

## **Skill Development in Higher Education**

The conventional wisdom today is that our main national problem at the college and university level of education is providing equal opportunity for entry for all young people and then retaining in school those entering until they complete their degrees. This view is based on the belief that a college degree is the key to success in American society today. Our current President and the major foundations funding higher education base their current policies on this belief.

This conventional wisdom is fine as far as it goes. However, of equal importance is the actual skill development and learning achieved by students while in higher education. The current perception is that our nation does fine on this objective. With this perception, then entry and throughput are the highest priorities for higher education. However, this conventional wisdom is wrong.

Disturbing recent evidence indicates that roughly one third of all students graduating in higher education today have made no progress in developing the critical skills needed for vocational success and for discharging the responsibilities of a citizen in a modern democracy.

This paper describes this problem and makes recommendations for what we should do about it.

## ***Purpose of Higher Education***

The purpose of higher education has remained remarkably constant for the 600 years since the founding of the earliest universities of Bologna, Oxford, and Cambridge. The purpose is to prepare young people for work and to help them understand how to live. Initially, the “work” part was for jobs in the Church and the Court. Today the range of jobs reflects the high complexity of our modern economy. Likewise, questions of how to live have become dramatically more complex. Nevertheless, these questions remain.

Many skills are useful in work and in considering how to live. However, skills to think critically, to solve complex problems, and to write are fundamental to success in work and in making and executing the many decisions that constitute how a person lives.

## ***Critical Thinking, Complex Analysis, and Writing***

What are critical thinking, complex analysis, and writing, and why are they so important? Critical thinking starts with a mindset. That mindset at its most fundamental level is a drive to understand reality as well as possible, and to understand why things are as they are. What are the “facts of the case?” What explains why things happen as they do? That mindset insists on “good” explanations. Critical thinking includes the development of these good explanations. Good explanations are consistent with the most fundamental principles we have about how things happen in reality. Good explanations are based on logic and rational thought as we understand them.

Critical thinking does not ignore emotions and intuitions. It pays attention to them. However, it insists that they be valid. That is, they are consistent with what we know about reality and our good explanations about why things happen the way they do. Nobody ever practices critical thinking perfectly. However it is the basis for our hope for progress in philosophical, political, and economic realms.

Why is critical thinking important? For many the answer is obvious from simply the description of what it is. In a survey of employers commissioned in 2010 by the Association of American Colleges and Universities, 81% of the respondents wanted colleges to place more emphasis on critical thinking and analytical reasoning. Strategies and business plans based on a realistic understanding of the situation and on what we know about how consumers and competitors behave have a better chance of leading to business success. Too often such efforts are based on “wishful thinking.” Then business success is simply a matter of luck. Applying critical thinking raises the odds above a roll of the dice. Similar benefits flow from approaching with a critical mindset the many day- to- day decisions faced by any operating organization.

With regard to the questions about how to live, perhaps the most pressing issues today concern how we govern ourselves under our complex, popular democracy. The backlog of unresolved social and economic issues is growing. The fellow citizens we elect to manage these affairs are not getting the job done. The current level of political discourse in our country reflects neither obvious reality nor long-understood principles for getting the job done in a democracy. We as citizens need to bring a critical frame of mind to our current situation and change it. The fact that we’re not doing so suggests we as citizens lack the skills to do so. Higher education is probably the most important institution for developing the skills needed.

### Complex Analysis

Complex analysis is a skill of application and action. It provides a method for resolving complex issues. This method is superior to assertion and opinion. It starts with a good conceptual understanding of the issue being addressed or the question being asked. Clarifying the issue or the question is often an important part of this first step.

Then a complex problem is broken down into manageable pieces where facts, figures, and principles can be brought to bear on specific parts of the problem and solutions for these component pieces can be developed. Judgment is still needed in most cases. However, by breaking the problem down, these judgments can be rendered on individual pieces of the problem where facts, figures, and principles can be used to support application of judgment. These judgments can be taken with more confidence than judgments at the level of the problem as a whole. At that level, such judgments amount to little more than opinion. Needless to say, we live in a world dominated by opinion and not complex analysis.

The final step is the synthesis of the results of the analysis of the individual pieces into a solution for the problem as a whole. This synthesis uses the logical and empirical relationships among the parts of the problem to generate an overall solution. Because the solution for one part of a problem often affects

the solution of other parts, the synthesis usually involves tradeoffs in reaching a final solution. These tradeoffs involve judgment.

Our modern society is beset with complex problems in all directions, and especially today in the realms of governance and economic performance. Business problems also are continuously increasing in complexity. Globalization, technological change, and government regulation are perhaps the most notable of the factors increasing the complexity of business life. No wonder that 75% of the employers responding to the survey cited above said that they wanted colleges to place more emphasis on complex problem solving.

Citizens also need to be able to judge whether adequate complex analysis has been applied by our governing bodies to the large, difficult problems of our society today. Healthcare is one of the primary examples. Our country uses resources of people, buildings, and equipment to provide healthcare to us. These resources in total are equal to the entire economies of France or the United Kingdom. The reform of our healthcare sector is an enormous undertaking. It requires perhaps the most complex economic, political, and social analysis of any of our problems today. As citizens, we need to judge whether our government leaders are analyzing this problem adequately. We must reflect our judgment on this issue by the way we vote and by what we say. Otherwise, we have lost control of our destiny and have to rely on trusting whoever our leaders are. We have then lost the ability to judge our elected leaders' performance and to change those leaders if their performance is not satisfactory to us. We cannot judge whether our leaders have based their decisions on adequate complex analysis unless we understand ourselves what adequate complex analysis is.

## Writing

Everybody knows what writing is by the standard definition in a dictionary. The issue here is the development of the skill of good writing. The purpose of writing is to document and communicate. Written language is one of the most fundamental building blocks of all civilization. Numerous civilizations died because they did not develop a written form for their spoken language.

For this paper we are talking about writing that is descriptive or that makes an argument. The test of successful writing is whether the audience understands what the writer intended to say in an efficient way. Thus the writing has to be clear. If the writer's thought is not clear to start with, then the writing cannot be clear. Thus, successful writing is tied to good critical thinking and to good analysis, if problem solving is the purpose.

The increasing complexity of today's world has made good writing more important than ever. Issues are more difficult to explain and address. Thus, spoken language is more prone to misunderstanding and incompleteness. Issues require more reflection, yet there's less time to reflect. Reflection requires the information considered to be in the permanent form of writing. Lack of time requires clear, concise writing. Sometimes, of course, matters move so fast that oral communication is the only vehicle possible. In the survey of employers cited above, 89% of respondents wanted colleges to place more emphasis on written and oral communication.

### ***Higher Education Performance***

How is higher education doing in developing the skills of critical thinking, complex analysis, and writing? Over the past decade higher education has made substantial progress in its ability to assess the skills of students in these areas. A significant part of this progress has come from the Council for Aid to Education (CAE) through its development of the Collegiate Learning Assessment (CLA) test instrument. This instrument measures skills in critical thinking, complex analysis, and writing.

A significant question for any new test instrument is whether the results are valid. Do faculty members trying to teach these skills agree that the answers to the questions on the test indicate the degree to which these skills have been developed? Do the graders of the test give roughly the same grades to the answers to the questions? Does the test given a second time with a new set of the same kind of questions give the same result? Are students motivated to do their best on the test? CAE has done a thorough job of this kind of statistical testing. Their results indicate that the CLA is valid and reliable for assessing the levels of the development of these skills in both groups and for individuals.

Since 2005, the CLA has been given to an increasingly large spectrum of students across higher education. Lots of data are now available. Unsurprisingly, use of these data has raised the question of exactly what is useful and meaningful to conclude from the data.

Some researchers have tried to use these data in an absolute sense. By this I mean that they have judged that certain answers to the test and certain aggregate scores indicate the achievement of an adequate level of proficiency in these skills. In my view, this type of conclusion should not be the primary result of this testing. We have no idea of the degree to which this skill can be improved by new and better methods of training, and we have no theory of the limits of the skill development. Higher is better, and we don't know how high we can go.

A more useful approach is to use the test instrument to assess the change in skill development resulting from the efforts of higher education to develop the skill. Again, some researchers have attempted to draw conclusions about whether the absolute amount of change in the measured scores is good or bad. In my view, we have no sound basis for knowing how much improvement in the overall scores is needed to say that higher education is doing a good job. There is only one case in which we can draw a strong conclusion about the performance of higher education from the absolute change in scores. That case is when there is no improvement in the scores of students participating in higher education.

It turns out we do have this case in U.S. higher education. Arum and Roksa reported in 2011 that of their sample of 1,666 students across 29 higher education institutions, 36% made no improvement in their CLA scores between entering freshman year in 2005 and finishing senior year in 2009. Their results did not change significantly for different types of higher education institutions.

This result was a shock to the conventional wisdom about higher education in the United States. That shock is still reverberating. It raises such fundamental questions about wasted opportunities and about

wasted resources that our country will be wrestling with this issue for a long time. We need to understand why this situation exists. I turn to this topic in the next section of this paper.

An equally important conclusion about the change in scores from participation in higher education can be drawn by comparing the average change across all the institutions with the biggest change found in particular institutions. We don't know what good practice or good performance is but we do know that there is always a difference between average performance and best performance. Because of this difference, we have the potential to improve average performance by learning from best performance. Best performance results from innovation. Innovation is inherently difficult to plan or predict. However, once it occurs it has the potential to diffuse to other applications in similar situations. This potential is exploited on an everyday basis in the commercial world. It's called "best practice" analysis, where best performance is assumed to reflect best practice. The CLA data give us the potential of conducting significant best practice analysis in higher education.

In the past 2-3 years, CAE has conducted extensive statistical analysis on its large database. The results give us a strong indication about the potential for best practice analysis based on the CLA. The CAE reports the distribution of the increase in average CLA score from freshman year to senior year among 158 higher education institutions. The increase in CLA scores for institutions at the high end of the distribution is roughly twice the average increase in score for all institutions.

This result could possibly be explained by higher increases in CLA scores from institutions admitting less well trained students. It is true that CLA scores are higher for institutions with more competitive and selective admissions. Thus there might be less room for selective institutions to increase CLA scores. However, these institutions on average increase the CLA scores of their students only modestly less than other institutions. Even among selective institutions, best practice institutions increase the CLA scores of their students much more than the average for all selective institutions. These large differences between best practice and average practice suggest significant potential for learning from best practice.

So the big questions are: Why do slightly over one third of students in higher education make no improvement in their CLA scores over four years of higher education? And why is there such a big difference in CLA scores between best practice and average practice?

### ***Reasons for Current Performance***

The potential for analysis of the CLA data to determine the reasons for current performance in developing the skills of critical thinking, complex analysis, and writing is huge. Only a modest amount of this analysis has been done. However, combining our extensive experience of skill development in general with the analysis of CLA data that has been done, we can develop a good theory.

Mankind has been developing intellectual and physical skills throughout our entire evolutionary history. We know that we develop and improve these skills through trying to achieve the objectives for which

the skills are useful. We also know that we improve these skills through feedback on our performance from those who already have high proficiency in the skills and through competing with those who have higher proficiency.

So how does this experience apply to acquiring the skills of critical thinking, complex analysis, and writing? We acquire these skills through confronting issues and problems inherent in the reality around us and within us and attempting to find satisfactory resolutions. Higher education is a dedicated time within which we strive to acquire these skills on an accelerated basis through training. That training is conducted by exposing students to realistic cases of problems and issues. The problems and issues are embedded in slices of reality, be they historical or current. The slices of reality are always somewhat simplified. However, for the slices to have enough complexity to be useful, they have to be conveyed in written form. Students are given the task of problem or issue identification, clarification, and resolution. Their conclusions involve sufficient complexity that they have to be in writing. Their responses are then judged by faculty, whose job is to improve these skills in their students and who have high proficiency in those skills. The tutorial systems of Oxford and Cambridge are perhaps the purest form of this training.

Hence, based on what we know, we can form the hypothesis that a significant fraction of students in U.S. higher education are not being exposed to this kind of training and that some higher education institutions conduct this training to a much more successful degree than most. Modest evidence from analysis stimulated by the CLA results is consistent with this hypothesis. This training inevitably involves substantial amounts of reading and writing by students. A large number U.S. higher education students take only courses that require little reading and writing. With that limitation, students cannot acquire the skills of critical thinking, complex analysis, and writing. Students taking courses that required substantial amounts of reading and writing improved their CLA scores significantly.

Conjectures to explain the CLA results have included the issue of whether faculty place sufficient emphasis on development of these skills in their courses. There is some evidence that faculty with high expectations for their students in improving these skills have students with greater improvement in their CLA scores. The implication of the CLA data is that many faculty do not have high enough expectations for their students in the development of these skills. That might be the case because of the high level of emphasis many higher education institutions have placed on research in their requirements for tenure, faculty performance reviews, and striving for academic prestige. More research is needed on this issue comparing institutions with average and best practice improvement in CLA scores.

So we have a good understanding of what kind of training experience higher education should give its students. We do not have a good understanding of why a significant fraction of students do not get this experience and why some institutions give it to a much higher degree than others. What should we do about this situation?

### ***Recommendations***

The issues raised above about skill development in higher education are of primary national importance. The future of our performance in the international workplace and in our ability to govern ourselves in a democratic way depends on how we resolve these issues. Business as usual in higher education is clearly not good enough. We need some oversight, coordination, and reporting to the nation about our progress on these matters.

My recommendations for how we go forward are in two areas: further research and slowly but surely moving towards requiring the use of standardized instruments for assessing skill development in higher education.

### *Research*

We understand that the majority of students in higher education are getting the experience needed to develop and improve their skills in critical thinking, complex analysis, and writing. However, we also understand that a significant fraction of students are not getting this experience. We need to understand why this is so.

We also need to understand why the improvement in CLA scores is twice as great for “best practice” institutions as for average institutions, regardless of the selectivity of the institutions.

To get to the bottom of these issues will require a planned and managed research program of substantial breadth. Analysis of the extensive CLA data base will yield many hypotheses. This work needs to be complemented with extensive interviewing of academic leaders to generate a list of hypotheses independently. These results then must be integrated to form the list of hypotheses for rigorous testing. At the same time, any remaining questions about the reliability of the CLA assessment instrument need to be addressed.

What organization should assume responsibility for getting this work done? No organization seems ideally positioned to assume this leadership role today. The lead organization certainly should not be the organization which developed the assessment instrument. Some discussion of this matter should occur among current leaders of the candidate organizations. This list should include the National Bureau of Economic Research (NBER), the National Academy of Sciences (NAS), the RAND Corporation, and the Association of American Colleges and Universities (AACU).

### *Requiring Standardized Assessments*

Standardized assessment of skill development of students in higher education is coming. It's coming for several reasons. The rising cost of higher education is causing students and their families to shop for institutions where they get the most value for their money. Employer discontent with the skills of higher education graduates is at an all-time high. Employers themselves are going to begin to administer the CLA to job candidates. Standardized measurement of quality performance in healthcare has clearly led to great improvements in performance in acute care, despite strong initial resistance from doctors and hospitals. Serious discussion about our inability to resolve our major domestic social

and economic problems in our modern democracy inevitably ends with the need to improve skill development in higher education.

Standardized assessment is essential because of the great benefits of learning from comparing best practice with the average practice. Much experimentation remains to be done in implementing standardization. This experimentation includes the use of methods that assess skills demonstrated by the course work students actually do. It remains to be seen whether these methods can be adequately standardized.

Nevertheless, we need to get started. We have so far to go that we have no time to waste. I recommend that state boards of higher education systems require that their institutions implement some form of standardized assessment of the skill development of students over four years in critical thinking, complex analysis, and writing. Student results on this test should be made available to the same degree grade point averages are. I also recommend that the organization taking the lead in research on standardized assessment also provide a service to assist state boards in making sense of their results. The service would include comparisons with other state systems so that state systems could learn from each other.

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Improving the skill development of students in higher education would contribute substantially to placing higher education as the foremost pillar on which our society is built. The academic world has serious doubts about where our society is going in many respects. However, the students going through higher education become the citizens who determine the nature of our society. Thus, higher education has a crucial opportunity to affect the future of our society through substantially improving the skill development of our citizens.

William W. Lewis

Founding Director, McKinsey Global Institute

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