transform our taken-for-granted frames of reference to make them more inclusive, discriminating, open, changeable, and reflective so that they may generate beliefs and opinions that will prove more true or justified to guide action" (Mezirow, 2000).

The theory of transformative learning is concerned with how learners critically reflect on experiences including existing knowledge and beliefs and how they integrate new knowledge to reflect a change in experience. Thus, for learning transformation to occur; individuals must become aware of their current habits of mind and points of views. More importantly, engage in examining, reflecting, and challenging their assumptions and premises for the mind-sets, as well as developing alternative perspectives. In addition, students would have to alter their frames of reference by critically reflecting on their assumptions as well as beliefs by consciously making and implementing plans that would bring about new ways of defining their worlds and general understanding.

Education in its broadest sense refers to the ways in which people learn or acquire skills, gain knowledge and understanding about the world, and about themselves. It is concerned with the general acquisition of values, knowledge, skills as well as attitudes and designed to remove the chains of ignorance, superstition, and diseases. Traditionally, education has been seen as a basic tool for effecting change in the learner; and the school an important socializing arena for preparing students to become active citizens as well as socialized individuals who become integral part of the society in which they live (Okojie 2007).

Sustainable development in the same vein is worldwide desired paradigm shift for the developed and the developing countries, and it refers to "a change of culture that develops and embodies the theory and practice of sustainability in a way which makes an individual critically aware (Sterling, 2001). It is a transformative paradigm which values, sustains and realizes human potential in relation to the need to attain and sustain social, economic, and ecological well being; recognizing that they must be part of the same dynamic". Thus, it is a necessary tool for liberating humanity from ignorance (Isiugo-Abanihe, 1996), and a key factor to bring about the necessary

awareness and understanding to meet the sustainability challenge in this century (HEFCE 2009; Clarke 2012). However, developing countries like Nigeria in the continent of Africa have not put some basic tools in place to achieve sustainable development particularly in the educational sector (Raheem, Kupari, & Lasonen, 2006 UNESCO 2005a).

Sustainable education is a precondition for progress in development and reduction of poverty since it helps people to earn more income and become more productive members of their society leading to the rise of localism, participative democracy, green purchasing, ethical business, health, nutrition, and efforts to achieve a low carbon economy. Through sustainable education people are empowered to transform their own lives and that of others in their communities by building capacity to utilize knowledge and information (Hamman, 2006). Although, increasing the literacy rate will not be enough to create a sustainable society; recognizing that a shift in the educational system is needed to move toward sustainability is critical (UNESCO 2013; Steier & Jorgenson 2003).

Education for sustainable development behooves that every human being acquires the knowledge, skills, attitudes as well as values necessary to shape a sustainable future. It is an educational orientation that demands including key sustainable development issues such as climate change, disaster risk reduction, biodiversity, poverty reduction, and sustainable consumption into the teaching-learning process; and requires a participatory teaching -learning environment that would motivate and empower learners to change their behaviour as well as take actions for future sustainability, as such, every school-aged child should be in the classroom. However, a set of report from UNESCO Institute for Statistics (2014) revealed that nearly 58 million children of primary school age (typically between 6 and 11 years of age) were not enrolled in school in 2012 and many of them will probably never enter a classroom as shown in Figure 1.

Education is a human right recognized worldwide as indicated in Article 26 of the Declaration of Human Rights (1948) which states that: “Everyone has the right to education”. More so, it is a general belief that equal access to educational attainment promotes social justice and cohesion and indirectly eradicates poverty. Consequently education for sustainable development promotes competencies like critical thinking, imagining future scenarios, and making decisions in a collaborative way which requires far-reaching changes in the way education is often practiced today particularly in Nigeria and some other Africa countries.

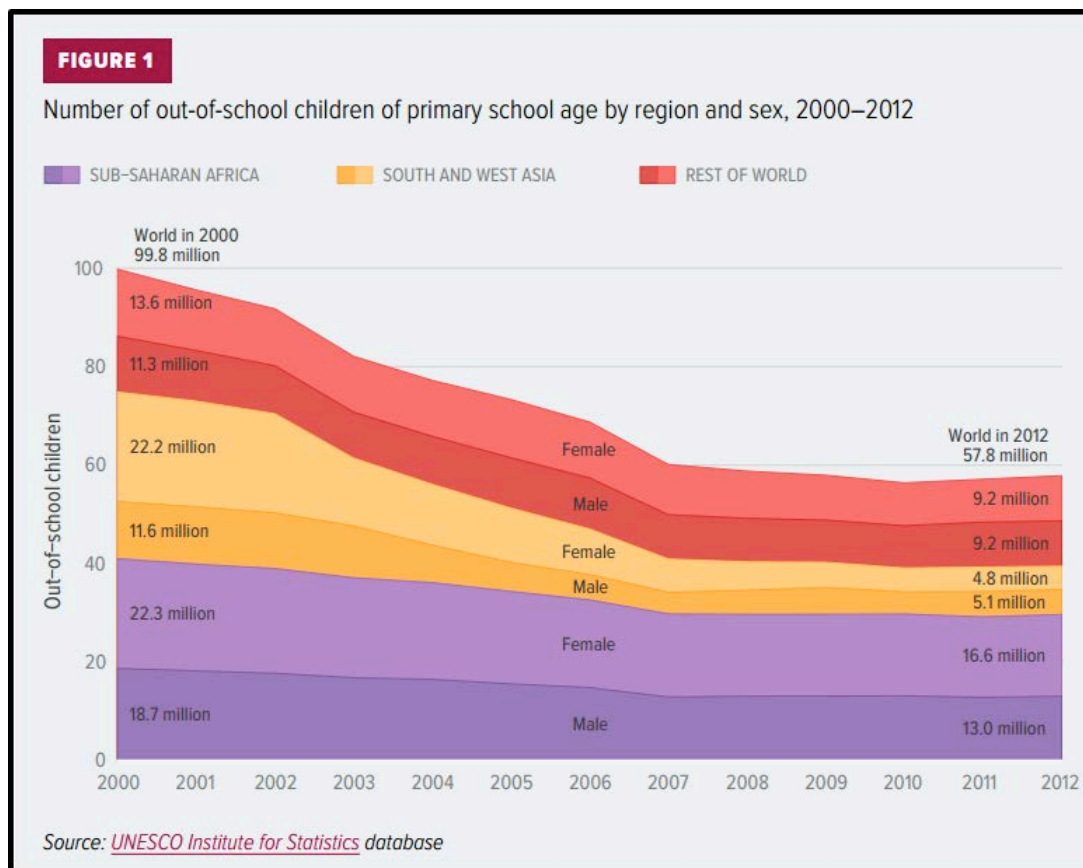


Figure 1: This is an image of the number of out-of school children of primary school age adopted from UNESCO's report.

In Nigeria, about 61% of the populace is literate but about 8.7 million children are out-of-school as shown in Figure 2. Many reasons have been attributed to the attrition in the number of out-of school children in the region but two of the pressing challenges noted by *The Global Initiative on out of School Children* are poor funding and the poor quality of the education offered in many schools (or learning crisis).

Evident in most teaching-learning environment is inadequate/overcrowded classrooms, insufficient learning materials, and unqualified teachers. As such, a large numbers of children drop out from school or repeat grades without mastering the basics. The reports which further highlighted on the importance of addressing income poverty as well as issues of location and gender; also stressed that culture, language, security, and the environment are vital considerations in improving education in this region and as such, urged African governments and donors to refocus efforts to providing free, and high quality education so that ultimately all children regardless of their backgrounds or circumstances will be in school and learning to guarantee sustainability.

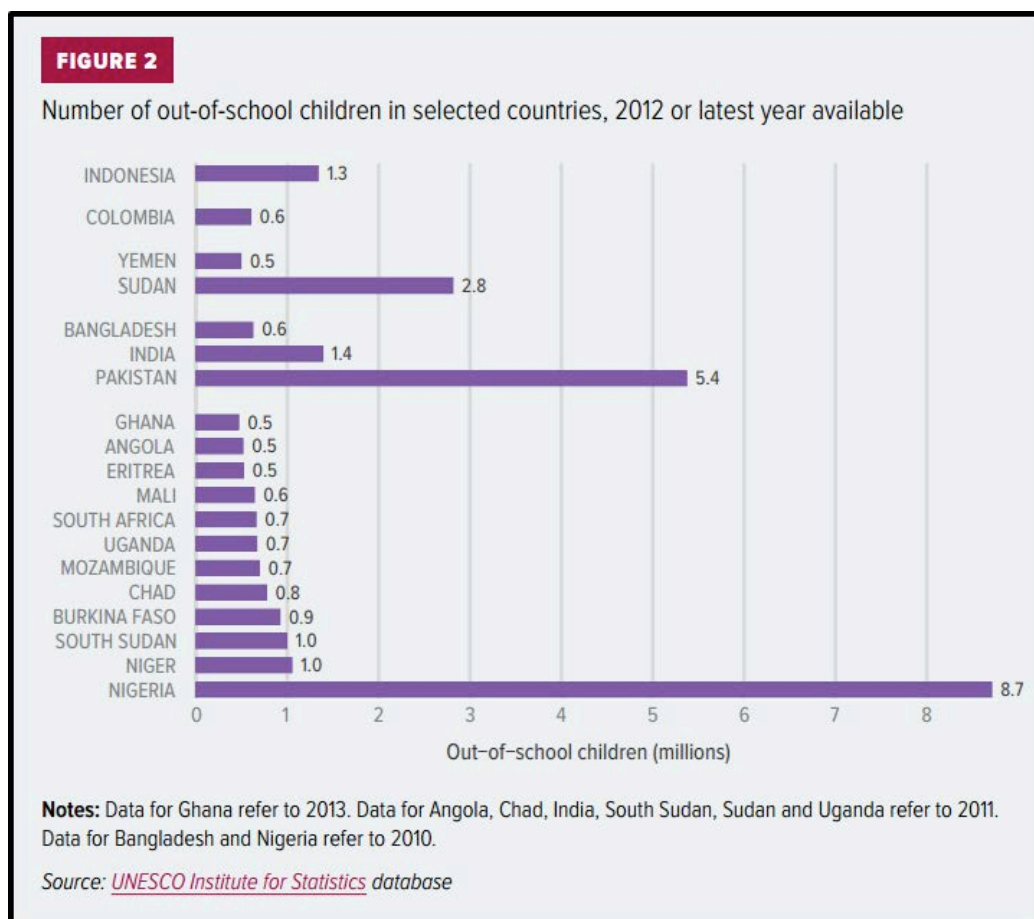


Figure 2: This is an image of the number of out-of school children adopted from UNESCO's report.

Therefore, as highlighted by the UNICEF and UNESCO's report; there is an urgent need for greater analysis and more evidence-informed planning in order to reach excluded children. This study is an effort to provide such evidence informed perception of stakeholders on the journey thus far as well as probable challenges on the way in South-East, Nigeria.

Purpose of study

The major purpose of this study was to investigate educational stakeholders' perception of transformative education as a tool for sustainable education development when properly implemented in the school system. Specifically, the study focused on:

1. Information access and sustainable education development
2. Curriculum reforms and sustainable education development
3. Entrepreneurship education and sustainable development
4. Male and female respondents' perception of the extent to which the three variables will enhance transformation and sustainability in educational development of the region

Research questions

1. To what extent is information easily accessible to staff and personnel in the educational sector to foster sustainable education development?
2. To what extent are curriculum reforms speedily implemented in the educational sector to foster sustainable education development?
3. To what extent will entrepreneurship education enhance sustainable development?
4. Is there a significant difference between male and female respondents' perception of the extent to which the three variables enhances transformation and sustainability in educational development of the region?

Hypothesis

One null hypothesis was tested at 95% confidence interval as stated below

Ho: Male and female respondents do not significantly differ in their perception of the extent to which the three variables enhances transformation and sustainability in the development of the region.

Literature review

Sustainable education in the views of Sterling (2008) implies four descriptors. The four descriptors include educational policy and practice which is sustaining, tenable, healthy, and durable. Sustaining follows that it helps sustain people, communities and ecosystems; tenable follows that it is ethically defensible, working with integrity, justice, respect, and inclusiveness; healthy follows that it is itself a viable system embodying and nurturing healthy relationships and emergence at different system levels; and durable follows that it works well enough in practice to be able to keep doing it. Thus, Sterling (2008) identified the following indicators as index to measure achievement of the sustainable education goals:

- **Information access:** larger number of communities with infrastructure in place that allows easy access to government information, public and private research, and community right-to-know documents.
- **Curriculum development:** increased number of curricula, material, and training opportunities that teach the principles of sustainable development.
- **National standards:** larger number of school systems that have adopted K-12 voluntary standards for learning about sustainable development similar to the standards developed under the National Goals 2000 initiative.
- **Community participation:** larger number of school systems and communities with programs for lifelong learning through both formal and non-formal learning institutions.
- **National achievement:** improved skill performance of students as measured by standardized achievement tests, and
- **Graduation rates:** increased high school graduation rates and number of students going on to college, vocational training, or other advanced training

This research effort will focus on information access, curriculum development, vocational training via entrepreneurship education and sustainable education development in the study area.

Information access and sustainable education development

Information literacy enables people to interpret and make informed judgments as users of information as well as become producers of information in their own right. Information literate people are able to access information about their health, their environment, their education, and work. Effective information access empowers an individual to make critical decisions about lives issues such as taking more responsibility for their own health, education, and general wellbeing. Paas (2004) opined that many changes called for in education for sustainable development (ESD) could be supported through greater integration of ICTs in the teaching- learning environment of all educational institutions.

In a digital world such as our world today; information literacy requires users to have the skills to use information and communication technologies in order to access and create information for example; navigating the cyberspace and negotiating hypertext multimedia documents requires both the technical skills to use the internet as well as the literacy skills to interpret the information. Thus, Quality education is a key to effective information access and relevant/usable information is a tool for achieving sustainable development. So, for formal education to contribute to sustainability, traditional systems and methodologies need to be re-oriented (Tilbury, Stevenson, Fien, & Schreuder, 2002; Huckle & Sterling, 1996; UNESCO, 2004).

Modern researches by scholars such as Paas and Creech (2008), Bassey, Okodoko and Akpanumoh (2009), and Sofoluwe, Shokunbi, Raimi, and Ajewole, (2013) have revealed that ICTs to a great extent advances education for sustainable development through increased access to educational materials about sustainability via educational networks, distance learning, and general databases, and helps to promote new ways of interacting in order to facilitate the learning called for in ESD which emphasizes not just knowledge but choices, values and actions. In the same vein, Bassey, Okodoko and Akpanumoh (2009) stressed the need for top management officials to embrace the rapid ICT revolutions for better efficiency. In their research in Africa, findings revealed that proprietors of public and private universities and their top management staff were slow to embrace the ICT revolutions thereby hindering quality assurance and goal attainment. But sustainability in education requires a positive and proactive attitude to ICT in all facets of human activity.

Curriculum reforms and sustainable education development

Education for Sustainable Development involves a comprehensive approach to educational reforms. It extends beyond the boundaries of individual school subjects, and as such, requires the attention of the teachers, education administrators, curriculum planners, and other related agencies so as to adequately and effectively integrate its objectives, concepts, and learning experiences into the syllabuses and teaching programmes of the schools. A basic premise of education for sustainability is that since there is a wholeness and interdependence to life in all its forms; so also must there be a unity and wholeness to efforts to understand it and ensure its continuation. Thus, a call for in-depth interdisciplinary inquiry and action needed for breakthroughs and discoveries (UNESCO, 1996).

The research project by the Institute for Educational Research University of Jyväskylä, Finland conducted by Raheem, Kupari, & Lasonen,(2006) which concentrated on differences between curricula, national systems, and national strategies for improving the quality and sustainability of education for sustainable development in Ethiopia, Ghana and Nigeria revealed that even though students in Ethiopia, Ghana and Nigeria are knowledgeable about the environmental problems they live with; many of the everyday activities around them do not show sustainable use of the environment. More so, although teachers in Africa have impacted positively on their students; they needed more support in training and enhancement of their conditions in areas such as:

- improvement of school environment such as teaching-learning environment that is very poor, the sanitation level which is very low
- instructional aides such as textbooks, pictographs, computers, etc
- other educational infrastructures such as school buildings
- better wages
- pre- and in-service training to update their knowledge and specific curriculum as well as pedagogic initiatives geared towards given greater attention to facilitate sustainable development

Capelo, Santos, and Pedrosa, (2014) research also emphasized the need for a deeper appraisal of secondary school curriculum content, learning goals, and activities in order to ascertain how well they were aligned with ESD principles, and to determine if they contribute effectively to sustainable development. Furthermore, Alabi and Okemakinde (2010) research on effective planning as a factor of educational reform and innovation in Nigeria revealed that there is a great need to plan for quality educational reforms in the nation because of the great need to accelerate structural integration of the country's plural society as well as equalize economic, social, and political opportunities.

Raheem, Kupari, & Lasonen (2006) research effort on science education for sustainable development in developing countries revealed amongst other things that specific as well as innovative curriculum and pedagogic initiatives are very poor, and the implication is the need to develop a measurement instrument for assessing sustainable development in the study area especially in science education. Since there is no proven recipe for success, and sustainability is an ongoing learning-by-doing process that actively involves stakeholders; this article reiterates the importance of ensuring an effective information access and innovative curriculums as critical elements in any education related to transformation and sustainability.

Entrepreneurship education and sustainable development

Entrepreneurship innovations are the backbone of development in the developed nations of the world because they play important roles in employment creation, income generation, and economic developments. Analysts have stressed the need for improved human capital development (HCD) in Nigeria and other developing nations on the ground that a nation's human capital is vital for future technological breakthrough, international competitiveness, and sustainable economic development. In addition, development theorists have established links between investment in

Human Capital Development (HCD), skills training, economic development, social progress, productivity growth, and technological innovations.

Several studies have also established a positive functional relationship between education and national development especially when the indicators of HCD are used as performance metrics (Becker, 1994; Awopegba, 2001; Babalola, 2003; Oluwatobi & Ogunriola, 2011; Simkovic, 2012 and Sofoluwe, Shokunbi, Raimi, & Ajewole, 2013). In the views of Oluwatobi and Ogunriola (2011) one of the potent factors that enhance the wealth of nations is that of human capital; and the better a nation's human capital, the higher the productive capacity and national wellbeing.

Entrepreneurship education is more than simply "starting a business school." Rather it is a process through which individuals are taught to identify opportunities, allocate scarce resources, and create value. This creation of value is often through the identification of unmet needs or through the identification of opportunities for change. Entrepreneurial success is thus simply the function of the ability of an entrepreneur to see and create opportunities where there seemingly seems to be none. In order words, for Nigeria to accelerate her socio-economic developments; deliberate attention should be focused on human capital development through regular interaction with human capital builders so as to facilitate the process of meaningful national development (Awopegba, 2001; Olaniyan & Okemakinde, 2008; Simkovic, 2012). That is to say, if Nigeria is to douse the rising wave of mediocrity and reduce the rising rate of unemployment; entrepreneurship education is of great necessity for economic sustainability.

The key roles of entrepreneurship in sustainable development include mobilization of domestic savings for investment, significant contribution to Gross Domestic Product (GDP) and Gross National Income (GNI), harnessing of local raw materials, employment creation, poverty reduction and alleviation, per capital income, skills acquisition, advancement in technology, and expert growth and diversification. In the views of Bink and Vale (1990) entrepreneurship is an unrehearsed combination of economic resources instigated by the uncertain prospect of temporary monopoly profit. It is the capacity and attitude of a person or group of person to undertake ventures with the probability of success or failures, and it demands that the individual should be prepared to assume a reasonable degree of risks, be a good leader in addition to being highly innovative. It is one of the elements crucial to averting the surging rate of unemployment, and guarantee employment sustainability.

Education in Nigeria to a large extent is devoid of this key element crucial to averting the surging rate of unemployment in the country. As such, more effort is needed in provision of entrepreneurship development through education to advance the economy of the nation. Put differently, more strategic measures need be put in place to ensure that entrepreneurship is engrained in our school curriculum with focus on profitable personal development since entrepreneurship development has led to the growth of many great economy as well as sustainable development in many developed nations.

Method

The survey research design was adopted for this study because the researchers were interested in describing and explaining the present condition of the topic by using

many subjects and questionnaire. The area of study was the South-Eastern part of Nigeria. South- Eastern Nigeria is the region that borders Cameroon to the east and the Atlantic Ocean to the south. It is the homeland of Kwa speaking people and the dominant language of this region is Igbo. It is primarily situated in the Niger Delta region of West Africa, where it meets the Atlantic Ocean to its South. It has lands on both sides of the lower Niger River although the larger chunk of the region is situated on the East of the river. The region is surrounded by a host of large rivers and plays host to five states namely Abia, Anambra, Ebonyi, Enugu, Imo state. Presently, this region is serviced by five federal and five state owned universities.

The population for this study was about 6000 stakeholders in the education sector comprising of school principals and high ranking personnel in the ministry of education out of which a sample size of 361 respondents were randomly drawn using simple random sampling techniques at 95% confidence interval in line with Krejcie and Morgan (1975) formula for determination of sample size. The instrument for data collection was a 24- items four- point Likert Scale questionnaire tagged “Questionnaire for appraising information access and curriculum reforms need in our institution” (QAIACRNI) constructed by the researchers and validated by experts in instrument construction. The instrument had a Split-half reliability index of 0.72, and the result of data analysis using simple percentages and Chi-Square statistics is as presented below.

Results

Table 1: % Extent to which information is accessible to staff / personnel in the education sector

Variable	n	High extent	Low extent	% high extent	% low extent	Decision
Male	200	23	177	11.5	88.5	Low extent
Female	161	8	153	4.97	95.03	
Total	361	31	330	8.59	91.41	

Table 2: % Extent to which curriculum reforms are Speedily implemented in the education sector

Variable	n	High extent	Low extent	% high extent	% low extent	Decision
Male	200	33	167	16.5	83.5	Low extent
Female	161	30	131	18.63	81.37	
Total	361	63	298	17.45	82.55	

Table 3: %Extent to which entrepreneurship education will enhance sustainability in development

Variable	n	High extent	Low extent	% high extent	% low extent	Decision
Male	200	33	167	16.5	83.5	High extent
Female	161	30	131	18.63	81.37	
Total	361	63	298	17.45	82.55	

Table4: Chi- Square analysis of male and female respondents' perception of the extent to which the three variables enhances transformation and sustainability in the educational development of the region

Variable	Information access	Curriculum reforms	Entrepreneurship education	Total	X ² Cal.	df	X ² Crit.
Male	1456	1325	1256	3653			
Female	1975	1725	1359	5059	125.	2	124.3
Total	3431	3050	2615	8712	3		

Discussion

The results of data analysis at 95% percent confidence interval using simple percentage and Chi-Square statistical analysis techniques revealed that to a low extent; information is easily accessible and curriculum reforms are speedily implemented while to a high extent entrepreneurship innovations enhances development. In order words, staff and personnel in the education sector have poor access to relevant information, and curriculum innovations are poorly implemented but entrepreneurship reforms are accessible development. More so, there was no significant difference between male and female respondents on their perception of the extent to which information access, curriculum reforms, and entrepreneurship education enhances transformation and sustainability in the development of the study area. Therefore, the Nigeria Government as well as other stakeholders in the education sector should take positive and proactive measures to remedy the abnormally in the sector if transformation and sustainability is to be achieved.

Conclusion

Nigeria has not achieved much in terms of reforming her education sector in order to cope with the daunting challenges plaguing her due to myriad of influencing factors. But the urgent need for her to plan and effectively implement quality educational reforms/innovations so as to fit in to our dynamic world of today cannot be over-emphasized. The time for a complete paradigm shift from traditional classroom environment to an e-learning classroom environment in our educational institutions for global competitiveness is now. Properly planning, implementation, and monitoring to accelerate structural integration of all sector is not negotiable.

Recommendations

In order to transform and enshrine sustainable educational development in Nigeria, the following proactive steps are necessary:

- Establishment and equipment of functional ICT department in all school at all level of schooling
- Teaching to impart lifelong learning skills to students at all level of schooling
- Entrepreneurship education/ skills should be taught to all students at all levels of schooling
- Training and re-training of teachers for creative thinking at all levels of teaching and learning
- Re- orientation of all school personnel towards creativity and innovativeness within and outside the school systems

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Assessing the Effectiveness of Applying a Tailored Time Management Course in Reducing Wasting-Time Attitude of University Students in the Field of Clothing Technology

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Abstract

The purpose of the present study is to apply a tailored time management course on fourth year students at the Home Economics Department, Women Faculty for Art, Science, and Education at University of Ain Shams, Egypt, to improve their planning and productivity in the field of clothing technology. During this study, the time consumed in the process of delivering a final product (woman's jacket) was determined through a two-stage process: 1. The "before" stage which was conducted in a real clothing and textile factory, before taking the time management course. And, 2. The "after" stage, which was conducted in the clothing laboratories after the course was applied. Statistical analyses were conducted for both stages, as well as the expected (control) time for the whole process. The results showed that the "before" stage had the highest mean value while the control had the lowest one. It was also found that there was a significant difference between the before and after stages while there was no significant difference between the after stage and the control.

This calls for the need of teaching the time management soft skill to reduce the "wasting-time" attitude and improve self-regulatory behavior of students in the field of clothing technology.

Keywords: time management, assessment, tailored course, clothing technology

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Introduction

Time management has been described using many different terms including spontaneity, balance, flexibility, and having control over time (Lakein, 1973). Time management has also been characterized as a habit developed through determination and practice (Simpson, 1978), or the process by which an individual more effectively accomplishes tasks and goals (Schuler, 1979; Mackenzie, 1972, 1975 and 1990). But despite the widespread use of the term time management, there is currently no universally accepted definition of time management. In general, time management is most commonly defined as the process of exercising conscious control over the amount of time spent on specific activities, to increase efficiency (Wetmore, 2005). It may be aided by a range of skills, tools, and techniques used to manage time when accomplishing specific goals (Wetmore, 2005).

Time management and “wasting time” attitude in workplaces

According to researchers, 20% of the average workday is spent on “important” things, while 80% is spent on things that have “little” or no “value” (Slaven and Totterdell, 1993 and Jones and Hood, 2010). Another study found that people claiming to work 60 to 69 hours per week clocked an average of 52.6 hours, while those who believed they worked 70-80 hours a week, their actual working time is not more than 58.8 hours where, most people use 60% or less of available work time (Gorlick, 2009).

A study by Green and Skinner (2005), found that office distractions ate up 2.1 hours a day for the average worker. People switch activities, such as making a call, speaking with someone in their cubicle or working on a document, every three minutes on average (Foster, 2006). Another study from the Institute of Psychiatry at the University of London suggests that a person's IQ falls 10 points when he/she's fielding constant emails, text messages, and calls, the same loss a person would experience if he/she missed an entire night's sleep and more than double the 4-point loss a person would have after smoking marijuana (Wilson, 2005). Furthermore, on a typical day, office workers are interrupted about seven times an hour, which adds up to 56 interruptions a day, 80% of which are considered trivial, according to time-management experts (Cole, 2004). Also, researchers studying the behavior of busy managers in nearly a dozen large companies found that 90% of managers squander their time in all sorts of ineffective activities. In other words, 10% of managers spend their time in a committed, purposeful, and reflective manner (Bruch and Ghoshal, 2002).

There is debate over exactly what skills and behaviors constitute effective time management. In order to utilize time effectively, a person must first be able to predict how much time is needed for the activity (Kelly, 2002). A person will become effective in using his/her time only when he/she clearly knows what they want to do, what they need to do, and for which specific target date (Soucie, 1986). They need to be more aware of how to use their time by respecting their established priorities while minimizing distractions (Soucie, 1986). Also, Crutsinger (1994), stated that time management involves determining what one should do by setting goals, deciding which events are the most important, making decisions about how much time to allow for certain tasks, adjusting to the unexpected and reconsidering goals and priorities on a regular basis.

Time management behaviors have more recently been characterized as making lists, organizing, goal setting, keeping evaluating schedules and breaking down tasks into simpler parts (Kelly, 2002).

Studies examined the effectiveness of time management training programs

In the literature, there are five studies that examined the effectiveness of time management training programs. Three of them examined employed adults (Macan, 1994; 1996; Orpen, 1993 and Woolfolk and Woolfolk, 1986).

Results of the two early studies (Orpen, 1993; Woolfolk and Woolfolk, 1986) indicated that time management training has significant immediate and long-term effects on time management attitudes and behaviors on those who receive time management training than those who do not. In comparison, two later studies (Macan, 1994 and 1996) found time management training to be only minimally related to subsequent use of time management behaviors. However, individuals who participated in a time management program did perceive more control over their time after the program. Furthermore, Macan (1994) was the first to examine the relationship between time management behaviors and the Theory of Planned Behavior (TPB). This model suggested that learning time management skills and consequently engaging in time management behaviors would lead to a greater perception of control over time.

Time management and clothing technology

One of the very important requirements in a workplace is performing work in time. Clothing technology is no exception where, time management of production is a comparative advantage for clothing manufacturers in global markets today, because it reflects on the quality, cost and rate of production. Therefore, it is necessary to make a thorough research on the structure of time of work and methods for determining the time of technological operations (Colovic, 2011).

Barnes, (1947) used the expression "Time and Motion Study" to emphasize that it is necessary first to define the appropriate method and then to determine the time. The time and motion study can be explained as: Analyzing methods, materials, tools and equipment used or to be used in the performance of a work. These analyses are conducted with the intention to • find the most economical way of performing this work; • standardize the method, materials, tools and equipment; • determine precisely the time required for the qualified and appropriately trained worker, who works at normal intensity, to do the task and • assist in training workers for the new method.

Clothing production deals with norm working. Norm is the time that an average skillful worker of appropriate expertise needs to perform a specific technological operation with normal effort and fatigue, at normal environmental action and under normal conditions of work.

Working norms vary according to the method of determining them. Researches in clothing technology, which have been made since 1960, have not found a unique

method for determining the time of technological operations. Different methods based on different scientific researchers are used nowadays.

Heckner (1975) developed a method for calculating machine-hand times which introduces the parameter of curvature of seam and the correction of stitches sewing speed depending on the specific density of stitches. He also discovered that the decrease or the increase of stitches sewing speed is also affected by psychophysical abilities of workers beside the machine. In another study, Hopf (1978) proved, through researches and analysis of machine-hand time, that sewing time of stitches depends on several factors including: the stitches sewing speed, the density of stitches, the accuracy of compiling the edges and the skills of workers. Where, Lohman (1987) proved that more accurate times of sewing can only be determined on the basis of average stitches sewing speed, but without the consideration of important factors including: the stages of acceleration and deceleration of the main shaft of sewing machines, the number of segments of joining one seam, the accuracy of joining seams and the level of training of workers.

Many systems exists and numerous productivity books and courses attempt to impose one system or another for time management. These systems prove to be effective at first, but seem to get forgotten over time and people fall back to their bad habits once more. Here, a tailored time management program was designed specifically for senior students in clothing technology, to help in improving their time management skills in workplaces.

Methodology

The time management course, applied in the current study, was designed by setting the following points: 1. Choosing course materials, students will learn during the course to help improve their time management attitude in clothing and textile workplaces, 2. Choosing the final product, students will apply during the study and 3. Choosing the appropriate method for time measurement and collecting of data.

1. Choosing course materials:

Course materials were divided into two different types of topics:

a. General topics about time management:

In the first part of the course, four topics, with general concepts about time management, were chosen for the current study to set students' minds about saving time attitudes in general. Those topics were:

- 1) Attitude towards Time
- 2) Planning
- 3) Organizing
- 4) Dealing with People

The description of each topic is listed in table (1).

b. Saving time principles in clothing industry workplaces:

In the second part of the course, the five main principles about saving time attitude in clothing industry workplaces were chosen to teach students that; proper design of each workplace, along with finding suitable methods of work with the appropriate

time standards ensures better structure of technological operations. The five principles are:

- 1) Principles in designing the workplace
- 2) Principles in designing the working processes
- 3) Principles in determining the working time
- 4) Principles in handling material and tools
- 5) Principles in designing the environment.

Descriptions of these principles are listed in table (2).

2. Choosing the final product:

A classic, easy to conduct design was chosen for the study, this design consisted of a woman's jacket, using one color in the outfit with two different textures that gives a richness effect, pleasing rhythm and a simple proportion. The lines in this design consist of vertical lines, which lead the eye up and down and give the impression of added length. Large pockets were added for good decoration as they attract the eyes and break the large space of the front side of the jacket. The whole design is symmetrically balanced.

The jacket is made in twenty-six steps in the sewing process (listed in Table 3), and five steps in the finishing process (listed in Table 4), with different technical difficulty that needs an average skilled worker to perform. Fourth year students at the Home Economics Department, Women Faculty for Art, Science, and Education at the University of Ain Shams, have the proper background knowledge and skills to make such product.

3. Choosing the appropriate method for time measurement:

A Stopwatch timer method was used for time measurement as it the generally used method to determine production time in clothing industry. Frederick W. Taylor developed the stopwatch time study in 1880. This method includes several techniques:

(a) *Continuous time technique*: in this technique, two large watch hands, with only one of them moving during the recording, and the other one can be stopped. The recorder takes only a total time and calculates the average production time.

(b) *Snapback time technique*: in this technique, a big watch hand makes full circle, then a small watch hand on a small dial moves for one degree and shows the value of one minute.

(c) *Three-Watch Time technique*: is a better technique than both the continuous and the snapback ones. Three continuous stopwatches are used on one board for each stage. When the worker finishes the task, the recorder pulls a common switch and presses it down. One watch is stopped so a reading can be made, the second watch is restarted and the third watch is reset to zero waiting for the time of the next task. The *Three-Watch Time technique* was used in this study.

Table 1: Descriptions of the chosen time management topics

Session	Topic	Contents
1	Attitude towards Time	<ul style="list-style-type: none"> ▪ How different people look at time? ▪ What mental techniques can you use to increase your productivity? ▪ What is the impact of perfectionism on your productivity and how can you manage it? ▪ What stops you from starting a task and how can you overcome it? ▪ What techniques can you use to avoid procrastination? ▪ How to take advantage of "dead time"? ▪ How to free your mind from thinking continuously about critical tasks? ▪ How can you optimize your day based on your capabilities and your workload?
2	Planning	<ul style="list-style-type: none"> ▪ How to set goals to maximize your productivity? ▪ How to set your mission statement? ▪ Which planning style is better? ▪ How to brainstorm? ▪ How to plan if you don't like planning?
3	Organizing	<ul style="list-style-type: none"> ▪ How to organize your environments? ▪ What reference, tray and calendar systems work best? ▪ How to take advantage of GTD principles (Getting Things Done)? ▪ How to priorities your tasks based on urgency and importance?
4	Dealing with People	<ul style="list-style-type: none"> ▪ The art of saying No. ▪ How to deal with interruptions politely? ▪ How to delegate to increase your productivity?

Table 2: Description of the chosen topics about saving time principles in clothing industry workplaces

Session	Principle	Contents
1	Principles in designing workplace	<ul style="list-style-type: none"> Properly designing workplace should make possible for the work to be performed either in standing or sitting posture. There should be enough space at the workplace for the operator to stretch his/her legs comfortably. Each operator should have a seat of such type and height as to assume proper posture in work. Armrest should be provided if the nature of work allows.
2	Principles in designing working processes	<ul style="list-style-type: none"> In performing an operation, the posture that should be applied, requires the minimum energy consumption. Standing posture should be used only when higher hands should apply force or when movements are necessary (cutting material, trim). Work should be organized so as to use both hand simultaneously whenever possible. Hand should be freed from work whenever possible and while serving the tools or machines done by feet. Specifying the height of sitting, the height and the size of desktop machines, pedal position, distance of chairs, with the necessary sight and visual acuity and the ability to perform simultaneous movements of hands, legs and torso.
3	Principles in determining working time	<ul style="list-style-type: none"> Pause for the handling loads, improper body postures in work and monotony should also be taught about when calculate manufacturing time, as they seriously impact fatigue coefficient. Real coefficient and additional time, including lunch break, breaks for physiological needs and justifiable organizational losses should be calculated.
4	Principles in handling material and tools	<ul style="list-style-type: none"> Operator should be free from transport procedures as much as possible. Hand should be free from holding all the work pieces. Each instance of handling the material should be provided it is economically feasible, mechanical or automated. Tools, materials and work pieces to be handled should be positioned so that the operator is not required to bend his body, if possible. Tools should be put at the workplace whenever possible.

Session	Principle	Contents
5	Principles in designing environment	<ul style="list-style-type: none"> ▪ When using both daylight and artificial illumination, the light source should always be to the left. ▪ Intensity, distribution and type of illumination should prevent excess strain of the eyes. ▪ Individual sources of light on sewing machine for work with dark materials and topstitch. ▪ Workroom temperature should be adapted to the type of work to be done.

How this study was applied

This study was applied in three stages:

1) *Before taking the time management course:*

This stage was conducted in a real clothing and textile factory. During this stage, students were asked to deliver the final product, which is a classical woman's jacket, where the time consumed for each step during the production process was calculated.

2) *During taking the time management course:*

This stage of the study was conducted in the Home Economics Department classrooms and laboratories. The first part of the course was taught in four sessions (Table 1). The duration of each session was two hours. The second part of the course was taught in five sessions with the same duration of two hours for each session (Table 2). All sessions were run like workshops with the following concepts being considered:

- A series of instructions were conducted at the beginning and at the end of each session to make sure that students understood why they needed to learn the topic, where they would use it and how it could be applied to their real world problems.
- Slides were designed, with many images and diagrams, to be visually engaging and to deliver a memorable message.
- Complex concepts were explained using step-by-step guides with useful animations.
- All teaching materials were included in a comprehensive workbook which students can use and keep as a reference if needed.
- If necessary, extra handouts were provided for exercises that students must submit after completing them.
- Rather than telling the students about new concepts, questions were asked to encourage the students to think of solutions themselves and were more likely to learn and remember the content afterwards.

3) *After taking the time management course:*

In this stage, the factory conditions were simulated in the clothing laboratories of the Home Economics Department. During this stage, students were asked to deliver the

same final product again. The time consumed for each step during the production process was calculated again after taking the time management course.

Results

A tailored Time Management course was applied on fourth year students in the Home Economics Department, Women Faculty for Art, Science, and Education at the University of Ain Shams, with background in clothing technology and good technical fashion skills.

The study was done in two phases; the “before” phase and the “after” phase, where the “before” phase was done before taking the time management course and the “after” phase was conducted after taking the course.

Data were collected and statistical analysis was conducted to assess the effectiveness of the course. The results showed that the highest time taken values were for the “before” phase, for both sewing (Table 3 and Figure 2) and finishing (Table 4 and Figure 3) processes, while the lowest ones were for the control.

The mean values for all the tested parameters were conducted and significance between all groups were calculated. Results showed that the highest mean value was for the “before” phase and the lowest was for the control. Also, There was a significant difference between the “before” and “after” phases, while there was no significant difference between the “after” phase and the control, Table 5 and figure 4.

Table (3): Prevalence of the before, after, and expected time for each unit of the product in the sewing production line in the factory

Opt.	Step name	Operation name	Time(sec)	After time (sec)	Expected time (sec)	Before time (sec)	Before time (sec)
1-	Join left princess seam in the front side	Holding	20.4	46	40	40	93
		Working	10.6			21	
		Passing	15			32	
2-	Join right princess seam in the front side	Holding	20.4	46	40	40	93
		Working	10.6			21	
		Passing	15			32	
3-	Join left princess seam in the back side	Holding	22.7	52	48	45	89
		Working	13			19	
		Passing	12.3			25	
4-	Join right princess seam in the back side	Holding	22.7	53	48	45	89
		Working	14			19	
		Passing	12.3			25	
5-	Join the center back line	Holding	12.5	34.5	30	25	67
		Working	10.6			19	
		Passing	11.4			23	
6-	Join left shoulder of jacket	Holding	10.5	26	22	18	50
		Working	6			15	
		Passing	9.5			17	
7-	Join right shoulder	Holding	12.8	31	28	18	50

Opt.	Step name	Operation name	Time(sec)	After time (sec)	Expected time (sec)	Before time (sec)	Before time (sec)
	of jacket	Working	8.2			15	
		Passing	10			17	
8-	Join the facing part into the center front line	Holding	14.6	35	32	31	77
		Working	8.2			19	
		Passing	12.2			27	
9-	Join the two parts of collar	Holding	15.3	38	34	33	81
		Working	10.3			21	
		Passing	12.4			27	
10-	Join the collar with the nick line of the jacket	Holding	15.6	39	35	34	82
		Working	12.6			25	
		Passing	10.8			23	
11-	Join the collar with the facing part of the jacket	Holding	13.6	30.5	26	29	61
		Working	6.2			14	
		Passing	10.7			18	
12-	Decorate the left front side of the jacket with Embroidery using golden metal thread	Holding	14.2	33	28	25	61
		Working	4.2			11	
		Passing	12.6			25	
13-	Decorate the tow sleeves with Embroidery using golden metal thread	Holding	14.6	37.5	34	31	80
		Working	10.2			22	
		Passing	12.7			27	
14-	Join the left sleeve with the armhole of the jacket	Holding	22.4	47	42	27	80
		Working	8.6			17	
		Passing	16.5			36	
15-	Join the right sleeve with the armhole of the jacket	Holding	26.5	59.2	55	31	99
		Working	12.2			25	
		Passing	20.5			43	
16-	Join the left sleeve and the left side of the jacket	Holding	20.4	43	38	43	92
		Working	18.2			38	
		Passing	4.4			11	
17-	Join the right sleeve and the left side of the jacket	Holding	18.6	45	40	39	99
		Working	12.2			27	
		Passing	14.2			33	
18-	Join left shoulder of lining	Holding	12.6	36	32	27	76
		Working	10.6			23	
		Passing	12.8			26	
19-	Join right shoulder of lining	Holding	14.2	36.5	32	30	78
		Working	9.8			23	
		Passing	12.5			25	
20-	Join the left sleeve with the armhole of the lining	Holding	20.4	46	40	42	96
		Working	10.6			23	
		Passing	15			31	
21-	Join the right sleeve with the armhole of the lining	Holding	20.4	46	40	42	96
		Working	10.6			23	
		Passing	15			31	
22-	Join the left sleeve	Holding	22.7	52	48	28	80

Opt.	Step name	Operation name	Time(sec)	After time (sec)	Expected time (sec)	Before time (sec)	Before time (sec)
	and the left side of the lining	Working	13			25	
		Passing	12.3			27	
23-	Join the right sleeve and the left side of the lining	Holding	22.7	49	44	28	84
		Working	14			29	
		Passing	12.3			27	
24-	Join the lining with the jacket	Holding	12.5	34.5	30	27	75
		Working	10.6			24	
		Passing	11.4			24	
25-	button -holes	Holding	10.5	26	25	25	59
		Working	6			13	
		Passing	9.5			21	
26-	Sewing the buttons	Holding	12.5	53.5	52	26	110
		Working	30			60	
		Passing	11.4			24	
Total Time			1075.2	100	963		2097

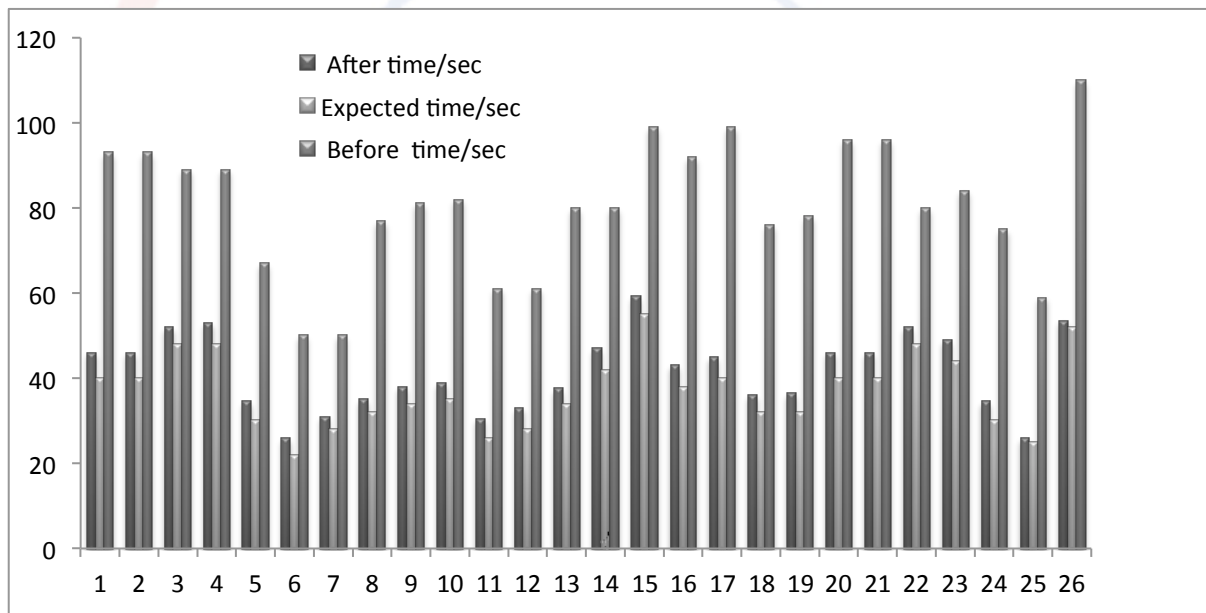


Figure (2): prevalence of the before, after, and expecting time for each unit of the product in the sewing production line in the factory

Table (4): Prevalence of the before, after, and expected time for each unit of the product in the finishing process

Opt.	Operation name	Operation description	After time (sec)	Expected time (sec)	Before time (sec)
1-	Finishing	remove threads and turn in the style	150	130	330
2-	Pressing	Pressing the dress	60	45	115
3-	Inspecting of quality control	Examining finished garment to determine	180	160	390

		acceptability against standards.			
4-	Labeling	Hand tag	10	6	25
5-	Packaging	Hanger + plastic bags then each half dozen in carton	60	45	125
Time needs for one style			460	386	985

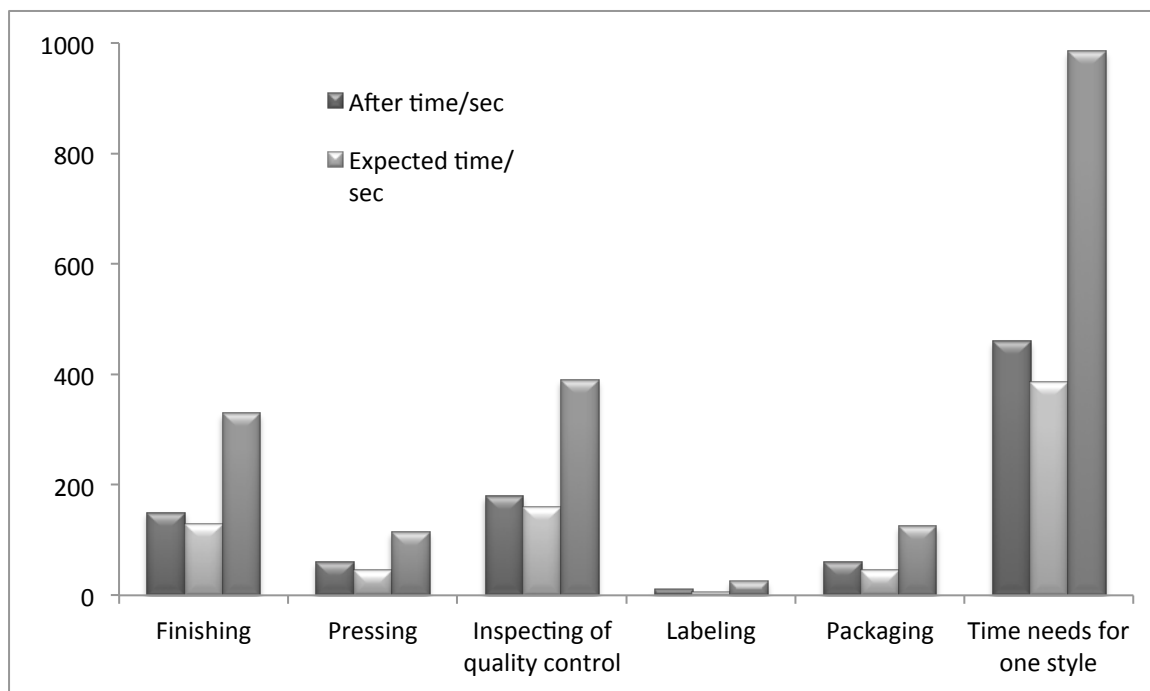


Figure (3): Prevalence of the before, after, and expecting time for each unit of the product in the finishing process.

Table (5): Prevalence and test significance of the mean value for the before, after, and expecting time in each unit of the product

	Mean	Std. Deviation	Sig.
Expected time/sec	37.038	8.669	NS
After time/sec	41.354	8.957	
Expected time/sec	37.038	8.669	*
Before time/sec	80.654	17.469	
After time/sec	41.354	8.957	*
Before time/sec	80.654	17.469	

NS = Insignificant.

* = Significant at ($p \leq 0.05$).

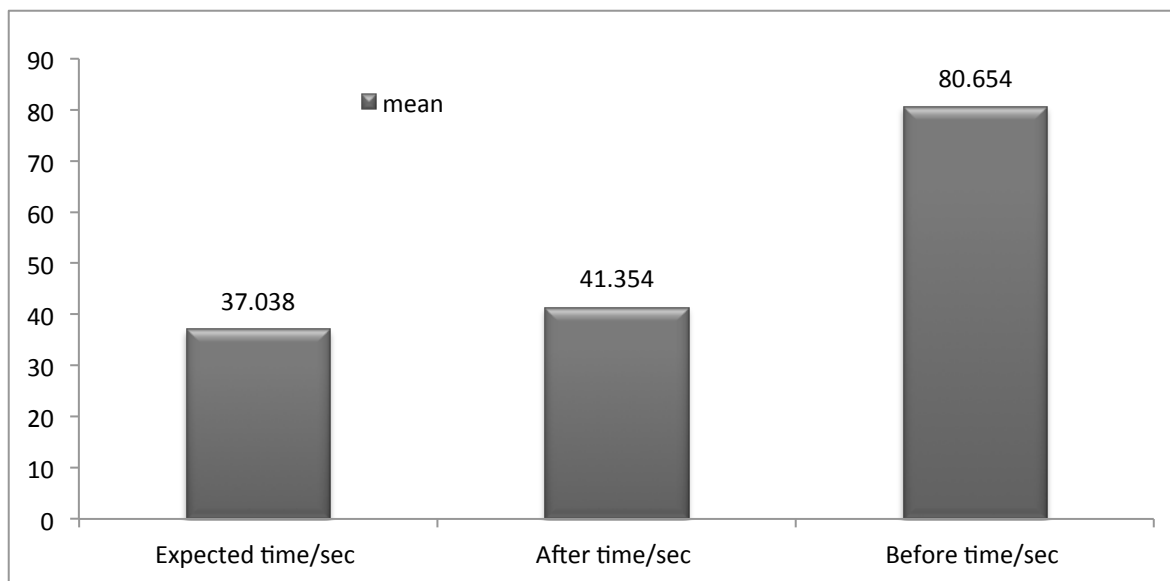


Figure (4): Prevalence and test significance of the mean value for the before, after, and expected time, in each unit of the product.

Discussion and Conclusion

Currently, there is a lack of agreement about the definition of time management, despite the epidemic of time management training programs (Quirk, 1989), and amount of literature summarizing time management across disciplines. Furthermore, Hellsten (2005) has argued that there is a lack of a theoretical model of time management.

In general, time management is a set of principles, practices, skills, tools, and systems working together to help get more value out of our time; where time management is a necessity in any project development as it determines the project completion time and scope (Wetmore, 2005).

In the clothing industry, technological processes of sewing clothes are performed with a large number of technological operations, where each technological operation does not take a lot of time and has a significant physical workload for each worker. The material used during these processes requires a careful handling when taking, assembling, positioning and putting it aside. Therefore, the structure of technological operations is mostly (65% of time) related to the handling of material. The sewing process is performed during the machine or machine-hand time (25%), while 10% of time is used for non-production work (Colovic, 2011).

The present study was applied on fourth year university students with a background in clothing and textile, to improve their time management skills in clothing technology workplaces and to help them reduce their westing time attitude in general. This study was conducted in two phases. Data from both phases were compaired to each other in one hand and to the expected time –the time ideally taken by each step- on the other hand and the following was found: before taking the course, the time taken by each step was almost double the time consumed after taking the course, while there was no significant difference between the data collected from the “after” phase and the

control.

These results were in agreement with Slaven and Totterdell, (1993), who evaluated a two day professional time management course, and examined the possible influence of personal and work factors on training outcomes and their results indicated improvements in self-perceptions of time-use. Moreover, after taking the course, students were able to perform tasks according to a schedule. This was also found by Ray and Jewkes (2004), who trained a selective group of employees in an accounting firm on time management. They found that this group developed some side skills like performing tasks according to task/time table.

Häfner and Stock (2010), studied the effects of time management training on perceived control of time. They found that after training, the subjects were able to work according to task/time schedule. Furthermore, students were capable of following a time-based competitive strategy, which allowed them to perform more tasks in less time. This was also in agreement with Jones and Hood (2010), who evaluated how effective time management can lead to improved personal and organizational performance.

In reality, time is a fixed resource; it cannot be generated, modified, increased or decreased. Time cannot be managed, only activities can be managed to accomplish within the time frame. Thus, calling for the need to integrate time management soft skill courses in the teaching /learning process, to equip university students with the necessary time management knowledge, skills, values, and attitude to help them improve their life quality.

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The logo for IAFOR (International Association for Frontiers of Research) is centered on the page. It features the word "iafor" in a light blue, lowercase, sans-serif font. The text is enclosed within a circular graphic composed of two concentric arcs: a red outer arc and a blue inner arc, which together form a partial circle around the text.

***Teacher Factors in Enhancing Quality Assurance in Physics Education:
A Panacea for Transforming Physics Education for Sustainable Development***

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Abstract

The study employed a descriptive survey to investigate Senior Secondary School three (SSS3) physics students' perception of the teacher factor in enhancing quality assurance in the teaching and learning of physics in Umuahia Education Zone of Abia State of Nigeria. A sample of one hundred and seven (107) SSS3 physics students from senior secondary schools in Umuahia North Local Government Area was selected. The instrument for data collection was the researcher's developed structured questionnaire of the Likert type. The reliability of the instrument was obtained as $r = 0.84$. Two research questions and one null hypothesis tested at 0.05 level of significance guided the study. Data collected was analyzed using mean, standard deviation and χ^2 -test. Findings revealed that qualified physics teachers, physics teachers' adequate use of approved instructional methods, proper use of instructional materials, maintenance of school records, ensuring adequate preparation, professional development of teachers and delivering of lessons by teachers in teaching and learning of physics can enhance quality assurance in the teaching and learning of physics. It was therefore recommended that educational institutions in Nigeria must engage in quality assurance activities that meet best practices by ensuring they explore ways of forging collaborations within and outside their location for sustainable development and also employ good quality and qualified teachers to teach physics in the secondary schools.

Keywords: Physics Education, Teacher Factor, Quality Assurance and Sustainable Development

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Introduction

Education is an expedient factor in nation building and development. In other words the development of any nation is found to be linked to the quality of its education system. This is because education is a major factor that imparts directly on human beings who are at the central point of the whole process of development. No wonder education has been described as the bedrock of every society and tool for nation building therefore making the quality of education an issue of global concern. This is why Adegbesan (2011) is of the opinion that for quality education to be achieved in a nation, the principal actors of learning which are the teachers, learners and the environment must be cooperatively organized. The implication of this is that the teacher must be adequate in quality and quantity. Today's education therefore must have the effect of making Nigeria a country that has a steady supply of highly creative citizens who help to keep improving the living conditions of the general citizenry and to solve problems that exist from time to time. For quality education to be achieved, the minds of the young therefore need to be exposed to critical thinking, analysis and problem-solving strategies in a fast-changing world (Okobia 2012),

Physics as one of the sciences is very crucial to understanding the world around us, the world inside us and the world beyond us. It is an international enterprise which plays a key role in the future progress of humankind. For a nation to develop a sound basis for modern technology, the study of physics which enhances an understanding of the interplay of forces which forms veritable armour against superstition anywhere. Physics is a science that observes natural phenomena and explains them by using general rules to describe what has been observed. According to Ayodele and Anyaegbuna (2012), today's physics has two sides, on the one hand, it provides the basis for our current world picture, while on the other hand, it is the foundation of other subjects for technological developments. Physics has helped in the development of modern technology through the application of its principles to modern invention. . The implication is that the outcomes of physics education affect the attainment and realization of our national goals and objectives with regards to the development of science and technology in Nigeria (Ayodele & Anyaegbuna, 2012).

There has been a drastic reduction in the performance of secondary school students in Nigeria in the past decades especially in Physics (Awolabi & Ogini, 2013). This could be traceable to lack of qualified teachers, poor methods of teaching and other related factors (Emaiku, 2012).. This means that Nigeria cannot develop technologically if the quality of the teaching and learning of physics in Nigerian secondary schools is not assured. For us to have a physics education that sharpens the mind of the recipients and a physics education that emphasizes not only certificates but prominently diverse skills, abilities and attitudes to cater for differences in talents and opportunities there is therefore the need for quality to be assured in the teaching of physics.

Various people have defined quality assurance variously. Quality assurance has been defined by Okobia (2012), as the standard of something as compared to other things: that is the degree of goodness or excellence. Boraham and Ziarati (2002) referred to quality assurance as a planned and systematic action deemed as necessary to provide adequate confidence that a product or service will satisfy given requirements for quality. The American Society of Quality Assurance defined assurance of quality as

the planned and systematic activities implemented in a quality system so that quality requirements for a product or service will be fulfilled. Wikipedia Encyclopedia defined it as the process of verifying or determining whether the product or services rendered meet or exceed customers' expectations. Quality assurance is really the best way to begin to turn around the present state of the Nigerian education system to serve as a change agent to meet local needs and for global competitiveness after several quantities of mass failure and half baked products from our educational institutions. This is in place since quality assurance ensures that input processes and output of the education system are geared towards meeting set standards to bring about improvement in teaching and learning. Quality assurance can also be said to be a holistic method of identifying and resolving problems within the educational system in order to ensure continuous quality improvement. Quality assurance according to Boraham and Ziarati (2002) is a planned and systematic action deemed as necessary to provide adequate confidence that a product or service will satisfy given requirements for quality. Ehindero (2004) emphasized that quality assurance focused on:

- Learners entry behavior, characteristics and attributes including some demographic factors that can inhibit or facilitate their learning.
- The teacher entry qualification, values, pedagogic skills, professional preparedness, subject background, philosophical orientation.
- The teaching and learning processes including the structure of the curriculum and learning environment.
- The outcomes which are defined for different levels in terms of knowledge, skills and attitudes including appropriate and relevant instruments to access these objectives.

Bateman (2006) further explained that quality assurance includes defined standards of achievement, documented procedures for identified processes; establish ways of responding to issues and clear accountability for outcomes. Quality assurance in education can also be defined as an all encompassing concept which includes all inputs, process and action through which the quality of education is developed, improved and maintained (Obioma, 2012). Quality assurance connects goals to which all secondary school students' teachers, staff and school leaders must achieve. This could be seen from the National Education Quality Assurance Policy which states that Nigeria is concerned with eight (8) components of quality assurance standards that are itemized as:

- i. Learners achievement and standard
- ii. Learners welfare and participations
- iii. Care, guidance and support
- iv. Leadership and management
- v. School community relationship
- vi. Learning environment
- vii. Teaching and learning
- viii. Curriculum

The quality of teaching and learning of physics is determined by the quality of

- Instructional materials

- Methodology and/or teaching learning approaches
- Capacity/professional development of teachers
- Readiness of learners
- Socio-economic status of learners
- Child friendly school environment

Obioma (2012), is of the view that quality of teaching and learning is determined by the quality and adequacy of teachers that teach the subject, the quality of instructional materials used by the teachers, teachers adequate use of daily lesson plan among other factors. In the case of the quality and adequacy of teachers that teach the subject Obioma (2012) recommended that there should be massive capacity building of physics teachers that are required to meet the demands of quality assurance and updating their knowledge. Quality teaching and learning of physics requires a unified and comprehensive approach relying on teachers professionally trained and equipped with requisite knowledge and skills. The physics teacher needs to understand his subject matter in ways that promote learning. He needs to help students acquire knowledge within the subject area in order that they meet the challenges of a scientific technological world. The availability of high quality physics teachers in adequate number is a necessity if the goal of Nigeria developing technologically is to be realized. The adoption of student centered instruction strategies like inquiring method, discovery method, discussion role play, games and other similar strategies have been shown to enhance active participation of students in the teaching and learning of physics. Consequent to this, the teacher's ingenuity in improvising, adapting and maximizing the utilization of the scarce and often insufficient instructional materials can have tremendous impact in the successful teaching and learning of physics. The emphasis on physics education is on the delivery of physics knowledge and skills. This implies that the quality assurance of physics education is focused on how well physics teaching and learning are organized to deliver the necessary knowledge and skills to the students; how well physics teachers teaching can be improved in a given time period and how well the delivery of physics knowledge and skills to the student can be ensured through the improvement of teaching and learning. Hence the need to investigate students' perception of the teacher factor in enhancing quality assurance in the teaching and learning of physics in secondary schools.

Specifically, this study tends to investigate students' perception of the teacher factor in enhancing quality assurance in the teaching and learning of physics.

Research questions:

The following research questions guided the study:

1. What are the mean scores of students' perception of teacher factor in enhancing quality assurance in the teaching and learning of physics?
2. What are the mean scores of male and female students' perception of teacher factor in enhancing quality assurance in the teaching and learning of physics?

Hypothesis

The null hypothesis below tested at 0.05 level of significance guided the study.

H0₁: There is no significant difference in the mean scores of male and female students' perception of teacher factor in enhancing quality assurance in the teaching and learning of physics.

Method

The study adopted a descriptive survey design to select a sample of one hundred and ninety-eight (107) senior secondary school three physics (SSS3) students from Umuahia North Local Government Area of Umuahia Education Zone of Abia State. The instrument for data collection was a researcher's developed structured questionnaire of teacher factor in ensuring quality assurance in the teaching and learning of physics in secondary schools. The responses are Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) that are weighted 4,3,2,1 respectively. The questionnaire is a fourteen-item questionnaire that is made up of teacher factor issues in enhancing quality assurance in the teaching/learning of physics in secondary schools. The instrument was validated and its reliability r was obtained as 0.89 using test-retest method. Two research questions and a null hypothesis tested at 0.05 level of significance guided the study. Data collected was analyzed using mean, standard deviation and χ^2 -test.

Results

The findings got from the study are presented in tables 1 and 2 below.

Table 1: Mean and standard deviation scores of students' perception of teacher factors that can enhance quality assurance in the teaching and learning of physics.

S/N	ITEM	X	\overline{SD}	REMARK
1.	Availability of adequate Number of qualified physics teachers.	2.59	0.79	Agree
2.	Availability of good quality Physics teachers.	2.96	0.80	Agree
3.	Physics teachers teaching physics in a way that Students' interest and curiosity are developed	3.34	0.76	Agree
4.	.Physics teachers' adequate use of instructional materials in teaching physics.	2.96	0.81	Agree
5.	Physics teacher's adequate use of recommended instructional methods in teaching physics	3.24	0.71	Agree
6.	Physics teachers' ingenuity in improvising while teaching physics.	3.20	0.80	Agree
7.	Physics teachers having cordial relationship with their students thereby making their students feel comfortable while studying physics.	3.19	0.76	Agree
8.	Physics teachers maximizing the utilization of the scarce and insufficient instructional materials.	3.05	0.86	Agree
9.	Physics teachers adequate use of ICT in the teaching of physics.	2.96	0.81	Agree
10.	Physics teachers taking their students on field trips thereby assisting to understand practical aspects	3.12	0.82	Agree

	of the subject better.			
11.	Physics teachers ensuring active Students' participation in the teaching/learning of physics.	3,31	0.76	Agree
12.	Physics teachers adequate use of well planned lesson to teach physics.	2.59	0.80	Agree
13.	Physics teachers' adequate evaluation of students physics learning outcomes.	3.24	0.71	Agree
14.	Physics teachers taking sufficient account of Students Previous learning before imparting new ones,	3.19	0.79	Agree

Result in table 1 above showed that all the items had mean scores that are greater than 2.5 which is the mean score value of the four point scale used. The table also showed that the physics students all agreed that these factors listed above are teacher factors that will enhance quality assurance in the teaching and learning of physics in our secondary schools.

Table 2: X^2 values of male and female students perception of teacher factors in enhancing quality assurance in the teaching and learning of physics

		SA	A	D	SD	TOTAL
Male	50	447 (407)	349 (347) (46)	51 (30)	31	878
Female	57	397 (437)	370 (372) (50)	45 (31)	29	941
Total	107	844	719	96	60	1819

$X^2_{cal} = 8.78$, $X^2_{tab} = 7.815$, $df = 3$

Table 2 above showed that the calculated x^2 value 8.78 is greater than the critical/table x^2 value of 7.815. This implies that the null hypothesis is rejected meaning that there is a significant difference between male and female physics students' perception of teacher factor in enhancing quality assurance in the teaching and learning of physics

Discussion

Table 1 showed that all the students, both males and females agreed that the items listed are teacher factors that will enhance quality assurance in the teaching/learning of physics. This is in agreement with Obioma (2012) who explained that quality of teaching and learning is determined by the quality of instructional materials, methodology and teaching and learning approaches, maintenance of records as well as ensuring adequate preparation and delivery of lessons by teachers. This result is also in line with Ojede (2007) whose view is that for quality assurance to be assured there is need to examine the qualification of teachers, the adequacy of the curriculum as well as the proper use of the process involved in the various skills to ensure that the finished products are of high standard. This also means that these factors if properly addressed and attained, will have the effect of making it possible for our country to

have a steady supply of highly creative citizens who help to keep improving the living conditions of the general citizenry, and to solve existential problems that are thrown up from time to time (Adegbesan, 2011). The achievement of this will in the long run produce physics students who will contribute to the scientific and technological development of our country.

Result in table 2 showed that the calculated χ^2 value is greater than the critical/table χ^2 value which resulted in the rejection of the null hypothesis. The implication of this is that gender played a significant role in the study.

Conclusion/Recommendation

The importance of Physics education in scientific and technological advancement of any nation cannot be over emphasized. Its study has the capability of explaining natural phenomena and everyday occurrences. For Nigerian citizens to meet global competitiveness in physics education, the assurance of quality in the teaching and learning of the subject is very imperative. It is therefore recommended that;

1. The Federal Government should employ qualified and good quality physics teachers to teach the physics in the secondary schools.
2. Physics teachers should ensure active students participation during physics lessons and adequate evaluation of students' physics learning outcome.
3. The school management should provide appropriate instructional materials that could be used in the teaching of physics in the secondary schools.
4. The school management should also ensure that physics teachers use appropriate instructional materials and approved instructional methods to teach the physics.
5. Physics teachers should be encouraged to make adequate use of Information and Communication Technology (ICT) and well planned lesson plans to teach the physics in the secondary schools to enable the students understand the subject better.

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***Is it Cheating if Nobody's Watching?
Conflicting Beliefs about Dishonesty in Online Learning***

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Abstract

This paper addresses part of an extensive study investigating faculty and student perceptions of academic integrity in online courses. This analysis compares the quantitative responses to the qualitative responses of a survey sent to three institutions asking 1800 faculty and students their beliefs about cheating in online courses. The conclusions drawn from this analysis of the qualitative data and a comparison to the previous analysis of the quantitative data is that faculty and students report the possibility for cheating in online courses at different rates. This phenomenon may be due to either a propensity for faculty to over report or for students to under report the extent to which cheating is occurring in online courses. Regardless, there is a conflicting belief about academic integrity between faculty and students interacting in an online course.

Keywords: academic honesty, distance learning, online courses, cheating, integrity

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Introduction

With a myriad of mobile technology in the hands of students and the academic pressure to succeed in college, the availability of online information lures students into believing they are not cheating if they can find, rather than know, the answer. Globally, institutions are afflicted with academic dishonesty among their student body (Bowers, 1964, Diekhoff et al., 1996, Hinman, 2002, King, Guyette, & Pitrowski, 2009, and McCabe, 2002). As institutions move more of their courses online, students are no longer in close vicinity to their instructors or classmates. “Whether judged positively or the contrary, institutions of higher education have been impacted by the adoption of internet technologies” (Tanner & Piper, 2010 p. 1457). The conversation about enforcement of academic values and honesty is not new to the digital era. (Diekhoff et al., 1996, Jordan, 2001, and McCabe et al., 1999). Research continues to show evidence that academic dishonesty in online classes is no more prevalent than in traditional face-to-face education (Grijalva, Nowell, & Kerkvliet’s, 2006). However, with the movement towards campuses encouraging mobile technology and courses being designed for hybrid and/or online delivery, the internet has given students an extensive and unrestricted opportunity to cheat (Bedford, Gregg, & Clinton, 2009, Brock, 2008, Rowe, 2004, Tanner & Piper, 2010). Academic integrity, especially in the online environment, continues to be a concern for universities (Bowers, 1964, King, Guyette & Pitrowski, 2009, Kitahara & Westfall, 2007 and McCabe, 2002).

Brock’s (2008) idea of moral relativity may be what is necessary to understand the temptations students are experiencing. He suggests that academic integrity and honesty do not have clear boundaries and, in certain situations or circumstances, “students believe that cheating and plagiarizing can be...acceptable” (p. 2). Moral relativity in virtual environments only adds to the frustration faculty experience when teaching online courses. There is more temptation to cheat in online courses primarily because the student is more distant from the instructor and secondary, many students taking online courses are busy in careers and are not invested in the integrity of the distance-learning programs as they would be in traditional face-to-face programs (Rowe, 2004). In the virtual environment, students seem to have a technological advantage because many faculty and administrators are still unaware of the possibilities for cheating online (Rowe, 2004 and Rogers, 2006). This difference in the belief about online cheating was the stimulation for this research study.

The purpose of the study was to uncover the beliefs about academic integrity, specifically academic honesty, with respect to online courses and compare the faculty and student perceptions. The objectives were to determine if and why students felt that it was easier to cheat in a distance learning course than a traditional face-to-face course.

Methodology

Three public institutions of higher education were sites for recruiting participation in our survey. The participants were either students (undergraduate and graduate) or faculty (full and part-time). The institutions are public four-year universities. The smallest university is a regional commuter campus in the southeastern part of the United States with an enrollment of 5400 students and approximately 500 full and

part-time faculty. The second and largest university is also in the southern part of the country and considered a top-tier research university with a student enrollment of 18,000 and approximately 1200 full and part-time faculty. The third university is located in the south central Midwest part of the country with a student enrollment of 17,000 and approximately 1400 full and part-time faculty offering degrees in more than 100 areas as well as master and doctoral programs in most programs. The universities offer traditional, hybrid and online courses.

A cross-sectional online survey was developed to incorporate the measurement variables for the constructs conceptualizing student and faculty beliefs about academic honesty with respect to online courses. Questions were structured in the format of multiple answers, Likert-scales, and open-ended comments for the purpose of comparing student and faculty responses. The surveys were developed and disseminated via survey monkey, an online tool that allows for the self-administration of surveys and data collection.

There were 243 faculty and 1649 students that responded to the larger survey. For this research paper, which is a subpart of the larger study, the qualitative data was examined by focusing on responses given to the open-ended student question "Is it easier to cheat in a distance learning course?" There were 644 student responses to this question and 541 of those responses were able to be coded into one of three categories: Lack of Supervision, Unclear Boundaries and Open Source. Each of the three categories corresponded to one of the relationships between faculty and student definitions of cheating suggested by the study's quantitative data. The coding was performed by one of the researchers and the responses were grouped into one of these three categories. This qualitative analysis compares the open-ended responses to the earlier quantitative analysis (Tanner & Piper, 2010) which is summarized in the background section.

Limitations

This study is not without its limitations. When using an online survey distribution tool, the participants are expected to have email in order to receive the invitation to participate, as well as access to the specific domain housing the survey instrument. Response rates for online surveys are usually lower than traditional postal mail or telephone interviews. However, this sample was one of convenience and purposive in that the researchers were affiliated with the institutions chosen for participant selection and the population selected from the institutions were only faculty and students rather than the entire populations of the institutions. All students and faculty at each participating institution had regular internet and email access. This can be problematic in that internet based sampling is not representative of general populations. However, it is rare that university communities are not fully integrating the expectation of primarily email correspondence.

Two different survey instruments were used to collect data. Students were asked questions similar to, but not exactly the same, as the questions asked of the faculty. Faculty were asked about their experiences with cheating in their online courses; whereas, students were asked if they knew of someone who cheated in an online course. Data sets for faculty responses and student responses were kept separated for the analysis. Responses to similar questions were compared using descriptive

statistics and one-way analysis of variance (Tanner & Piper, 2010). The separate analyses were compared, but no causal or correlation statistics were run with aggregated data due to the differences between instruments (Tanner & Piper, 2010).

It was not possible to control for duplicate responses due to the nature of the questioning around cheating and the ethics review board recommendations. The researchers were not permitted to limit the number of responses per internet protocol (IP) address or require individual passwords in order to ensure anonymity of participants (Tanner & Piper, 2010). The researchers realize that the sensitivity of the topic of cheating may discourage the honesty of the student responses out of fear of being caught or incriminated. However, the response rate of 18% for each group of participants (faculty and students) was similar among the participating institutions (Tanner & Piper, 2010).

Background

Previous analysis of this research data (Tanner & Piper, 2010) showed that students perceive it is easier to cheat in an online course vs. a traditional face-to-face course for the following most commonly cited reasons: (1) lack of proctoring, supervision, being watched or monitored makes it easy to cheat and difficult for instructor to catch cheating; (2) unlimited test time allows one to look up answers to the test online or via cell phone, texting or emailing a classmate; (3) all course materials can be laid out for reference and one can also work with a classmate at the same time and not get caught; and (4) one classmate can take the test and email or text answers to others.

Based on the previous analysis of this research data (Tanner & Piper, 2010), the research results indicated that dishonesty exists; and the temptation and occurrences of cheating occurs most frequently on tests and quizzes, then homework assignments, and finally, major papers. Both faculty and students were equally divided on whether or not instructors can control academic dishonesty and the difficulty of enforcing academic honesty. The findings suggest that faculty perceive cheating to be occurring at a higher rate in online courses than in traditional courses. However, the study also indicates that students consider cheating to be occurring at a lower rate in online courses than faculty assume. The somewhat contradictory nature of these two findings is reflected in much of the literature surrounding academic honesty in online courses. A number of studies, such as Lanier (2006), Kennedy, Nowak, Raghuraman, Thomas, and Davis (2000) and King, Guyette, and Piotrowski (2009), indicated that both faculty and students consider cheating in online courses to be easier and more prevalent than cheating in traditional courses. However, other studies indicated a divergence between faculty and student perceptions of cheating with Grijalva et al (2006) suggesting students considered there was no difference between the amount of cheating in online and traditional courses. Complicating the matter even more, studies by Stuber-McEwen, Wiseley, and Hoggatti (2009) and Watson and Sottie (2010) suggested students believe less cheating occurs in online classes.

Analysis

Further analysis of the study's quantitative results suggests three possible scenarios for explaining the discrepancy between student and faculty perceptions of academic honesty in online courses. These scenarios are based on the assumption that mutual

understandings between faculty and students regarding academic integrity are more problematic in online courses due to the lack of face-to-face interpersonal contact and to the open source nature of digital information (Scanlon & Issroff 2005). The first scenario suggests students and faculty may perceive different levels of cheating occurring in online courses because students tend to underreport personal acts of dishonesty while faculty over report cheating due to the fact they are more acutely aware than students of the potential for the relatively un-policed nature of online courses to encourage student cheating. In this scenario, a stable, shared definition of what is and what is not academic dishonesty skew reported faculty and student perceptions of the amount of cheating occurring in online courses in opposite directions due to different levels of willingness to acknowledge the possibilities for cheating. Studies such as Trenholm (2006) and Sanders, Wenzel, and Stivason (2008), which emphasize increased monitoring of online courses as the primary remedy to cheating, support this scenario in that the call for increased monitoring at least tacitly assumes a shared definition of cheating between faculty and students.

The second scenario for explaining discrepancies between faculty and student perceptions of academic honesty in online courses centers on the confusion which may occur as the result of shifting definitions of the distinction between collusion and collaboration. Because the distinction between these two concepts is not absolute and can vary from teacher to teacher and thus from course to course, students may occasionally incorrectly assume certain behaviors are collaborative as opposed to collisional. In such cases, students would once again tend to report fewer instances of cheating than faculty. Such a scenario also assumes a stable definition of academic honesty. However, in this case, the definition is conceptually, but not operationally, shared; faculty and students simply interpret similar behaviors in different manners. Studies such as Barrett and Cox (2005), Turner (2005), and Jakes (2009) support this scenario in that they indicate web-based courses either create or enhance confusion regarding exactly which behaviors should be considered collaboration as opposed to collusion. Such studies' prescriptions for maintaining academic integrity in online courses emphasizes such techniques as creating assignments that are inherently collaborative, and specifically identifying for students the few circumstances in which collaboration is not permitted, i.e. where collaboration will be considered collusion.

The third scenario for explaining the study's findings of student and faculty's perceptions of academic honesty in online courses envisions a generational redefinition of the concepts surrounding intellectual property. Such a redefinition is created by the possibilities digitalization provides for the open sourcing of information (Evans, 2009). In this scenario, the operating assumption is students report less cheating in online courses than faculty because students' views on ownership of information, particularly digital information accessed online, are fundamentally different than the views of faculty. Students, due to their more open-source orientation to digital information, are assumed to have a far less restrictive notion of the possibilities for legitimately accessing and sharing information online. Moreover, not only is their view less restrictive where compared to faculty views, it is also less restrictive than their own views of non-online information. In much the same way students tend to make more of an ethical distinction than faculty between downloading a pirated cd than shoplifting the same cd, students from this point of view see information mediated through the internet as significantly more open to common use than information obtained in other manners. Such a student open source

perspective on digital information translates in online courses as a far less restrictive notion of academic honesty than faculty typically have. Thus, in this third scenario, the discrepancies between faculty and student perceptions are explained by the fact that faculty and students approach open source resources in online courses with significantly different definitions of cheating.

The three scenarios presented range from a completely shared definition of what is and what is not cheating (lack of supervision) in the first scenario to a conceptually shared but, somewhat operationally, fuzzy definition (unclear boundaries) in the second scenario to a final scenario in which faculty and students operate under different conceptions of academic honesty with respect to open source information (open source). Because of the variation in alignment between student and faculty conceptions of cheating the three scenarios represent, each scenario calls for fundamentally different actions for successful amelioration. The first scenario, for instance, would simply call for a higher level of monitoring students, while the second and third scenarios would require clarification and negotiation of a shared definition of academic honesty, respectively. Successfully coping with cheating in online courses is dependent on which of the possible scenarios suggested by the study's quantitative data is most likely.

In order to establish the relative likelihood of each of the possible scenarios arising out of the study's quantitative data, an element of the study's qualitative data was examined. This element focused on responses given to the open-ended student question:

[Is it] easier to cheat in a distance learning course?

Of the 644 student responses to this question, 84 percent (541 categorized responses) were able to be coded into one of the three categories: Lack of Supervision, Unclear Boundaries and Open Source. Each of the three categories corresponded to one of the scenarios between faculty and student definitions of cheating previously explained. Of the 541 categorized responses 273, or 51 per cent, were identified as belonging to Scenario 1 *Lack of Supervision* - the category corresponding to a shared, common definition of cheating between students and faculty (see Figure 1) which included directly quoted responses such as:

- No one is watching.
- No one is there to prevent you from taking a test collaboratively.
- There is no direct face-to-face interaction with instructor to develop rapport and respect.
- No one is there to prevent you from using books, notes, and the internet.
- I have a relative whose wife took all his tests for him.
- There is no one to hold you accountable, and it is very difficult for professors to catch cheaters and even harder for them to prove academic dishonesty if they suspect it.
- There is no way to monitor it and there are more opportunities for cheating to occur.

- If no one is watching you take the exam, there is little chance you will get caught looking up the answers.
- There is less oversight in distance learning courses.
- Testing is often not proctored or monitored. Some students may use resources that are supposed to be forbidden.

Such responses agreed with the near universal faculty view, evidenced by the study's quantitative data, that cheating, or at the least the opportunity for cheating, was more prevalent in online courses due to the inherent difficulties of monitoring student behavior in such courses.

Responses coded into the Scenario 2 *Unclear Boundaries* totaled 169, or 31 percent of the total responses coded, assumed a shared general concept of cheating, but also indicated some confusion as to the application of the shared definition in certain specific instances. Sample of directly quoted comments include:

- Most of the time professors don't define cheating.
- The boundaries of what is and what is not cheating become blurred.
- Students are encouraged to seek input from others.
- Cheating in distance learning classes is no different than if we were given the same 'take home' assignment in a traditional classroom setting.
- Groups can collaborate.
- Depends upon the rules, guidelines and preventative measures put in place.
- If it is an online course and you are doing it on your own time, then anything is fair game.
- It can hardly be called cheating when it's distance learning – if the time and resources are available, they'll be utilized.
- Not sure what you could define as cheating in an online class.
- I have never been monitored during distance learning courses so I am allowed any sources I choose.
- There is not a barrier to prevent students from doing assignments/tests together.
- Just because teachers don't specifically say, "Don't use the internet to help. Don't call other people." Without those restrictions, people think it is okay.
- Humans need and use references every day so it's not a big deal as long as the comprehension is there.

Responses in this category suggested that students share a similar definition of academic honesty with faculty, but are often uncertain in online classes if certain specific behaviors are ultimately considered fair or foul in regard to the shared definition of academic honesty.

Scenario 3 *Open Source* accounted for 18 per cent (99 out of 541 responses) of the student responses and suggested students and faculty operate from significantly different definitions of academic honesty as it relates to online courses. This category of responses relates to the third scenario for explaining discrepancies in using open

source resources between faculty and student perceptions of cheating in online courses. Directly quoted responses in this category include:

- Most of the work is done and submitted online and a student can give anyone their sign-in information, look-up answers on the internet, or have help from an additional person.
- Data can be looked up in real-time and applied immediately without knowledge from a professor.
- I know of some people who will have a second window up on their computer to search for answers while taking an online test.
- Able to use a book, family member, friend, or the internet on exams, papers, and projects.
- Because if it's taken on the internet there's no stopping anyone to look on google for the answer or to ask someone sitting next to them the answer to a question.
- You can look up material on the internet that you would not originally know during a test.
- Because you have the book right in front of you and can look at class notes.
- You have more resources around you that tempt students more than a traditional structured class room would be in a traditional course.
- Because you can look up everything online. Even with things like Respondus Lockdown, it is simple to bypass or use another computer.

Responses in this category implied that students, due to generational differences toward the open sourcing of information made possible by digitalization, operate in online courses with a fundamentally different view of intellectual property and, by extension, a fundamentally different set of assumptions about academic honesty in online courses than faculty.

Responses coded into the *Other* category totaled 103, or 16 per cent of the total responses, dwelled on a myriad set of responses having to do with ethical beliefs about cheating, instructor techniques used to prevent cheating, and students' perceptions of their instructor's ability to design and administer distance learning assignments and tests. Samples of quoted comments from this category include:

- If someone has integrity issues and is going to cheat, it doesn't matter if it's in a classroom or not.
- There are time limits set on tests to make looking up information a little more difficult.
- Teachers don't know how to use their own computers and make it easy to cheat. For example, Art History – place pictures on test to identify, but pictures are file named with what they are so it's easy to get points on test.
- Most of my teachers allow open book and make the questions more difficult.
- The instructor cannot control whether or not you use outside resources.
- If there is not a camera on the person taking an online test, someone else could complete the test.
- Somebody else has already taken it usually, & can tell other people what's on it. I knew one time that someone even put a digital recorder in their shirt, went

into a testing center and quietly read every question to himself & then gave the recording of the final exam to their friend.

- A few years ago, yes, it would have been extremely easy. Now, it would be slightly less so, due to the advent of things like Turnitin, though I question their effectiveness, because effectiveness of a program like that is based on volume of samples available, and I seriously doubt that the volume is sufficient to truly do what they claim to do.

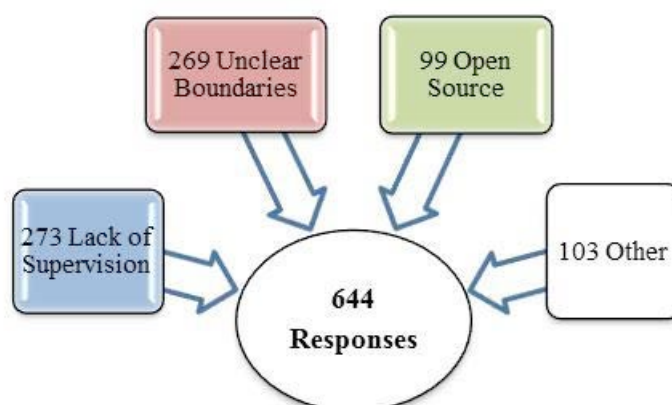


Figure 1: Why Students Cheat in Online Courses

Conclusions

Public institutions are being pressured to compete with for-profit virtual campuses by offering more online courses and degrees. There are critical challenges and barriers to any online course or program (Tanner, 2007 and Yang & Cornelious, 2005). The challenge of upholding high academic standards, specifically academic honesty, becomes arduous. Faculty and students know and admit that cheating is occurring in online courses (Tanner & Piper, 2010, Piper & Tanner, 2011 and Tanner, Hartsell, & Piper, 2012). However, faculty are at a distinct disadvantage as there is still a “generational digital literacy divide” (Tanner, 2007, p. 126).

Based on analysis of student answers in the qualitative part of the study, it would appear that a primary question raised by the findings of the study’s quantitative data “*Does dishonesty exist in online courses?*” is definitively answered in the positive. The fact that responses coded into Scenario 1 *Lack of Supervision*, the category most suggestive of a common definition of cheating among students and faculty, were almost the same in percentage as the responses coded into Scenario 2 *Unclear Boundaries* and Scenario 3 *Open Source* combined, assumes that online courses are exposing a digital divide between faculty and students over the parameters of academic honesty. Moreover, the fact that both Scenario 1 *Lack of Supervision* and Scenario 2 *Unclear Boundaries* presuppose a common definition of academic honesty only serves to further advance the assumption of a shared definition. Because the distinction between Scenario 1 and Scenario 2 rests on how a shared definition of academic honesty is operationally applied in different circumstances, not on different concepts of academic honesty, it would require that responses coded into Scenario 3

be greater than responses coded into Scenarios 1 and 2 combined before it could be stated that a majority of responses indicated students and faculty operate from different notions of what constitutes cheating in online courses. Thus, at least based on the study's student responses, if digitalization and the open-access to information it provides is indeed forcing, as Pfannenstiel suggested (2010), a generational redefinition of the concept of individual versus community ownership of intellectual property, such a redefinition has yet to create a fundamental divide between faculty and student definitions of academic honesty.



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International Service-Learning in Nicaragua for Japanese Medical Students

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Abstract

Service-learning (SL) aims to match subject content with social need to give practical meaning to student learning. This international service-learning trip to Nicaragua paired medical English and other medical skills students were learning with the social need for medical care by underserved people in San Ramon, Nicaragua. One purpose of the trip was to provide a venue for the use of medical English learned in the classroom at a time when there was no such venue available. In addition, we hoped that students would “wake up” and recognize that language is a living thing meant to be used in communicating. Students joined US based NPO Corner of Love on medical missions to provide services to impoverished Nicaraguans while at the same time being given the opportunity to use English learned in university courses.

We sought answers to the following: 1. Did the SL help students improve their English skills? 2. Did the SL improve student learning motivation? 3. Is it possible for beginning medical students to effectively serve in a rural clinic? Student questionnaires and journals reflecting on the SL experience were used. We established that the SL experience led to increased motivation and awareness of language weak points. In addition, students identified barriers to communication that went beyond language, such as biases and stereotypes. Finally, students initially felt their medical knowledge was inadequate when working in the clinics, but found as they worked at the clinics they were able to offer indispensable assistance to the other team members and Nicaraguans.

Keywords: service-learning, Medical English

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Introduction

Service-learning is defined as a teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities (National Youth Leadership council 2009). In the early stages of the creation of the Nicaragua Service-learning program for Japanese medical students, there were no programs available at my (C. Kuramoto) university that connected medical-English classroom learning with actual use of the language outside of class. In addition, class sizes of over 120 students made it impossible to monitor English use in classes. A number of students were interested in having more opportunities to speak and discuss in English with the instructor and others, but the large class size made this very difficult.

In addition, an agreement between my university and a university medical school in an English speaking country was canceled by the cooperating university which effectively eliminated a program that may have provided an environment for students who wanted to put their medical English skills into practice. Therefore, at the request of my institution, I began contacting universities around the world trying to form an alliance that would allow my students to go into the world and try to use their medical English skills and other medical skills they were learning. Unfortunately, after contacting over 30 universities it became clear that there were no universities willing to accept my request to allow our students to visit their medical schools for short term programs without going through formal matriculation procedures.

Subsequently, I began to contact NPOs which provided medical services to medically underserved groups of people in the hopes of finding a community with needs that could be served by my enthusiastic students. However, most of the NPOs also turned down the attractive offer to get hard-working Japanese medical students to join their ranks on the premise that they did not have the funds to undergo security screening of international students, a precaution they deemed necessary. Finally, we were able to form an alliance with an NPO in Washington State through a personal connection to one of their founding members. The NPO, called Corner of Love, is an organization that brings medical care to the underserved area of San Ramon in Nicaragua. Corner of Love has an open policy which welcomes volunteers from around the world and was willing to welcome my students after meeting with me.

Why Service-learning?

Service-learning was an appropriate fit for the needs of both the medical English students and the San Ramon underserved community (Figure 1). Some students were bored of large classes with little or no opportunity to speak. However, many students were interested in helping people and using the medical and language skills they were learning in the real world. San Ramon is a community that is among the poorest of the poor in Nicaragua. The people of San Ramon live on less than 1 US dollar a day, even lower than the World Health Organization's definition of poverty which defines poverty in monetary terms of living on 2 US dollars a day.



Figure 1: matching student and community need

Purpose

The main purpose of this SL program was to provide a venue for the use of medical English and other skills learned by Japanese medical students. However, through this international SL, students would be learning about civic responsibility and would have an opportunity to improve their self-esteem. Beyond the English the students would learn about poverty, different medical systems, clean water, parasites, and education needed in impoverished countries. In addition, students would be learning about themselves and their abilities. As shown in Figure 2, SL takes into account the interests of students, the academic content (which varied depending on the years of medical training), and the needs of a community.

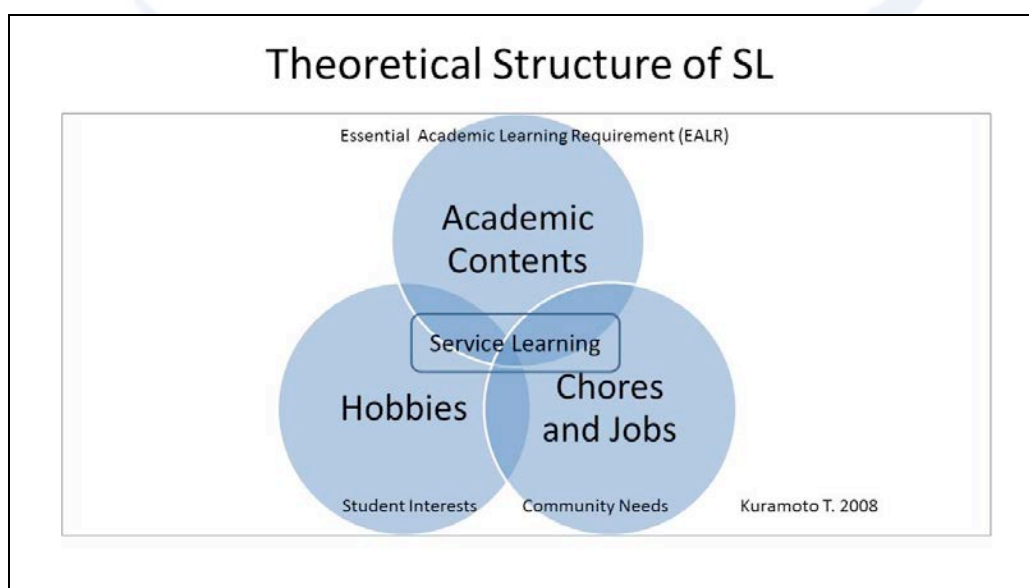


Figure 2: Structure of service-learning

For this presentation, we analyzed data from student questionnaires and journals in an attempt to answer these three questions. Below are sentences written by students that related to the questions asked. All answers are included just as they were written by students without corrections.

1. Did the service-learning improve student learning motivation?

- The medical treatment is sometime more effective than medical cure if we could understand the background of medical and social issues, and our own talents and limitations. I have to study pathophysiology more.
- We learned more medical knowledge and values through Nicaragua volunteer activities (S-L).
- Why did I come here? I must be much more active. Today, I felt worthless, but smiles of children encouraged me. Tomorrow, I would like to do something more meaningful.
- “She said that allergy gave him headache, and gave him histamine 1 blocker. Honestly, I could not agree with her because I had never heard allergy cause headache. I have to study pathophysiology of allergy.
- I am a passive person and I wanted to adjust (improve) new situations and real world. Also, this is precious experience for me. So I proactively try to communicate with local people with Spanish and English or body language.
- The community are always in need for medical care. Poor sanitation, after seeing the situation, my motivation for being involved in the community has definitely changed.

Recognizing their own limitations led students to want to learn more. The above statements show a desire to study and learn more after the SL experience. Therefore, we believe that the SL experience was motivating to the students.

2. Did the service-learning help students improve their English skills?

- We heard many Americans talking with each other in the bus, but I could not understand their English, which worried me.
- Knowledge of idioms is much more useful than knowledge of complicated words when we talk with natives [*native speakers of English*].
- It was not only a language barrier but also a mind barrier that made it difficult for me to communicate with foreigners [*native-speakers of English*].
- I followed Dr. Kirby who would see a patient with ganglion on the back of her hand. He removed the contents of the ganglion with syringe, and packed the scar.
- Later, he told me that we should ask patients with chest pain not only when they felt the pain but also whether they were sweating when they felt the pain in addition to whether they had dyspnea. But, I wondered if there was anything that we could do for the patients who might have angina pectoris. In Nicaragua, we could never know which coronary artery was obstructed. All we could do might be to talk them out of exercising. We saw some patients who had problems in the vein of their legs such as the patient with vascular spider and the one with venous malformation.
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We realized that without an instrument measuring English levels before and after the SL experience there was no way to quantify English improvement. Therefore, for future investigations we would change this question to ask whether the experience motivated participants to continue learning English and in what ways. In these comments by students, you can see that students are discovering their own weaknesses and determining the importance of particular expressions in communicating well in English. Furthermore, you can see the use of medical English words they have learned in class.

3. Is it possible for beginning medical students to effectively serve in a rural clinic?

- After this trip, I got to know that ability to get physical findings is much more crucial than ability to read results of examinations (X-ray photographs and ECGs) .
- At first, I did not know what I should do because of my poor ability to listen to English. After watching other volunteers working, however, I could understand what I should do.
- I worked with Tanya who saw patients. I wrote prescriptions in Spanish following examples which she had written before.
- So, I wished I had learned how to get physical findings in addition to knowledge of parasitology and dermatology before the trip."

Through these comments, we saw that students were, again, discovering their own weaknesses. However, they were also discovering ways to cope and overcome their weaknesses. They learned new skills by watching and learning from others. In addition, I observed the students at work and saw clearly that they were able to serve effectively at the clinics under the supervision of other COL staff and volunteers.

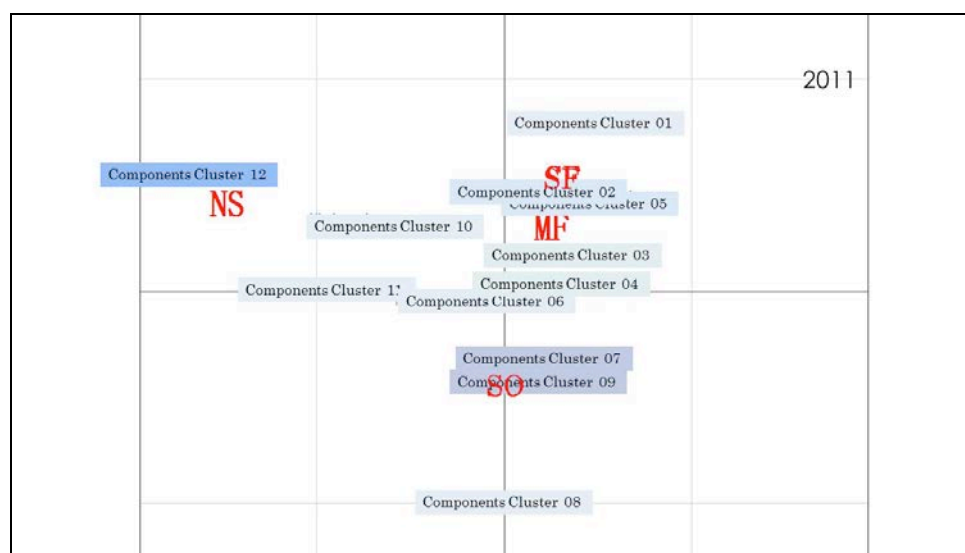


Figure 3: Additional analysis through text-mining

Text-mining of Student journals

We analyzed 10 student journals after the 2011 team service-learning activities in Nicaragua (Figures 3, 4). The questions students were asked to address in their journals were: “Looking back at the expectations you had before the trip, how did the reality of the situation match your expectations?” and “Is there anything you wish you had known more about before the trip?” The student answers fell into the following 4 categories. Student Factors and Impressions (SF), Medical Factors (MF), Student Opinions (SO), and the Nicaragua Situation (NS). These four components gave use a clear picture of the main themes students wrote of in their journals.

Text-mining of Students’ open-ended questionnaires

Students	Questions and Answers of Students	Keywords
	1. What have you learned about yourself through this experience?	1. What have you learned about yourself through this experience?
A	I noticed that I liked talking with local people by using local language. (In this trip, Spanish) When I communicate with them by using only simple words, body languages, and smile, I really enjoy doing this.	local language, Spanish, communicate, body languages, smile, enjoy
B	Nicaragua does not have a healthcare system that serves equally for the whole country. Seeing that most of the people don't have the opportunity to receive proper medical care, I recognized that I was taking medical care for granted. Living in a country like Japan makes it hard for us to see and know the situation in other poor countries.	Nicaragua, healthcare, opportunity, medical care, recognized, granted. Living, Japan, know, situation, poor
C	About myself, that I can communicate with people with a little words. I speak little of Spanish, but I was able to talk and play a little with them.	myself, Spanish, able, talk
D	I can't speak English. I can help people in many ways.	can't, English, help
E	I've learned it is important for me triumph into the new situations. I can get a lot of precious experiences by trying various works in this trip.	important, new, precious, experiences, trying, trip.
F	How important the relationship between government and NGO, when NGO want to do something.	relationship, government, NGO, something.
F	We have to adjust or create new standard line (about living, Hygiene ,disease,financial.etc ...), when we do some project for the villagers in other countries. I thought Its completely different thing about everything, if the country changed. It is like CM and G.	adjust, create, standard, living, disease,financial, project,different
F	How important to discuss with other team member. Through the discussion, We can make our opinion more smartly	discuss, opinion
G	The biggest thing was that I almost didn't know anything about the real world. The things I see here in Japan is not a matter of course, for example clean clothes, clean houses, clean water etc.	biggest, know, real world, matter, clean
G	Another thing was that I hood to be more proactive toward new things because I was passive to most of the things and happenings in my life.	proactive, passive, life.
I	I have learned the difference of Nicaraguan and Japanese medical treatment	difference, Nicaraguan, Japanese medical treatment

Figure 4: Manual text-mining of student answers to question 1 in 2014

Manual text analysis of student answers to question 1 (Figure 4) produced two categories as shown in the following examples.

(1) Personal development

“I am passive person and I wanted to adjust (improve) new situations and real world. Also, this is precious experience for me. So I proactively try to communicate with local people with Spanish and English or body language.”

(2) Deepened awareness of social issues

“The communities are always in need of medical care. Poor sanitation, After seeing the situation, my motivation for being involved in the community has definitely changed.”

Conclusion

This international service-learning project has provided students with an invaluable experience which successfully connected the classroom content from medical English class and other skills to the needs of a community. We found that students were 1. motivated to increase their knowledge in both English and medical subject areas, 2. able to see their own English language weaknesses and strengths, and 3. capable of effectively serving in a rural clinic even as beginning medical students.

As practitioners we have also learned that it is important to think outside of the box when trying to provide educational opportunities for our students. The original request to find a place for students to observe at an English speaking medical institution led to the search which eventually evolved into our current SL in Nicaragua program. It was a winding and sometimes frustrating road, but has brought about an opportunity for our students to work alongside medical care workers and actually help people in need in a way that we never would have imagined if not for the obstacles we met along the way.

In Japan we have a saying 可愛い子には旅をさせろ (kawai ko ni wa tabi o sasero), which means you should send your beloved child on a journey. As we continue to send our beloved students on this journey, we believe that it will provide them with a means to feel connected to the community, their own purpose in life, and the world.

Acknowledgment

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Minimizing Perceptual Mismatches – Re-Arranging the Lens

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Abstract

Miscommunication or being misconstrued is indeed an old story of the English language classrooms. Chances of miscommunication further escalate when the learner is the second or third language speaker of a target language. Mostly, teachers and learners don't look at the same classroom event as a potential learning event and mismatches exist between teacher perceptions and learner perceptions of the lesson objectives. These mismatches increase the gap between teacher input and learner intake and the desired learning outcome is not achieved. This is common in monolingual classrooms with minimal diversity and becomes more challenging in diversified multilingual classrooms. However, the nature and degree of mismatches vary in monolingual and multilingual classrooms and can't be used as a scale to consider either better than the other. The focus of studies done earlier have been perceptual mismatches and 'learning gap' and the emphasis in this paper is the 'learning map.' Also, more than a gap there is a 'disconnect' between a teacher's theoretical approach to a lesson/lecture and his/her practical implementation of it – 'planned' and 'practical' teaching. The discussion here is threefold - from theory to practice to perception. Small steps need to be taken, if maximum learning is the goal, including well-defined and well-explained specific learning objectives for each lesson; methodology, even if sometimes it means to choose from what is termed as 'conventional teaching methodologies' and teachers and students preferred styles. Well-defined learning map and eclectic and innovative teaching approaches and techniques maximize learning opportunities thus minimizing the mismatches.

Keywords: perceptual mismatches, learning gap, learning map, styles, eclectic teaching approaches and techniques

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Introduction

Human interaction has the potential to contain ambiguities and mismatches. Misinterpretations and mismatches are part of everyday teaching and learning. The gap created due to these mismatches between teacher's input and learner's intake has kept the pedagogists on a go to investigate and experiment with new techniques in order to maximize the learning opportunities for the students thus minimizing the mismatches. If we look through the history of teaching and in particular language teaching in the past century, we get interesting and varied interpretations of 'the best way' of teaching a foreign language. The exercise of teaching and learning cannot be categorized into set rules, methods, trends or techniques – we can neither categorize it nor limit its scope. In fact, 'The best way' of teaching is a myth and probably will remain so in the years to come. The teachers need to develop an approach based on the classroom needs and use techniques that best suit the learning needs of the students. According to Brown (2000), a teacher's choice of selecting designs, materials and techniques for teaching a foreign language in a particular context largely depends on his/her approach. When we talk about choosing an approach or a technique, we must keep in view the 'theory' and the 'practice' map– one is not divorced from the other but certainly, most of the times there are 'disconnects' that create a gap between a teacher's theoretical understanding of the lesson objectives vs. the actual practice of teaching and also, between students' perceptions of the lesson objectives. The two important questions included in this research paper are:

- 1) How can we maximize the learning opportunities in our classes by minimizing the mismatches?
- 2) What is a 'learning map' as compared to a 'learning gap' and what should it include?

Most of the studies done earlier have focused on the 'learning gap' and the main objective of this study is the 'learning map.' The focus of studies done earlier has been the learning gap, and in this paper, the significance of a 'learning map' in the context of a learning gap and perceptual mismatches have been highlighted.

With the advent of communicative language teaching in the 1970's there has been a reasonable shift in the pedagogic world – teachers don't stick to one particular method to teach a foreign language as previously it was believed and practiced. Though in communicative language teaching (CLT) the focus is on communication 'the meaning' rather than individual grammar items 'the form/s', still it has helped language teachers a great deal in shaping their perceptions towards language teaching. CLT is not a 'teaching method' but is usually characterized as a 'teaching approach' in the broader sense. The CLT approach has certain features. The most recognizable of these features are David Nunan's (1991) five features of CLT:

1. An emphasis on learning to communicate through interaction in the target language.
2. The introduction of authentic texts into the learning situation.
3. The provision of opportunities for learners to focus, not only on language but also on the Learning Management process.
4. An enhancement of the learner's own personal experiences as important contributing elements to classroom learning.

5. An attempt to link classroom language learning with language activities outside the classroom.

Our main emphasis is on the ‘learning management process.’ How and what do students learn? What goes into learning and teaching a specific item? How best is the task done or an item learned? What lesson can be derived from a specific task and how it can be implemented, improved, improvised, adapted and customized while preparing similar and other tasks in order to gain maximum learning out of it? While it is important for the students to focus on the process, it is equally important for teachers to keep track of the classroom events.

Many studies have been conducted on perceptual mismatches (e.g., Trigwell, Prosser, & Waterhouse, 1999; Peacock, 2001; Sanchez, 2000; Rao, 2002 and Ford & Chen, 2002). The writers in these studies have mainly focused on the mismatches between the teaching styles and learning stages. The most famous studies on perceptual mismatches have been conducted by Kumaravadivelu (1991), Slimani (1989), Block (1994, 1996) and Barkhuizen (1998). All of their studies confirmed that mismatches occur between teacher perceptions and learner perceptions of what is available to learn.

Nearly twenty-three years ago, Kumaravadivelu (1991) conducted a research study in order to investigate the perceptions of the learners of a language learning task in an ESL context. The subjects of his study were low intermediate level ESL learners in the US. Based on his study, he identified ten sources that have the potential to contribute to the mismatch between teacher intention and learner interpretation. The ten sources that he identified are: *cognitive, communicative, linguistic, pedagogic, strategic, cultural evaluative, procedural, instructional and attitudinal mismatches*. Kumaravadivelu’s study is one of the pioneer studies on the identification of perceptual mismatches. According to Kumaravadivelu (1991), “the more we know about the learner’s personal approaches and personal concepts, the better and more productive our intervention will be” (p. 107). There is no doubt, that mostly the classes are comprised of mixed ability students irrespective of monolingual or bi/multilingual classes. The teachers almost are encountered with similar problems in different classroom situations. According to Haritha (2014), “In the 21st century language classrooms, there have always been contradictions between the learner’s understanding of the content and the teacher’s perception of teaching the content” (p. 502). The degree of perceptual mismatches varies depending on multiple variables related to the background and nature of the students, teachers and class. However, it cannot be decided that language learning in monolingual ESL classes is better than bi/multilingual ESL classes and vice-versa, what might appear the strength in one class could be a challenge in the other one.

There is no such thing as an ‘ideal’ classroom, but there certainly could be ‘better’ classrooms. Mismatches can’t be avoided; they are inevitable. Teacher’s perspective aligned with the student’s perception/s will keep learning and teaching less challenging and more rewarding. In the words of Lee (1960), “... You never really understand a person until you consider things from his point of view” (p. 30).

People think different because of differing experiences--not everybody thinks alike. Experiences and missed and availed opportunities play a great role in shaping our

mindset and our attitude; therefore, learning agendas vary. Within one classroom students are different and so each student has his/her own learning agenda (McDonough, 1995, p. 121). Students come to class with a different mindset which is not according to their teachers assumptions (Nunan, 1995, p. 140). Shohamy (2006) draws an analogy between a teacher and a soldier where teachers like soldiers carry out orders of the system without questioning the policy and agendas behind it. The aforementioned claims show that already a perception barrier exists. The teachers struggle with the notion of 'carte blanche' and because of this confusion, some understanding and learning is hampered; this indicates that objective mismatch between the teacher and the taught maybe inevitable. The gap created because of these mismatches between the teachers' perceptions and the learners' perceptions of the lesson objectives, also impedes the language acquisition (LA) process, thus affecting it adversely. Studies conducted by Green & Oxford, 1995 and Littlewood, Liu & Yu, 1996 show the adverse affects on the LA process due to these gaps.

The theory and practice of learning and teaching go hand in hand. Theoretical underpinning, whether implicit or explicit, is the basis of all classrooms teaching practice. This understanding of the theoretical knowledge of the classroom practices might be a result of a teacher's professional education, personal experience and observations, robust commonsense or a combination. One cannot be divorced from the other. Theory and practice should inform each other, and should therefore, constitute a unified whole (Kumaravadivelu, 2003, p. 18). However, O'Hanlon (1993) explains a distinction between 'professional theory' and 'personal theory.' According to him:

A professional theory is a theory which is created and perpetuated within the professional culture. It is a theory which is widely known and understood like the developmental stages... Professional theories are generally transmitted via teacher/professional training in colleges, polytechnics and universities. Professional theories form the basis of a shared knowledge and understanding about the "culture" of teaching and provide the opportunity to develop discourse on the implicit and explicit educational issues raised by these theoretical perspectives... A personal theory, on the other hand, is an individual theory unique to each person, which is individually developed through the experience of putting professional theories to the test in the practical situation. How each person interprets and adapts their previous learning particularly their reading, understanding and identification of professional theories while they are on the job is potentially their own personal theory. (pp. 245 – 246)

The aforementioned implies the traditional assumption, which is also a false dichotomy that professional theory is the theorist prerogative and personal theory is the teacher's domain. Besides, it also implies that based on their experience and understanding, teachers are not empowered to practice their own theory, instead they should use the theories presented by the theorists who are not actual teachers but outside experts. This shouldn't always be the case because it takes power from the teacher and the whole enterprise of learning and teaching is affected by it and results in lesser learning opportunities.

According to Can (2008), based on the knowledge of methods and, more significantly their experiences and frameworks, instructors can construct their own methods and

thus, act as evaluators, observers, critical thinkers, theorizers and practitioners. A teacher is an expert of his/her own class and in the field per se. The teachers have the right to have their own personalized theories that come from the practicalities and realities of classroom events that they deal and live with on a day-to-day basis. Taking this privilege away from them definitely puts the learning at stake. 'Empowered' learning and teaching includes both the teacher and the taught. It is always good to have the privilege to exercise theories both by the 'outside expert' the 'theorist' and the 'in- class expert' the 'teacher.' Critical pedagogists are strongly against this artificial divide. Such an approach makes teachers faithful executors of established theories and gives them little or no room to self-conceptualize and self-construct their personal theories (Kincehloe 1993). A teacher is both a privileged theorist and practitioner and this should be acknowledged and accepted across the board. These restrictions create a gap between teacher input and learner intake on one hand, but a closer look will help us understand that such a mindset is also an important factor of the disconnect between a teacher's theoretical approach and his/her teaching practice in the classroom.

In order to maximize the learning opportunities in the class it is vital to understand that mismatches are not only the results of gaps but also 'disconnects' between the teacher's theory and practice. In other words, sometimes what is identified as a gap between teacher input and learner intake is actually a 'disconnect' between a teacher's theory and practice in teaching. A study conducted by Wong (2011) at a secondary school in Hong Kong show that the teacher's teaching practices largely determine whether the students are able to discern the learning objectives correctly or not. The learning objectives should be clearly stated before the lecture begins. This will help students better understand on what to be learnt and will expedite the learning process by making the students more proactive. Another study conducted by Khany & Darabi (2014) was carried out in order to investigate teachers' performances teaching at a high school level in an ELT Iranian context on the application of principles-based and post-method pedagogy in their teaching. The results of the study show that principles-based and post-method pedagogy practices are not highly applied in the classroom by teachers in their teaching practice.

We are indubitably people of different percepts, but finding ways in order to align our agendas with the majority to create a win-win situation is a matter that deserves serious attention. The ways the lessons are planned play a significant role in achieving maximum learning in the classrooms. What might appear neat and organized on a paper as a lesson plan might not appear and work the same way in practical teaching. This indeed is a thwarting experience for both the teachers and the students. Lesson planning is indeed a vital component of the teaching-learning process, but what goes into it is what really matters. As mentioned earlier, theory informs practice and "theory to practice" has been tremendously emphasized in research studies. However, a teacher is both the practitioner and the theorist, but the important question is, what makes a teacher a theorist? A simple answer might be, a teacher who theorizes his/her own practice. In doing so, a teacher does an 'action research' in which s/he carries out research 'with the people' and not 'on the people.' This brings us to the kernel of the whole discussion – the emphasis here is not 'theory to practice' rather it is 'theory for practice.' The discussion here is three-fold: theory, practice and perception. According to Burns (1996), "Theories for practice, as distinct from the theories of practice typically taught in teacher education programs, construct the cognitive

structures for planning, decision making and teaching behavior in the language classroom” (p. 174).

There is no doubt that even meticulously planned lessons don’t give us the desired output. It is important then for a teacher to revisit his/her lesson planning and look for some missing connection/s or disconnect/s. The approach should be praxis-driven:

practice —→ *theory* —→ *practice*

The main focus in the post-method era is the use of eclectic approaches and choosing teaching materials from eclectic sources. According to Bigelow and Cushing (2014), “For teachers utilizing principled eclecticism, language acquisition inhabits a space where risk taking and mistakes are supported (and often modeled), informal assessment of learning occurs on a regular basis and informs next-steps in lesson planning, and goals for success remain student-driven” (p. 249). However, this doesn’t undermine the use of traditional methods when and where required to maximize learning opportunities. In fact, the whole concept of *eclecticism* in language learning and teaching is incomplete if traditional methodology is not part of it – it completes the picture – in other words, traditional teaching methodology is not divorced from it. Nunan (1989) found that students found traditional learning activities better than communicative activity types and in some cases preferred the former over the later. What matters is the context in making informed choices as also, noted by Arikan (2006) that within the use of traditional methodology the focus should be on how teachers construct and implement methods rather than how methods work for teachers. It is important to keep the context in mind because content divorced from the context has greater chances of producing less desired results. Contextualized learning is vital; according to Berns and Erickson (2001) contextualized learning is the “conception of teaching and learning that helps teachers relate subject matter content to real world situations” (p. 2). The classroom students are also part of the ‘real world situation’, and they should be included while designing lessons and defining lesson objectives – the student should lie at the very heart of lesson planning. Active student centered learning is a main component of contextualized instruction (Dowden 2007).

There is no doubt that we have mixed ability students in our classes. A study conducted by Rauf and Iqbal (2008) on the struggles and challenges faced by Pakistani immigrant students while learning English in American schools. They found that students who are hesitant to speak and communicate in English feel left alone in the language learning process. It is the instructor’s responsibility to take these students on board who otherwise become ‘silent’ and ‘passive’ fighting with their own language deficiencies (p.57), and also hinders their academic growth on the whole. Generally students are divided into three groups according to their academic/learning strengths and caliber: good, average and below average. The important question is how do we determine their strengths? Learning that doesn’t take into account the learner is disintegrated learning. In many EFL/ESL contexts, students lag behind because they lack in the English proficiency skills to survive and succeed in the English medium context of education. “The language teachers, policy makers, syllabus designers and the teacher trainer should strive hard in order to bridge the gap between what majority vernacular medium schools deliver to language students and

what should be the actual required level of language proficiency” (Rauf & Iqbal, 2008, p. 58).

In many academic institutions students are screened; they take standardized tests and accordingly are placed in different levels based on their test scores. These standardized tests actually don't take into account the “actual learning strength” of a student, and therefore, ultimately it is the instructor's duty to identify it. The pioneer study done in this area is Howard Gardner's study on multiple intelligences (MIs) in the late 1970's and early 1980's. The MIs theory by Gardner, posits that each individual possesses a different kind of mind and therefore learn, remember, perform, and understand in different ways; they possess eight or more relatively autonomous intelligences. Individuals draw on these intelligences, to solve problems that are pertinent to the society in which they live, either in individual capacity or corporately (Gardner, 1983, 1993, 1999, 2006b & 2006c). This also goes with the universally accepted truth that each individual is unique; we can be similar in many ways, but not the exact identical. Multiple intelligences also determine the learner's preferred style/s of learning. Akbarzadeh and Fatemipour (2014) conducted a study in which they investigated the preferred style/s of Iranian EFL language learners at the upper-intermediate level and also the teachers' preferred style of teaching. The results of the study show a mismatch between teaching style preferences and learners' learning style preferences. They found that the teachers have their own fixed style of teaching based on the requirements of the course/s and not on the students' learning style preferences. Despite the fact the teachers were aware of the theories of learning styles; they did not take those into account while designing lessons and/or lectures. This also highlights the significance of having more teacher training forums and more projects on the English language teaching reforms, so that we can better equip and train our teachers to face such kind of challenges. According to Oxford (2001):

One image for teaching English as a second or foreign language (ESL/EFL) is that of a tapestry...woven from many strands...the characteristics of the teacher, the learner, the setting, and the relevant languages (i.e., English and the native languages of the learners and the teacher)...to produce a large, strong, beautiful, colorful tapestry, all of these strands must be interwoven in positive ways...the instructor's teaching style must address the learning style of the learner, the learner must be motivated, and the setting must provide resources and values that strongly support the teaching of the language...if the strands are not woven together effectively, the instructional loom is likely to produce something small, weak, ragged, and pale—not recognizable as a tapestry at all. (p. 1)

Prior to setting lesson goals, one main goal for all the classes is and should be ‘maximum learning.’ The teacher is definitely on a higher pedestal than the students and therefore, should make informed choices for the students by taking them on board and by making them understand that both teachers and students are in a joint enterprise of teaching and learning.

Theoretical Framework of a Learning Map

A classroom lesson should be designed in a way that take into account the following learning map where the student is an integral part, and the teacher is also an important

part of the language learning and teaching process in order to maximize the learning opportunities in the class, thus minimizing the mismatches. The teachers need to get involved in their teaching by reflecting on it. This means to do an in-depth analysis of the classroom events, lessons, material/s used and draw meaning from those experiences and later testing that knowledge to make better and informed choices. Below is a framework that can be used by teachers as they plan their lessons and class activities:

- 1) Clearly define and communicate learning objectives and goals.
- 2) Keep in mind, the preferred learning and teaching style/s of teachers and students. The learning strength/s of a student; the way they learn better, keeping in view their multiple intelligences. Incorporate (visual and audio aids etc) in the lessons to make it more interesting.
- 3) Keep students in mind besides the content of the lesson while designing lessons plans.
- 4) Use multiple authentic sources by giving open choice to the students to select one according to their preferred style.
- 5) Use tiered tasks with mixed ability students in the same class (level) for the same task/lesson.
- 6) Use the wider community as a resource for learning by finding a relationship between the real-world and pedagogic tasks.
- 7) Invite guest speakers for talks and lectures. The institution's administration could be consulted for this.
- 8) Carry out an ongoing assessment and observation through action research.
- 9) There should be synchronization between a teacher's theoretical approach to a lesson and his/her teaching practice.
- 10) Make students write one goal at the beginning of each lesson and ask them to reflect and evaluate that goal in terms of why and what has been or has not been achieved.
- 11) Get feedback at the end of each lesson from the students. This is a good starting point to involve the students in lesson planning. This will help teachers and students get more insight and will also help them better understand how things can be learned and taught by reducing the input and intake gap.
- 12) Employ multiple methods, techniques and approaches and make students aware of the various teaching methodologies.
- 13) Evaluate each lesson by having post - discussion sessions on how much learning has been achieved and also discuss possibilities of preparing future lesson objectives and plans. This will aid students in decision making, taking ownership of their learning, and reflecting upon their learning.
- 14) Have pre-discussion sessions on a lesson and ask students to communicate their interpretations about it. This will help instructors define clear lesson objectives that will be more aligned with student interpretations.
- 15) Design rubrics that clearly communicate the focus areas of a lesson. Discuss the rubric before the lecture begins. It would be great to keep one or more areas open (depending on the nature of the lesson) and ask students to fill that up – how would the students like to be evaluated?
- 16) Bolster the morale of the students by making use of 'positive notes' during the course of the course. It is important to motivate students!
- 17) Share different kinds of perceptual mismatches and make them aware of it.

- 18) Make students confident of their knowledge. Help them know what they know; this is a good way to gauge student interest.
- 19) Involve students in exploratory projects.
- 20) Allow students to prepare tests/question papers in groups and later collate those with yours and have an open discussion about it. This will help them understand the significance and nature of tests and being tested. You might also pick questions prepared by different groups and make one test out of it and give it to the students.

Conclusion

On the basis of the literature reviewed and the teaching experiential knowledge, including classroom observations, in this paper, a small effort has been made to present an illustrative framework of a 'learning map' that can be used by teachers to maximize learning opportunities in their classrooms by minimizing perceptual mismatches. The framework of the learning map presented above can be used, applied and adapted both by experienced and inexperienced teachers in order to facilitate them in their professional development both as a researcher and practitioner. There is a dire need that teachers become directly involved in the process of theory and practice by conducting action research in order to gain more insight on the learning and teaching perceptions and practices.

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Dancing with the Trees: A New Way to Learn Science with Classical Values

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Abstract

Science education has undergone a sea of change with different approaches and methodologies. But value oriented science education has not been given enough thought. Drawing from thinkers like Michel Foucault, Jean Baudrillard, Judith Butler and Louis Althusser, this paper seeks to posit methods of inculcating values through construction of knowledge, transformative pedagogies and how educational institutions can play a vital role in the process. The paper is divided into the following areas: construction of knowledge, both subjective and objective, along with the challenging and transforming task of imbibing values. Most essential part of this area lies in the fact that learners are allowed to develop their cognitive skills in their own pace irrespective of their differences in the power of absorption and retention. 2. transformative pedagogies: power of transforming one is the key to radical changes in the society and it will begin with the change in thought and attitude of learners and teachers involved. By involving both learners and teachers in scientific projects where issues -in near by vicinity are addressed, they get involved and absorbed into the societal improvement. Classrooms in educational institutions pave the way for these individual transformations and change in mindset and attitude. Therefore, science education in classrooms should involve an objective learning of concepts and definitions, it should also bring student closer to human values like empathy and cooperation and team spirit. Here in lies the essence of science education in 21st century.

Key words: science education, construction of knowledge, values, classrooms, learners, teachers, scientific projects, transformation

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Introduction-Whither bound?

“To be or not to be”, the Hamletian dilemma is universal as it touches human life at many points. The American Educationist and Philosopher John Dewey (1933) contended that Education touches life almost at all points. Applying the syllogistic premises of logic on the two stated propositions, it may be deduced that Education sometimes undergoes the Hamletian dilemma. In this paper I try to address such a dilemma: should science be taught within a broader framework of human values, or should it be treated objectively as a subject of amorality. The argument of my paper is to embed values in science education within classrooms. Science education loses its purpose and charm when values are not infused in science education in teaching learning process in classroom transactions. The main objective is to show that the scientific projects undertaken can act as a great medium and tool to bring forth the infusion of values with science education. The student fraternity can greatly benefit and can develop holistically to their fullest potential if this coupling is put into proper effect. Classrooms and the activities undertaken can act as sites of imbibitions. Sensitisation of younger generation towards environment is done through these projects and it combines social values with science education. Along with science, students learn empathy, patience, team spirit, to work cooperatively and collaboratively with each other, develop self esteem and reach out to the community and environment in their vicinity. The paper boils down to an education with respect to physical nature which has an impact on human nature.

Crossroads

Science education has many overlapping instructional methodologies that are widely used all around, project based, inquiry based, and problem based and place based being some of them. Learning science helps students to think critically, solve problems, develop curiosity and help the students to take decisions that improve the quality of life. All these methodologies share certain commonalities: all of these are student-centric, they are participatory in nature, they involve use of multimodalities, and they are flexible. In spite of sharing these commonalities, these methodologies retain their individual characteristics. The challenge is to construct a model that would at once cater as effectively as the above-mentioned methodologies as well as provide a teaching basis of effective value system to the students. However, before trying to negotiate through this complex crossroads towards an effective model, I will state in brief the efficacies of these methodologies in the teaching-learning process in science classrooms.

In the project based learning of science, all the students work collaboratively in group seeking answers to a driving question of the investigatory project. The questions addressed are very much related to real life and are meaningful. Hence, as Krajcik *et al.* (1999) suggests, “project based science calls for a question or problem that is meaningful and important to learners.” (p.9) The source of the question also plays an important role. The question can be real life contextual question from the teachers side or a natural question from the students side. The length of time students are involved in the project is considerably longer than short time activities. And the most important part of project based learning is that students, teachers and community collaborate to meet the end. This is inevitably very important as this helps in building up of the right skills and attitudes in the students.

In regard to the inquiry standards, as mentioned by Llewellyn (2013) the National Research Council (NRC) points out:

Inquiry is a multi faceted activity that involves making observations; posing questions; examining books and other sources of information to see what is already known in the light of experimental evidence; using tools to gather, analyze and interpret data; proposing answers, explanations, and predictions; and communicating the results. Inquiry requires the identification of assumptions, use of critical and logical thinking, and consideration of alternative explanations. (p.3).

Students should become conversant with the strategies of using thinking skills, while they learn. This would include hands-on experience such as inquiry and problem-based approaches “including asking questions, planning and conducting investigations, using appropriate tools and techniques to gather data, thinking critically and logically”. (Llewellyn, 2013, p.3). Five essential features of inquiry include “engagement of learners in scientifically oriented questions, giving priority to evidence, formulate explanations from evidence, evaluate their experiences in the light of alternative explanations, which reflect scientific understanding and communicate and justify their proposed explanations”. (Llewellyn, 2013, p.3).

Place based education is based mainly in this thought, if we want children to flourish, to become truly empowered, then let us allow them to love the Earth before we ask them to save it. As Sobel (1993), quoting from Thoreau’s *Walden* puts it, “the more slowly trees grow at first, the sounder they are at the core, and I think the same is true of human beings.” Sobel (1993) locates three important stages in a child’s life that deepens her/his relationship with Earth:

... early childhood from ages four to seven, the elementary years from eight to eleven, and early adolescence from 12 to 15. Though these age frames need to be considered flexibly, my belief is that environmental education should have a different tenor and style during each of these stages. (Source: internet)

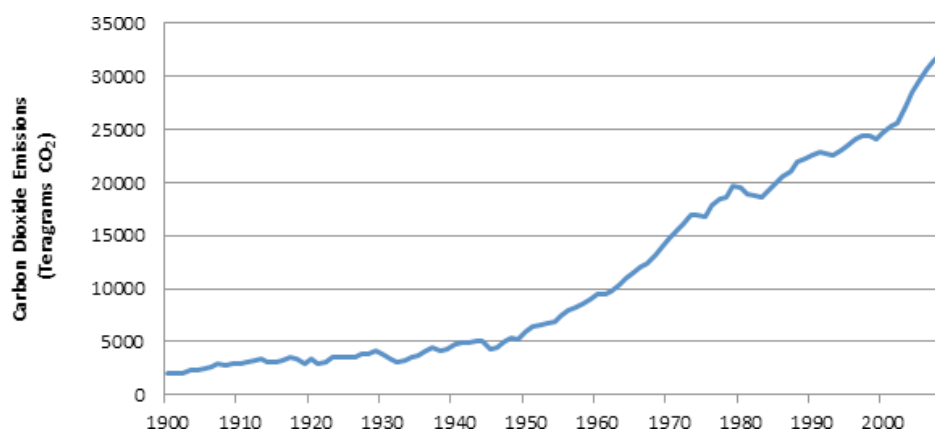
Walking into the heart of matter

J. Bronowski (1984) in his essay ‘Technology among mankind’ and Amartya Sen and John Drezze (1996) in their essay ‘Environmental Pollution’ contend and point out that if environment is separated from human values, it leads to a world of destruction. A corollary to this is if Environmental science is associated with human values it leads to a world of joy, the heart and the eye locks, beauty becomes truth and here is a world to live in. However, such a utopia does not exist. Let’s take a glance at some facts and figures. Worldwide, net emissions of greenhouse gases from human activities increased by 35 percent from 1990 to 2010. Emissions of carbon dioxide, which accounts for about three-fourths of total emissions, increased by 42 percent over this period.¹ Global carbon emissions from fossil fuels have significantly increased since 1900.

“Emissions increased by over 16 times between 1900 and 2008 and by about 1.5 times between 1990 and 2008”.

“Emissions of non-CO₂ greenhouse gases have also increased significantly since 1900”. (Global Anthropogenic Non-CO₂ Emissions: 1990-2000).

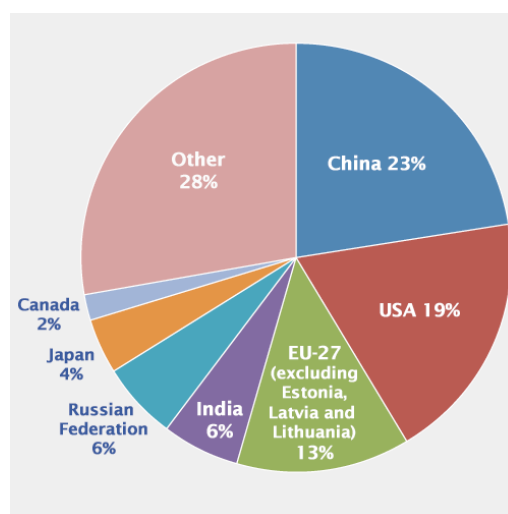
Trends in Global Emissions: Global carbon dioxide emissions from fossil –fuels 1900-2008



Source of data: Boden, T.A., G. Marland, and R.J. Andres (2010). Global, Regional, and National Fossil-Fuel CO₂ Emissions. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A. doi 10.3334/CDIAC/00001_V2010.

Continued emissions of (CO₂) and global warming arising due to these emissions is going to produce a drastic effect in 21st century than what we saw in twentieth century. The U.S. National Academy of Science has stated that “global climate warming is most pressing international issue of the 21st century. With the population touching the 1.22 billion mark in August, 2014, as per the Indian National census, India remains a major contributor to global warming. The pie chart, Emissions by country, depicts countries which are major contributors of CO₂ gases and India’s role can be very easily inferred from the following chart.

Emissions by country 2008: Global Emissions from fossil fuel combustion and some industrial processes (million metric tons of CO₂)



Source: National CO₂ Emissions from Fossil-Fuel Burning, Cement Manufacture, and Gas Flaring: 1751-2008.

In 2008, the top carbon dioxide (CO₂) emitters were China, the United States, the European Union, India, the Russian Federation, Japan, and Canada. India's contribution was 6% in spite of being a developing country where as US contribution was 23%. These data include CO₂ emissions from fossil fuel combustion, as well as cement manufacturing and gas flaring. Together, these sources represent a large proportion of total global CO₂ emissions.

From this data it can be easily inferred that every environmental issue is very much global as well as local and problems and solutions are shared by all. Every solution is going to have global significance in the long run. India, being one of the most populous countries, has a great share in these emissions and the issue mentioned above still remains a grave area of concern. One important conclusion that we can derive from looking at the data is human activities locally, and regionally can have global repercussions. Even changing the very earth and its atmosphere and finding solutions to the environmental issues remains a challenging endeavor.

The Double Helix Model & Classroom Pedagogy



When we see the double helix, the term that comes to the mind is the blue print of life. This double helix is also the essence of my paper. It's a small attempt to correlate environmental education with values. One of strand representing the environment and another representing the values, strongly intertwined and bonded with each other. The interconnecting bond is day to day classroom transactions. Both of the strands are of the same color showing their equal importance and its bringing together of two disciplines.

Coming to methodologies that form the bulwark of the present model. These five methodologies that are closely related to classroom transactions are listed below:

1. Constructivist approach meaning making education, working from questions to situate discussions at different levels of proficiency, unique to each group.
2. Historical cases- History is not about high and almighty figures, it's also about common daily incidences of life
3. Classroom transactions inside and outside the classrooms which includes reading materials and talking to specialists.
4. Cultivated through practice stimulated actions in real life situations
5. Theoretical practice takes place in classrooms but real practice takes place in field trips.

Helix model in practice

Groundwater and soil are dynamic resources and undergoes significant variations quantitatively and qualitatively. The quality of the above are dependent on the quality of recharged water and soil, atmospheric precipitation, inland surface water. It also depends on geochemical processes viz., the interaction with aquifer minerals or by the inter mixing among the different groundwater reservoirs and soil along the flow path in the subsurface. Resolving quality of soil and water in developing countries has got global attention. Polluted land and water resource denies the most essential of all rights, the right to life. Fluoride contamination is a major cause of water and soil pollution in many countries. India is among 24 nations in the world, where fluoride in soil and ground water is creating health problems. Of late, in mid of 1999, Assam region of Northeast India has been identified as a fluoride affected area. (Fluoride above the guideline values of WHO, has been found in groundwater of the eastern and southern plains of the city.) Government has also confirmed the prevalence of fluoride in the groundwater and soil of Kamrup district of Assam. The Karbi anglong and the Nagaon districts of the state are the worst affected. As groundwater is a major and preferred source of drinking water in the district and soil for cultivation, the population seems to be vulnerable to the health effects of excessive fluoride in the drinking water and soil.

When fluoride from the air and soil ends up in soil it will settle into the sediment. When it ends up in soils, fluoride will become strongly attached to soil particles. In the environment fluoride cannot be destroyed, it can only change form. Fluoride that is located in soils may accumulate in plants. It leaves severe damages to soil like decline in growth, reduces crop yields. Most affected are corns and apricots. Animals that eat fluoride containing plants suffer from dental decay, bone degradation, causes low birth-weights. The only remedy is prevention by keeping fluoride intake within the safe limits.

Dental fluorosis

Due to excessive fluoride intake, enamel loses its lustre. In its mild form, dental fluorosis is characterized by white, opaque areas on the tooth surface and in severe form, it is manifested as yellowish brown to black stains and severe pitting of the teeth. Normally, the degree of dental fluorosis depends on the amount of fluoride exposure up to the age of 8–10. The effect of dental fluorosis may not be apparent if the teeth are already fully grown prior to the fluoride over exposure. Therefore, the fact that an adult shows no signs of dental fluorosis does not necessarily mean that his or her fluoride intake is within the safety limit.

Skeletal fluorosis

Skeletal fluorosis affects children as well as adults. It does not easily manifest until the disease attains an advanced stage. Fluoride mainly gets deposited in the joints of neck, knee, pelvic and shoulder bones and makes it difficult to move or walk. The symptoms of skeletal fluorosis are similar to spondylitis or arthritis. Early symptoms include sporadic pain, back stiffness, burning like sensation, pricking and tingling in the limbs, muscle weakness, chronic fatigue, abnormal calcium deposits in bones and ligaments. The advanced stage is osteoporosis in long bones and bony outgrowths

may occur. Vertebrae may fuse together and eventually the victim may be crippled. It may even lead to a rare bone cancer, osteosarcoma and finally spine, major joints, muscles and nervous system get damaged.

Therefore, now there is a need to focus greater attention on the future impact of fluoride on water and land resources, and take into consideration all the related issues of fluoride removal.

Due to the relevance of the fluoride contamination and Assam being one of the worst affected, analyzing the fluoride levels and finding new ways for de fluoridation is a local yet global issue and was chosen as the driving question of the investigatory project.

Findings

After applying scientific techniques and tools, we arrived at the following findings for estimation of fluoride levels in the water samples collected from 10 foot hills and 10 plains of Kamrup dist., Assam. Fluoride concentrations were above the desired concentrations at some of the sampling areas of foot hills and plains. Fluoride levels were detected by spectrophotometric detection by SPADNS reagent after collection of water samples from chosen sites.

Along with these scientific skills, students develop global perspectives in values consisting of scientific temper, critical thinking, reflective thinking and analytical thinking. Scientific temper is studying an issue or problem under the light of reason. Reason does not remove the use of emotion, it rather moderates and balance emotion leading to a healthy subjective objective continuum judgment. Critical thinking does not involve critiquing others, but a movement of whole to parts and parts to whole. Reflective thinking involves what Einstein defines imagination to be, encircling the world. Analytical thinking pertains to analysis of issues and all the above 21st century skills contribute to problem solving and decision making. They learnt to work cooperatively and collaboratively and reached out to the community better. They developed self-esteem and played a greater role in creating awareness about the fluoride contamination in the nearby vicinity. They were more responsible and turned out to be acquiring holistic skills while executing the project and working towards the cause.

[Table for Fluoride concentrations in water samples (values in mg/L)].

Sr. no.	Places	Ring well	Tube well	Sr. no.	Places	Ring well	Tube well
1	Baghorbori	0.26	1.02	11	Basista	0.58	0.77
2	Noonmati	0.66	0.92	12	Khanapara	0.52	0.98
3	Chandmari	0.52	0.52	13	Hengrabari	0.84	0.84
4	Bhetapara	0.66	0.1	14	Japorigog	0.1	0.32
5	Bhangagarh	0.08	0.42	15	Patharquarry	1.12	1.18
6	Uzanbazar	0.08	0.42	16	Kahilipara	0.1	0.88
7	Panbazar	0.74	0.55	17	Ambari	0.02	0.02
8	Amingaon	0.31	0.14	18	Maligaon	0.44	0.31
9	North Guwahati	0.45	0.32	19	Kamakhya	0.29	0.5
10	Borjhar	0.4	0.18	20	Gorshuk	0.16	1.1

Values and places marked in red are areas of concern where fluoride levels are higher than desired concentration.

Conclusion

“God’s in his Heaven and / And all’s right with the world”, wrote an optimistic Browning, the British Victorian poet. Such an optimistic vision, in spite of all its aura, cannot be dreamed of in a science classroom. In a large cross-section of the academia, many environmental science classrooms do not give importance to values. However, there is no denying the importance of teaching values along with the concepts of environmental science, as Elliott (1993) suggests:

“cognitive initiative” or the capacity to initiate a course of action to improve a situation; the capacity to diagnose, discern and discriminate the practically relevant dimensions of the problem situation; the capacity to share the thoughts and feelings, the points of view, of those who are involved in the situation; and the capacity to reflexively self monitor one’s own actions and their consequences in the environment.” (p.23).

Holding courage in both my hands, I dare state that following the Helix model in science classrooms would go a long way in the teaching of values in environmental classrooms, leading to a Nature-Value-Pleasure continuum.

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