The Risks and Opportunities Associated with Weak Arithmetic Skills of Accounting Students

Stephen Kerr
Associate Professor and Chair of Accounting
Bradley University
Peoria, Illinois

George Krull
Professor and Chair of Accounting
Saint Louis University
Saint Louis, Missouri

ABSTRACT

This paper explored the authors' concerns about students enrolled in their introductory accounting course. Anecdotal evidence suggested that students struggle with basic arithmetic concepts that underlie basic business transactions even though their math placement and ACT scores are high. A survey of 125 students in a first accounting course was conducted in the spring of 2010 to assess the basic arithmetical skills. The results indicated that the ACT scores and math placement tests do not reveal weakness in basic arithmetic. We find that faculty and students will experience frustration due to the impaired arithmetic ability. By taking for granted that students possess basic skills in arithmetic faculty will exclude exercises from the curriculum that will build the kind of arithmetic abilities students need to think on their feet about basic business transactions. We conclude by arguing that making curricular accommodations to cope with the deficit in arithmetic is not in the student's best interest. A competitive advantage for students can be created by addressing the deficit head on rather than adjusting the curriculum to work around the problem.

Introduction

This paper was prompted by a shared complaint and frustration with the apparent inability of undergraduate students to do basic arithmetic. Class sessions are interrupted because students cannot follow the arithmetic that underlies basic business transactions. Faculty would like to assume that students possess basic arithmetic abilities and then become frustrated when the students fall short of this desire. That frustration leads the faculty involved away from responding to the environment they encounter with an intention to create opportunities for the students to gain a competitive advantage through skill development. So this paper explores the issue of student's struggling with basic arithmetic concepts.

The impact of the seemingly reasonable assumption about arithmetic is quite serious. It has even reached a level of concern that comments have appeared in the Accounting Review. Kaplan (2011, page 380) noted the following shocking outcome:

“I learned earlier this year that a major bank employs 500 accountants to mark its entire global portfolio of securities to fair value each day. The chief accounting officer told me that they cannot hired graduated from U.S. accounting departments for this task. The students so not know sufficient economics, mathematics, and statistics to perform the fair value calculations. This deficit is a direct result of accounting scholars not doing research on fair value measurement and therefore not being able to teach our students how to perform such calculations.”

Aside from the Bankers exaggeration we are not willing to assume the cause of the problems are with research. We

1 The authors wish to thank Skip Burhans for his contributions to an earlier version of this paper. The authors are also grateful for the feedback provided by member of the Bradley University CBER forum (DATE) and the Mid-West Regional AAA Conference (DATE).
train students in a long list of contemporary issues that is growing faster than the available contact hours. How do we cope, if not by letting something go? We would argue it is equally plausible that the cause is the shift away from arithmetical processes, they are assumed to be within the student’s grasp.

So when Kaplan critiques the academy stating “by responding slowly, if at all to major (page 378) new challenges and opportunities in the environment in which accounting is practiced, accounting scholars have become less familiar with emerging professional challenges and opportunities.” Our concern regards a view of what the “environment” is. As the business curriculum has shifted from the four basic functions. The emphasis therefore is on and higher education institutions were planning significantly.

Of the Baby Boom generation was approaching college age. The origin of this paper was to re-visit the analysis of problem solving skills and the degree of appreciation of basic arithmetic skills. Atkinson, 2009) put another way the language of arithmetic has been lost. Since arithmetical ability is taken for granted it is not necessarily included in the tests that are often used to process arithmetical relationships in common business transactions and processes. This territory, assumed to be below our threshold of concern, is now therefore an issue.

No, so the professional environment includes weak ability to perform basic arithmetic. Increasingly incorrect or inappropriate decisions flow from the lack of appreciation of basic arithmetical relationships. (Moore, 2009) put another way the language of arithmetic has been lost. Since arithmetical ability is taken for granted it is not necessarily included in the tests that are often used to process arithmetical relationships in common business transactions and processes. Specifically, we explore the nature of arithmetical assessment in testing and preparation of a first course in accounting.

The American College Testing program (ACT)
The American College Testing Program (ACT) was founded in 1959 by E. F. Lindquist and is a not-for-profit organization headquartered in Iowa. At that time the first layer of studies came the focus of the next layer of studies. So, for example, Ballard and Johnson (2004) did a similar study with economics students. Yunker, Yunker and Krull used the Ballard and Johnson testing instruments to tie the studies together, as does this paper.

The ACT assumption that higher mathematics requires underlying arithmetic. This gives us further evidence that the ACT assumption that higher mathematics requires understanding of the basic four operations: addition, subtraction, multiplication, and division. Along with the reported relative declines in this nation’s overall education (compared to the rest of the world), there has been an apparent lack of mastery of basic arithmetic skills (i.e., addition, subtraction, multiplication, and division), critical thinking, and analytical reasoning skills.

2. What does the math section of the widely used ACT purport to measure and what does it appear not to measure?

The Program of International Student Assessment (PISA) is conducted by the Organization for Economic Cooperation and Development (OECD). PISA is an annual assessment of problem solving skills and aptitude of applied learning on a national scale. The USA’s participating students have slipped from a position of global leadership to rankings of 25th in terms of mathematics and 24th in terms of science. The report noted:

“Several other facts paint a worrisome picture. First, the longer American children are in school, the worse they perform compared to their international peers. In recent cross-country comparisons of fourth grade reading math, and science, U.S. students scored in the top quarter or the top half of advanced nations. By age 15 these rankings drop to the bottom half. American students are furthest behind just as they are about to enter higher education or the workforce.”

McKinsey, pg. 8, 2009

The current situation changes the intellectual place where university accounting educators first meet accounting students in an introductory or principles of accounting course. It is their responsibility to take their students from that place of first encounter to one of global competitiveness. In his recent book, Academically Adrift: Limited Learning on College Campuses, Arum and Roka (2011) noted that university business majors average 955 hours of study per week. Since this is not enough to recover from their relatively poor high-school preparation in reading comprehension, writing and, in particular, basic arithmetic skills, the impact of their reduced skill sets and competencies must affect the scope of their university curriculum.

All business students, regardless of their specific major, will benefit from good numerical literacy. The daily process of critical thinking and analytical reasoning is essential for academic and subsequent business success. Successful students must think on their feet and be clever and entrepreneurial enough to detect opportunities for growth and profit. Some entrepreneurial aspects should be embedded into almost every part of the undergraduate business curriculum. There are limited opportunities for an individual faculty member to remediate for prior academic, elementary, secondary, or collegiate weaknesses, so we surmise that accommodations are made—leading to further faculty angst. Generally, our colleges admit based on reported psychological test scores (e.g., ACT, SAT) well-qualified students, but they have a decreasing facility with “basic street math” (arithmetical). Arithmetical for the authors’ purpose in this paper, consist of the basic four operations: addition, subtraction, multiplication, and division.

Building on Previous Studies

There is a large body of research that documenting the ex- perimentation of factors that will indicate student success. The work of the Pathways commission is a possible framework for building this analysis. As a general observation there is a weak correlation between various entrance examinations and success in a post-secondary program. It seems that there is some overriding dynamic that has yet to be articulated.

The Risks and Opportunities Associated with Weak Arithmetical Skills of Accounting Students

Stephen Kerr & George Krull

Journal of Learning in Higher Education

Spring 2017 (Volume 13 Issue 1)
model of curriculum. In broad terms there is a concern that what goes on in the classroom is directed towards the issues to be faced. However, taking an open systems approach we cannot assume the inputs, that is students arriving on campus, are a consistent commodity.

Consideration of this previous work helps us foster a more specific purpose for this paper. That is to explore the extent and implications of the changes in mathemati- cal emphasis in schools. Consider if Manchester United announced that entry into its development program will be heavily influenced by a players speed. This will cause coaches, who want their athletes to succeed, to favor speed training at the expense of other developmental activities. Why? Regardless of their belief in a well-rounded athlete, time away from “speed” training diminishes their player’s chance of being promoted to the program. So the coach then has an incentive to shift time away from skill de- velopment and give that time to speed training.

The extension of this analogy points to opportunities that may arise from this research. Emphasis on the ACT, SAT, and math placement tests has an inevitable impact on the coaches (teachers) upstream from the universities. A good high school will emphasize the calculus, geometry, and advanced algebra that are predominant in these admis- sions tests. They have to do it because they are now hurdle in the admissions test. We postulate this shift is at the cost of time spent emphasizing arithmetic. So to bring this together, one can see that the ACT and SAT will not be good predictors of arithmetic since they do not include these items.

Post-secondary education is in tune with the contem- porary environment will adjust to the current strengths and weaknesses of freshmen arriving on campus. So, rather than complain about a skill deficit, an oppor- tunity exists to rely on the new strengths of students and shift time back understanding arithmetic at the college level. In consideration of the environment there is a bias towards factors that students will face at the expense of what they went through to be admitted to university.

Our Study

The business core at Bradley University (Bradley) includes two freshman level accounting courses: ATG 157, Ac- counting Principles-Financial, and ATG 158, Accounting Principles-Cost Management. The design of the ATG 157 course presumes the students possess basic elementary- school arithmetic skills. For enrolling freshmen in their required university mathematics courses of their general education requirements, Bradley uses the reported ACT math score in conjunction with its own designed math placement test to measure essential mathematical reason- ing. Any student with an adequate combined score on the ACT mathematics component and the Bradley math placement test may take ATG 157 in their first semester, while others must wait until a lower-level math course is completed, such as Math 109 College Algebra.

Anecdotal observations by the Bradley Department of Accounting reveal a general concern about the lack of students’ arithmetic ability, regardless of their combined ACT math and Bradley math placement scores. Con- sequently, many students struggle with the arithmetic needed to do calculations supporting basic business trans- actions covered in ATG 157. The anecdotal experiences do not seem to connect with students’ reported ACT math scores and Bradley’s math placement scores. A trial sur- vey of students at Bradley’s summer freshman orientation in July 2009 lent credibility to this concern. This current study was undertaken to gain more insight into the practical arithmetic skills and various other competencies asso- ciated with students’ performances in ATG 157. The study will enable the Bradley accounting faculty to examine its concerns regarding its students’ mathematical reasoning with a view to curriculum revision.

Students registered in ATG 157, Accounting Principles – Financial, in the spring semester of 2011 were surveyed. Four sections were offered that had 135 registrations at the time of the survey (32, 35, 38, and 38, respectively). A total of 125 students were present and elected to take the special survey on the final exam of the class. To maximize ana- lytical flexibility, good students were excluded when their data such as ACT math scores, Bradley Math Place- ment Scores, and demographic data were missing. This leaves us with 89 students for which we have individual full data sets.

Twelve of the 89 students withdrew from ATG 157 be- fore earning an overall course grade. The 77 students that completed the course achieved an overall GPA of 2.8 on a 4.0 scale for ATG 157. That group was made up of 52 male students and 37 female students. They had consider- able diversity in their academic experiences. Their average semester credit hours completed before the Spring, 2011 semester were 37, while the least experienced had seven hours and the most experienced had 125 hours. Bradley has five undergraduate colleges and a “university” college where undecided students may reside until they choose a college major. Table 1, at the top of the facing page, pro- files the students in four ATG 157 sections, categorized by their chosen college of origin with abbreviated names ease of reading.

The students were asked to answer twelve basic arithmetic questions with a ten minute limit. A copy of the survey is provided in Appendix A. These questions were split between basic adding or subtracting, multiplication, and division word problems involving a simple linear relationship. Cal- culations were kept very simple, and the students were not permitted to use their calculators. This enabled the faculty to prohibit calculator based prompts to compensation for an inability to mathematically describe and arithmeti- cally complete the sort of basic arithmetic computations underlying many basic business transactions. The survey was administered on the first day of class. There is a risk the test was not taken seriously that may be offset by a de- sire to do well at the first meeting of a course.

Hypothetical Development

In step with the first small data set at this point in time, our research and building upon previous studies it is possible to develop five hypothesis out of this study. Previous studies all point to the predictive value of the ACT/SAT. This study points to the need to explore the gap predictive gap along a new line of consideration as follows:

H1: There is an overall weakness in arithmetic skill that the ACT does not capture effectively.

Following this we will again look to gain validity by aligning with previous studies (Yunker, Yunker, and Krull, 2009) which affirm that arithmetic is an important factor in predicting success in Accounting 157. By isolating the arithmetic this effect is predicted to be sta- tistically strong.

H2: The arithmetic Quiz will be a better predictor of ATG 157 success than the ACT mathematics score. Our anecdotal experience with students points to an in- ability to understand arithmetic relationships. The lan- guage of math is missing. It is very hard for many therefor to translate words into quantitative relationships. As a re- sult we expect evolution problems to meet the most prob- lematic and therefore the most predictive.

H3: Arithmetic problems presented in a word expres- sion format will be more difficult than other for- mats.

The significance of the problems grew exponentially with the ATG is a sound predictor of success in business stud- ies. If we build on the idea of Accounting as the language of business, there has to be a positive correlation, arithme- tic perhaps become that alphabet of that language.

H4: There is a strong connection between arithmetic, ATG 157 and success in business studies.

Our final concern that individual faculty can make little changes to the system. As discussed teachers, like coaches have to respond to the admissions criteria. Changes to ad- mission processes, like reliance on the ACT, has implica- tions on the skill set of the incoming class.

H5: Faculty responsiveness to the lack of basic arithmetic en- able students to proceed in spite of a skill deficit, needed for professional progress.

STREET MATH RESULTS

The overall average percentage score on the twelve item survey was 54 percent, of which about half (27 percent of the 46 percent missed resulted from wrong answers. The remaining incorrect responses (nineteen percent) resulted from questions that were left blank.

The Risks and Opportunities Associated with Weak Arithmetic Skills of Accounting Students

### Table 1

<table>
<thead>
<tr>
<th>College of Record</th>
<th>Student Count</th>
<th>Withdrawn</th>
<th>GPA</th>
<th>ACT (Math)</th>
<th>Bradley Math (Placement)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business</td>
<td>35</td>
<td>6</td>
<td>2.7</td>
<td>13.7</td>
<td>29.5</td>
</tr>
<tr>
<td>Communications</td>
<td>13</td>
<td>3</td>
<td>2.4</td>
<td>23.2</td>
<td>16.0</td>
</tr>
<tr>
<td>Engineering</td>
<td>19</td>
<td>0</td>
<td>3.2</td>
<td>28.1</td>
<td>29.9</td>
</tr>
<tr>
<td>Education</td>
<td>1</td>
<td>0</td>
<td>4.0</td>
<td>28.0</td>
<td>31.0</td>
</tr>
<tr>
<td>Arts/Science</td>
<td>4</td>
<td>0</td>
<td>3.0</td>
<td>25.5</td>
<td>22.3</td>
</tr>
<tr>
<td>Exploration</td>
<td>19</td>
<td>3</td>
<td>2.5</td>
<td>24.7</td>
<td>24.0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>89</td>
<td>12</td>
<td>2.8</td>
<td>24.7</td>
<td>22.6</td>
</tr>
</tbody>
</table>

### Table 2

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>ALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct</td>
<td>90%</td>
<td>90%</td>
<td>88%</td>
<td>83%</td>
<td>53%</td>
<td>42%</td>
<td>56%</td>
<td>41%</td>
<td>87%</td>
<td>88%</td>
<td>48%</td>
<td>28%</td>
<td>17%</td>
</tr>
<tr>
<td>Wrong</td>
<td>4%</td>
<td>10%</td>
<td>60%</td>
<td>16%</td>
<td>25%</td>
<td>51%</td>
<td>26%</td>
<td>52%</td>
<td>9%</td>
<td>21%</td>
<td>19%</td>
<td>28%</td>
<td>27%</td>
</tr>
<tr>
<td>Blank</td>
<td>9%</td>
<td>8%</td>
<td>2%</td>
<td>1%</td>
<td>22%</td>
<td>8%</td>
<td>18%</td>
<td>37%</td>
<td>4%</td>
<td>38%</td>
<td>53%</td>
<td>55%</td>
<td>19%</td>
</tr>
</tbody>
</table>
The performance deteriorates as the survey progresses. Only 1 percent of the responses to the first 3 questions were left blank. This grew to 46 percent of the responses for the last three questions. One could ask if the ten minute limit was too short a period of time for the students to demonstrate their competencies. This was also observ- able when questions were similar. Question 7 asks, "Last year, Jake’s salary was $58,000. At the end of the year, he received a 10 percent increase in salary. What is his salary this year?" Only 56 percent of the students provided the correct answer. How- ever, only 32 percent of the females answered correctly as compared to 73 percent of the males. One would assume that a prerequisite to closing the national salary gender gap will be an ability to compute salary changes!

In addition to a possible revealed gender gap performance, we see that business students were slightly less able to dem- onstrate competency in computing a salary increase. Only 49 percent of the 35 business students were able to answer question 7 correctly. When split by gender, we found that 62 percent of the males registered in business could an- swer the question. The numbers are small, but it is still noteworthy that only 29 percent of the fourteen females registered in business could answer the same question. This is a distressing gap in arithmetic ability for students that have selected into a College of Business major.

We expected basic profit relationships would fall within the natural area of interest, especially for business stud- ents. Question 3 asked the students: "If a television costs $500 and the sales tax is 25%, what is the local sales tax rate in percentage terms?" Whereas question 8 asked the stu- dents: "XYZ company's profits this year are $2,500,000. Its profit rate on sales (in ratio terms) is .10. What are its sales this year?" Both questions required arithmetic manipulation of a basic ratio. It was a surprise that business students scored about the same as the overall group. 63 percent of the business students determined an incor- rect tax rate and 46 percent calculated an incorrect sales amount.

This of course leads back to the Bradley Accounting fac- ulty’s angst over the use of ACT scores to assess basic mathematical proficiency in the admission process and in the Ar- chimedes course enrollment. How is it possible that 89 per- cent of the surveyed students with a relatively strong ACT math profile could not determine the correct sales figure from two experienced professors who retook the SAT so their much improved understanding was not being mea- sured? From this perspective, the authors will consider why women are apparently more willing to apply themselves to their ATG 157 studies than the men are.

### Table 3

<table>
<thead>
<tr>
<th>College of Record</th>
<th>Number of Students</th>
<th>Portion of Grade Frequency</th>
<th>Male – Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business</td>
<td>21–14</td>
<td>53%–57%</td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td>3–10</td>
<td>33%–41%</td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td>15–2</td>
<td>62%–88%</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>0–1</td>
<td>NA–83%</td>
<td></td>
</tr>
<tr>
<td>Arts/Science</td>
<td>2–2</td>
<td>50%–58%</td>
<td></td>
</tr>
<tr>
<td>Exploration</td>
<td>11–8</td>
<td>57%–52%</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>80</td>
<td>54%</td>
<td></td>
</tr>
</tbody>
</table>

In addition to the differences across the colleges, we found a significant gender gap. Males produced eight of the top nine mean math placement scores. Females produced seven of the bottom ten Bradley math placement scores. Recall, there were 52 and 37 male and female students, respectively. These scores point to some perplexing questions as to why the majority of accounting majors are male.

The gender gap is significant in some of the specific ques- tions. Question 7 stated: "Last year, Jake’s salary was $58,000. At the end of the year, he received a ten percent increase in salary. What is his salary this year?" Only 56 percent of the students provided the correct answer. How- ever, only 32 percent of the females answered correctly as compared to 73 percent of the males. One would assume that a prerequisite to closing the national salary gender gap will be an ability to compute salary changes!

In addition to a possible revealed gender gap performance, we see that business students were slightly less able to dem- onstrate competency in computing a salary increase. Only 49 percent of the 35 business students were able to answer question 7 correctly. When split by gender, we found that 62 percent of the males registered in business could an- swer the question. The numbers are small, but it is still noteworthy that only 29 percent of the fourteen females registered in business could answer the same question. This is a distressing gap in arithmetic ability for students that have selected into a College of Business major.

We expected basic profit relationships would fall within the natural area of interest, especially for business stud- ents. Question 3 asked the students: "If a television costs $500 and the sales tax is 25%, what is the local sales tax rate in percentage terms?" Whereas question 8 asked the stu- dents: "XYZ company's profits this year are $2,500,000. Its profit rate on sales (in ratio terms) is .10. What are its sales this year?" Both questions required arithmetic manipulation of a basic ratio. It was a surprise that business students scored about the same as the overall group. 63 percent of the business students determined an incor- rect tax rate and 46 percent calculated an incorrect sales amount.

This of course leads back to the Bradley Accounting fac- ulty’s angst over the use of ACT scores to assess basic mathematical proficiency in the admission process and in the Ar- chimedes course enrollment. How is it possible that 89 per- cent of the surveyed students with a relatively strong ACT math profile could not determine the correct sales figure from two experienced professors who retook the SAT so their much improved understanding was not being mea- sured? From this perspective, the authors will consider why women are apparently more willing to apply themselves to their ATG 157 studies than the men are.

### Table 4

<table>
<thead>
<tr>
<th>Grade Frequency</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>W/F/D</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>22</td>
<td>29</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>ACT Mean Math Score</td>
<td>23</td>
<td>23</td>
<td>25</td>
<td>28</td>
</tr>
<tr>
<td>Mean Math Placement</td>
<td>39.1</td>
<td>18.3</td>
<td>22.9</td>
<td>30.6</td>
</tr>
<tr>
<td>Mean Semester Credits</td>
<td>26.3</td>
<td>29.6</td>
<td>36.3</td>
<td>53.3</td>
</tr>
</tbody>
</table>

Our students produced a result consistent with previous studies. The higher grades in ATG 157 were consistent with higher ACT math scores, higher math placement scores, and greater university experience. But good students prepare for the ACT and math placement test. Good students are persistent and form more produc- tive study habits as they gain post-secondary experience. However, good students prepare for these exams so overall they do well. We can also see that academic ex- perience improves performance. This too makes sense as better students will persist and improve their study skills.

### Table 5

<table>
<thead>
<tr>
<th>Grade Frequency</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>W/F/D</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>22</td>
<td>29</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Survey Grade</td>
<td>47%</td>
<td>49%</td>
<td>55%</td>
<td>58%</td>
</tr>
</tbody>
</table>

Previous research showed the math survey we used is a reasonable predictor of success. The table above reveals this was also true with this group. However, this observa- tion is not satisfactory when we see that students earning an overall course grade of an A averaged only 58 percent on this measure of basic street math. Our focus is on pro- fessional studies and yet we are attracting students with a relatively weak arithmetic skills profile. We are left to wonder what systemic accommodations have crept into the curriculum to accommodate this arithmetic weak- ness.

There is a major validity issue here in light of the 89 par- ticipants’ overall weak math performance. In terms of our population, nine of the top ten ACT reported math scores were male students with a mediocre average grade of 78 percent on the math survey. The comparative math average for the top ten females is 58 percent. This represents a massive re- cruiting error. Why are we not attracting equally capable women? It is encouraging to note that the females earn a higher overall GPA in the ATG 157 course 2.9 versus 2.7 for the men. Despite their lower overall demonstrated arithmetic competencies on the survey, they earned a sig- nificantly higher rate of “A” grades. In subsequent work on this topic, the authors will consider why women are apparently more willing to apply themselves to their ATG 157 studies than the men are.

### Findings and Conclusions

The purpose of this paper was to explore faculty frustra- tion with their students’ inability to process the arithmetic behind basic business transactions. The apparent disson- nect between sound ACT-MATH scores and classroom performance did not make sense to us. Without some under- standing of the underlying phenomena, faculty are at a loss to respond of show due empathy. So, specifically we set out to explore arithmetic skills as the variable which may explain much of this contradiction.

A significant body of research exists on the topic of stan- dardized tests that has had limited applications in ac- counting educations. Harper (2009) provides a reflection from two experienced professors who retook the SAT so they could better understand a child’s experience. The sur- prise there was that in the marginal increase in their ACT scores they did not even attempt this straightforward ques- tion. In terms of ACT scores, the top ten percent of the students in this study had an average ACT math score of 28.5. That places those students a bit above the 98th percentile of all their peer high school graduates. It is a shock to note that five of these top students were unable to answer question 8 correctly.

These arithmetic survey results support the ATG 157 fac- ulty’s concern that students lack basic arithmetic compe- tencies and the applied, practical functionality to process basic business transactions. They have serious deficiencies in the basic functional life skills. No wonder the USA cannot compete even against the developing global econo- mies and jobs continue to move overseas. As a group, the

The Risks and Opportunities Associated with Weak Arithmetic Skills of Accounting Students

Stephen Kerr & George Krull

Journal of Learning in Higher Education

Spring 2017 (Volume 13 Issue 1)
The Risks and Opportunities Associated with Weak Arithmetic Skills of Accounting Students

Stephen Kerr & George Krull

Journal of Learning in Higher Education

in both controllership and audit functions. Again point-
could examine how this reduces or correlates with the ca-
1994) We propose that a good area for future research
arithmetic relationships. But, faculty adjusts so that these
succeed by preparing for the ACT -exam but that does
We see in the math education literature an additional fil-
the education stream feeding the profession.
our use of the ACT test discourages them from entering
those topics emphasized on the ACT/SAT test. The size
at arithmetic but show poorly in mathematics—especially
is a group that do well in mathematics but do poorly with
interest in calculus. We know from this study that there
preparation, or seniors that lack an interest in mathemat-
that have good arithmetic skills, but lack access to ACT
ber are weak in this skill as found in this study.
are there substantial numbers of high-school seniors
that have good arithmetic skills, but lack access to ACT
preparation, or seniors that lack an interest in mathemat-
icity? For example their experiences with work have them
be handled with minimal use of basic arithmetic. Our
now that this also would make arithmetic less important
too, and easy to enable with increasingly available tech-
nology. The assumption that is now appears to be an er-
or about arithmetic, as the mathematics on the ACT can
be handled with minimal use of basic arithmetic. Our
problem then becomes, the arithmetic needed to think on
one’s feet and negotiate typical business transactions, is no
longer available.
This leads to our concern about how the ACT-dependent
admissions process may affect the decisions of students in-
teresting in our profession. We can start by considering
that the ACT is an early filter in the educational process
of entering the profession. The profession needs entrants
who understand financial transaction, can think on their
feet, to audit or negotiate transactions. Good arithmetic
skills are crucial to many aspects of this entrepreneurial
process. It is a great impairment to the profession if mem-
ber are weak in this skill as found in this study.
Are there substantial numbers of high-school seniors
that have good arithmetic skills, but lack access to ACT
preparation, or seniors that lack an interest in mathemat-
icity? For example their experiences with work have them
able to make change but have left them with no skill or
interest in calculus. We know from this study that there
is a group that do well in mathematics but do poorly with
arithmetic. Given that, perhaps there a strong possibility
that there is a good sized group of seniors that are good
at arithmetic but show poorly in mathematics—especially
those topics emphasized on the ACT/SAT test. The size
of this group should be investigated along with the ways
our use of the ACT test discourages them from entering
the education stream feeding the profession.
We see in the math education literature an additional fil-
tering concern. We have found that good students will
succeed by preparing for the ACT-exam but that does
not mean they have that they have good sense for basic
arithmetic relationships. But, faculty adjusts so that these
students can still succeed (Ehleit, 2005). We know from
other research these students avoid quantitative approach-
subs suppresing adaptive activities that could change the
situation. (Siegel, Galassi, Ware, 1985) (Pajares, Miller,
1994) We propose that a good area for future research
could examine how this reduces or correlates with the ca-
pacity to design, prepare and utilize analytical procedures
in both controllership and audit functions. Again point-
ing to how we maybe enabling a skill set to be neglected
that has been an historic strength or an accounting educa-
In conclusion we feel that our exploration of our frustra-
tion with our student’s apparent inability to do arithmetic
adds an extra dimension to Kaplan’s (2012) commentary.
Kaplan warned that our scholarship should reflect more
awareness of the environment. While he did not say so
explicitly, the environment includes the skills and apti-
tude of those entering the profession. Today’s students
are no doubt as motivated as previous generations. Their
strengths should not be assumed to be the same as earlier
cohorts. Individually we cannot the use of the ACT or
similar instruments. However, we can adjust our time and
emphasis to show we understand who is in our classroom
and down-stream professors they will have. A better emo-
tion than frustrations would be to embrace the opportu-
nity and provide incentives for our excellent students to
gain a competitive advantage.

References


http://www.actstudent.org/scores/norms.html


(Footnotes)
1 GPA of students completing the course.
2 Foster College of Business Administration.
3 Slate College of Communications and Fine Arts.
4 College of Engineering and Technology.
5 College of Education and Health Sciences.
6 College of Liberal Arts and Science.
7 University Exploration Program (students have yet to identify a college and major).
This is not a placement test. Your scores here are being used for research purposes only. You will have 10 minutes to answer the 12 questions listed. Calculators are not permitted. Please use the space provided on the front and back to make any necessary computations.

<table>
<thead>
<tr>
<th>Your College:</th>
<th>You are entering as:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foster College of Business</td>
<td>Freshman</td>
</tr>
<tr>
<td>Communication &amp; Fine Arts</td>
<td>Transfer student</td>
</tr>
<tr>
<td>College of Education &amp; Health Science</td>
<td></td>
</tr>
<tr>
<td>College of Engineering &amp; Technology</td>
<td></td>
</tr>
<tr>
<td>College of Liberal Arts &amp; Sciences</td>
<td></td>
</tr>
<tr>
<td>Academic Exploration Program/University Program (UNV)</td>
<td></td>
</tr>
</tbody>
</table>

11. \( 122,302 + 652,365 = ? \)

22. \( 861,365 - 241,211 = ? \)

33. The formula for calculating sales tax is \( S = A \times r \), where:
   - \( S \) is the sales tax
   - \( A \) is the cost of the product
   - \( r \) is the sales-tax rate

   If a television costs $500 and the sales tax is $25, what is the local sales-tax rate in percentage terms?

44. The cost of a long-distance phone call is 15 cents for the first minute, and then 3 cents per minute for every additional minute. How many cents would a 24 minute phone call cost?

55. By the end of the year, the population of Galesburg is expected to increase 2% from the current population of 45,000. If this prediction is accurate, what would be its new population at the end of the year?

66. \( 56.7 \times 3.1 = ? \)

77. Last year Jake’s salary was $58,000. At the end of the year he received a 10 percent increase in salary. What is his salary this year?

88. XYZ company’s profits this year are $2,500,000. Its profit rate on sales (in ratio terms) is 0.10. What are its sales this year?

99. If Janice has 12 quarters, 3 dimes, 6 nickels and 7 pennies, how much money does she have?

110. Take 62 percent of $12,000. The result is:

111. \( 12,000 \times 0.03 \times 2/3 = ? \)

112. On the first of January the local bank agrees to lend you $20,000 for college tuition, room, and board. They charge you 6% interest per year payable on a monthly basis. How much interest must you pay at the end of January?