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Full Length Research Paper

A Recipe for a Successful Beginning for Adult Learners

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Abstract

At some point in a professor's career, there is a guarantee to have interaction with older adult students. These students are unique in the sense that they have many reasons for being in the college arena and we as professors, administrators, Deans, and advisors must be sensitive to their needs. They could be returning to college after losing a job, career change, having never finished their degree years ago, didn't have time with family commitments or with several other jobs, or were too intimidated or scared to start college. As educators, we must reach out to these students when they are sitting in front of us during lessons and provide them with the support they need to be successful. This paper talks about the very special program offered through the Pennsylvania State University at Erie, The Behrend College, called the Academic Transition Program (ATP) for older adult students and how the program has helped students get college ready in Mathematics, English and Writing, and teaching study skills.

Keywords: Behrend college, Mathematics, teaching, skills.

INTRODUCTION

Teaching adults is very different than teaching traditional college students. There are many ways these two groups are different ranging from the obvious differences in ages, life experiences, study habits, more responsibilities, and different levels of life pressures. What this paper particularly focuses on is not only how older adult students are different learners than traditional college students, but how we as professors can help them be successful. It should not be of any surprise that due to being away from schooling for *n* numbers of years, the older adult students will have a hard time adjusting to school again. This maybe a result of poor past experiences, fear of certain subjects, for example, Mathematics, and forgetting how to study for assessments. This paper will talk about some effective study skills needed for the success of the adult student. Lastly, the paper will discuss the ATP program and how study skills are incorporated into its curriculum.

Academic Transition Program: It's Beginnings

In early February of 2011, my then Interim School of Science Director at Penn State Behrend had approached me asking if I would be willing to teach a developmental Mathematics course for adult learners. This was out of the blue to say the least. At the time, I had just completed my first semester as a full-time faculty member after graduate school and was still getting used to not only the new role at the University, but adjusting to new surroundings after moving to a new part of the country. However, he saw my CV and knew I was the right professor for the job.

After I had agreed, my next step was to meet with the director for adult learners. Going into this meeting, I had no prior knowledge of what I was to become a part of nor how this offer would be so meaningful not only for the students, but for me. I learned in this first meeting that

Penn State Behrend was starting a program for adult learners in the summer of 2011. This program, called the Academic Transition Program, is a three-part program where adult learners obtain a refresher course on Mathematics, English and Writing skills, and learn effective study skills. I was selected by my director to teach the Mathematics portion. In this course, which I titled *Understanding Mathematics,* I covered whole numbers, fractions, decimals, percent's, signed numbers, and basic statistics. When I began my teaching career in New York City at Borough of Manhattan Community College and at New York City of Technology, these remedial Mathematics courses were the courses I had taught while in graduate school and so, it was very natural to teach these topics again.

During the first summer of the program in 2011, it was decided that the program would last six weeks with Mathematics on Tuesdays, English and Writing on Thursdays, and two study skill sessions would be held on Saturdays. The Mathematics portion involved the following topics:

Arithmetic of Whole Numbers

- Writing, rounding, adding, subtracting, multiplying, and dividing whole numbers.
- Estimating the sum, difference, products, and quotients of whole numbers.
- Problems involving exponents, simple averages, and order of operations.
- Prime factorizations of whole numbers.
- Applied problems and word problems.

Fractions

- Forming, reducing, adding, subtracting, multiplying, dividing, and comparing fractions.
- Converting between mixed numbers and improper fractions.
- Solving applied problems and word problems.

Decimals

- Writing, rounding, adding, subtracting, multiplying, dividing, and comparing decimals.
- Converting between decimals and fractions.
- Solve applied problems and word problems.

Basic Statistics

- Finding mean, median, mode, and range of a given set of numbers.
- Reading and interpreting tables, line graphs, bar graphs, and pie charts.
- Solving applied problems and word problems involving basic statistics and bar graphs.

Percent's

- Writing and simplifying ratios and rates as fractions.
- Finding units rates and best buys.
- Setting up and solving proportion problems.
- Solving applied problems and word problems.
- Converting between decimals, percent and fractions.
- Solving percent problems, including application.

Geometry

- Angles.
- Rectangles, squares, parallelograms, trapezoids, rhombuses, triangles.
- Square roots.
- The Pythagorean Theorem.
- Circles and volumes.

Signed Numbers

- Adding, subtracting, multiplying, dividing, and comparing signed numbers.
- Determining absolute values.
- Completing word problems involving signed numbers.

Scientific Notation

- Converting numbers between standard form and scientific notation.
- Adding, subtracting, multiplying, and dividing numbers in scientific notation.
- Solving applied problems and word problems.

Due to the timing of the six weeks and only meeting the students for 2.5 hours each week, I need to prioritize the topics and give the students the fundamentals they would need heading to their first semester. At the same time, I didn't want to scare the students with an overload of algebra. They would see more advanced topics once they completed the program.

Academic Transition Program Post 2011 Pilot

In the following summers of 2012 through 2016, the program has been extended to an 8-week program. The reason for the two additional weeks was due to feedback we received from students from the pilot 2011 class as they did, in fact, want more time for algebra. During the additional two weeks, I added topics of equations of lines,

polynomials, factoring, and Quadratic Formula. These topics were chosen as I believe, these would provide a solid background to some of the most fundamental concepts these adult students would need. With the help of my teaching assistants over these summer school sessions, both of us were able to provide one-on-one help to *each* student through warm-up activities, lecture, and have students work together to solve problems. Below are some examples of the problems and worksheets given to students:

EXIT SLIP ON GRAPHING, FACTORING, POLYNOMIALS, AND QUADRATIC FORMULA

Factoring

1. Factor out the greatest common factor or factor by grouping.

a. $60z^3 + 30z =$

b. $100m^2n^3 – 50m^3n^4 + 150m^2n^2 =$

c. $6y^2 + 9y + 4xy + 6x =$

2. Factor completely.

a. $y^2 – 13y + 40 =$

b. $r^2 – r – 56 =$

c. $p^2 + 2pq – 120q^2 =$

d. $3x^4 + 30x^3 + 48x =$

e. $3r^2 + 11r – 4 =$

f. $5t^2 – 11t + 12 =$

i. $144p^2 – 36q^2 =$

j. $x^2 - \frac{49}{100} =$

k. $16m^2 + 40mn + 25n^2 =$

l. $1000p^3 + 27 =$

3. Solve each equation, and check the solutions. Try one using the Quadratic Formula.

a. $x(2x – 5) = 0$

b. $x^2 = -15 + 8x$

Homework on Introduction to Graphing and Laws of Exponents

Graphing

1. Complete the given ordered pairs for x = 3y. (0,), (8,), and (, -3).

2. On what axis does the point (k, 0) lie for any real value of k? The point (0, k)? Explain.

3. Without plotting the given points, name the quadrant in which each point lies?

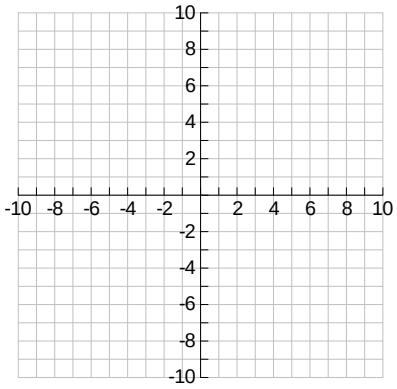
a. (-2, 3) b. (-1, -4)

c. $\left(0,-5\frac{1}{2}\right)$

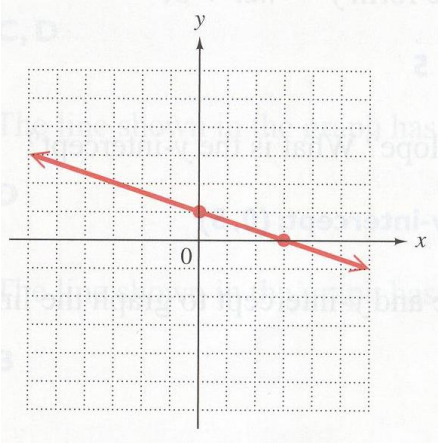
g. $-3m^3n + 19m^2n + 40mn =$

h. $n^2 - 64 =$

4. Find the intercepts of 2x + y = -7. Graph the line.

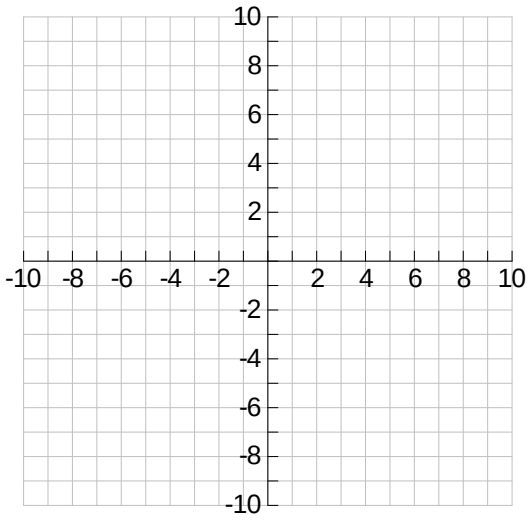


5. Find the slope and equation in slope-intercept form of the line.



6. Find the equation of the line in point-slope and slope-intercept forms for the line passing through (-3, 5) and (2, -7).

7. Graph the linear inequality $2x - 3y \geq -6$.



Polynomials

1. Find the following.

a. $(-5y^2 + 3y + 11) + (4y^2 - 7y + 15) =$

b. $(12r^4 - 7r^3 + 2y^2) - (5r^4 - 3r^3 + 2r^2 + 1) =$

c. $5x(2x + 14) =$

d. $(3r - 2)(2r^2 + 4r - 3) =$

e. $(3k - 6)(2k + 1) =$

f. $(2x - 1)^3 =$

g. $(5a + 6b)(5a - 6b) =$

While I spent more time on factoring, these topics were received with positive comments from students. In short, the program has been a success since 2011 and there are no plans to stop the program.

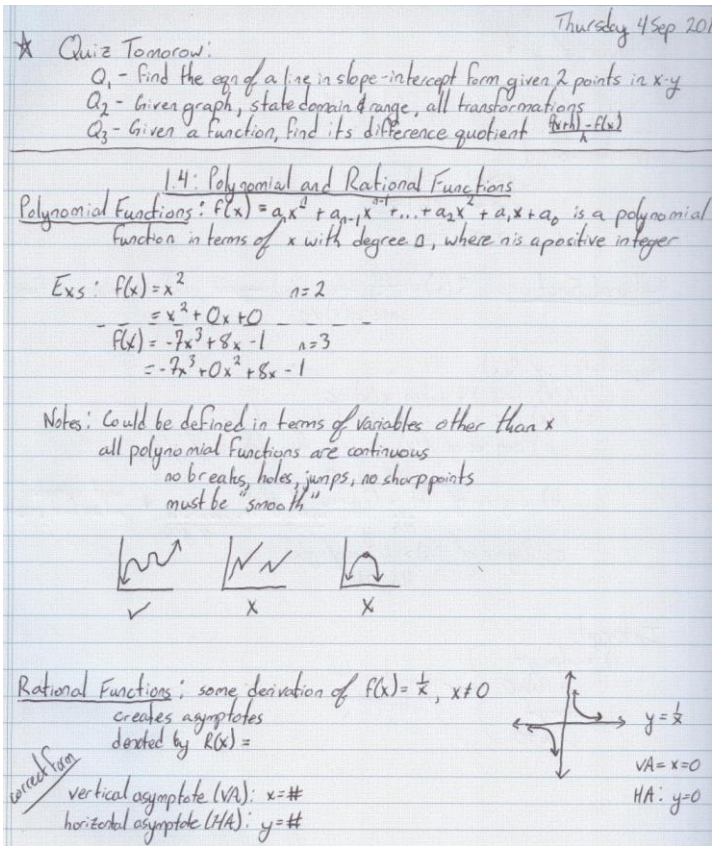
Teaching Study Skills to Adults

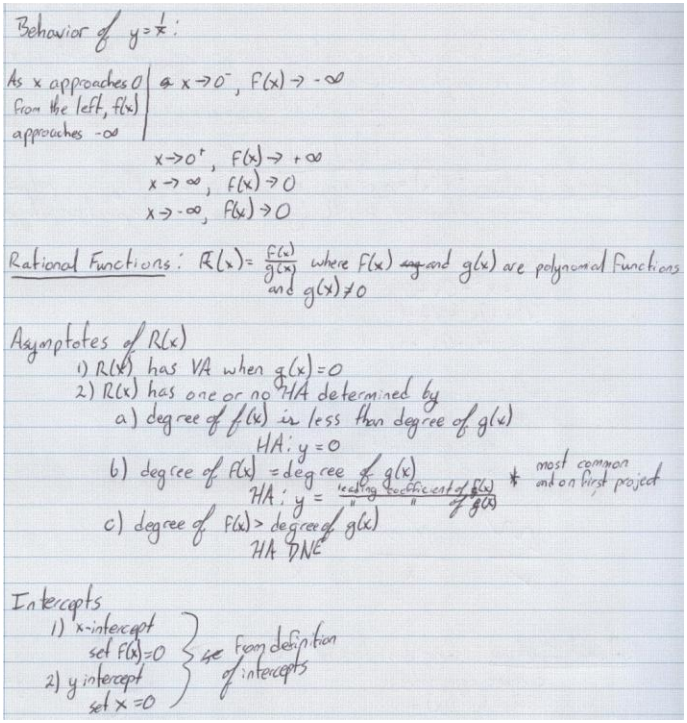
Since the pilot study in 2011, we have had study skill sessions for these students on two Saturdays of the session. However, in the 2016 session, I chose to devote some time out of part of one of my classes to teach some additional math specific study skills. My teaching assistant at the time was interested in presenting some of her own study skills for Mathematics and offered to present her findings. In addition, we received some effective study skills others have used in Mathematics education tailored for adult students. The presentation began with outlining the following listening study skills given by Devine (1987):

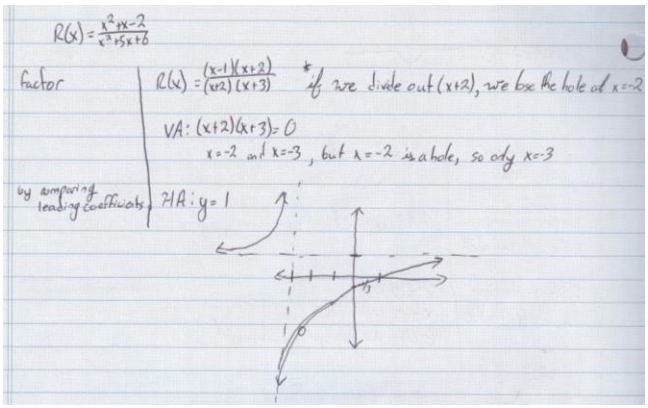
1. Purposeful Listening.
2. Note taking.
3. Noting main points.
4. Following sequences.
5. Paraphrasing and summarizing.
6. Relating.
7. Evaluating.
8. Using new information and ideas.

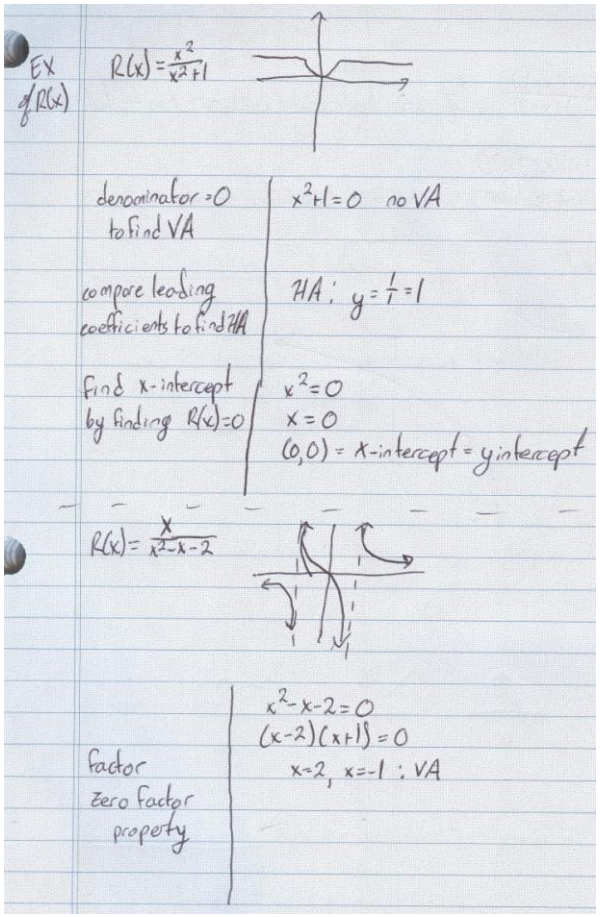
By having this cycle of events, the adults were better able to discuss topics not only with me on the board, but also when working in groups. We also encouraged students of the following: 1. Go to class, 2. Take lots of notes, 3. Paraphrase or summarize your notes after the class, and 4. Review your notes after class and before the next class.

There was a great deal of emphasis on taking effective notes. One example we presented to the class was the following:









We went through these notes, which are dated, neat, easy to read, and summarize the topics "We then discussed the different types of thinking they would encounter once the 2016 fall semester began (Russell, 1956)".

Perceptual Thinking

This kind of thinking is less directed toward a goal or conclusion and most affected by the environment. The student is shown a photograph of a sun spot and may “think” sun or spot. This is not higher-level thinking, but it does involve selection of certain items from many presented.

Associative Thinking

This occurs when one object or idea triggers the memory to link it to other objects and ideas. Sun may stimulate the student to think of summer, baseball, escape. Such thinking is not directed consciously toward a goal but is influenced by the student’s memories of past experiences and dominant interests at the moment.

Inductive-Deductive Thinking

This thinking occurs when a student tests out an idea either by checking to discover if examples “fit” a given rule or principle (deductive) or to discover the principle by an experiment (inductive), both are goal-directed.

Problem Solving

This type of thinking gathers relevant data, forms hypotheses, critiques the hypotheses, and tests out the best ones.

Critical Thinking

This occurs when the student evaluates the data he or she collects. Some of it may be irrelevant to the problem,

some of it biased, and some of it false. Critical thinking clearly overlaps the other five kinds of thinking described here.

Creative Thinking

This thinking takes place when the student goes beyond the routine solution of a problem to a fresh discovery or new invention. It is related to both associative thinking and problem solving and is often labeled imaginative or divergent thinking.

While we as educators in higher education strive to mold students to be thinkers and to make connections between the concepts and the goals of the courses we teach, often times, these six types of thinking are not always easy or achievable to all students. In addition, other psychologies see other types of thinking (Newell and Simon 1972). In our study skills, we pointed out that students were involved in the first four types of thinking and explained each type. The other two types of thinking would be seen later post the Academic Transition Program as this was a foundations course to help recall or to completely learn new concepts. However, these concepts were the fundamentals and greater and more in depth connections would be attained in the fall semesters.

Teaching older adult students is totally different than teaching traditional college students. Remember, they have chosen to be in your class, they want to learn, and are more driven to work harder due to more life experiences. In addition, you as the teacher will have students from diverse backgrounds and you must make an extra effort to get to know your students. The study skill session we had was the second to last day of the summer semester and we had chosen effective study skills that related back to how the course ran for the semester. During the summer, we had practiced making study guides, which are vehicles for connection building (Tutolo 1977, Thomas and Cummings 1978; Herber 1978). We also presented how to read mathematical textbooks by covering up the worked out solutions and first trying the problems on your own. This way, the student could clearly see if they made any mistakes. We also presented the six major patterns of texts: enumeration, classification, generalization, problem solution, comparison and contrast, and sequence (Robinson 1978).

In terms of outlining key points, we presented some effective ways that note taking and outlining not only worked for my teaching assistant, but also for me when I was in college. We presented the five benefits outlined by Taylor 1983; 1984 and D'Angelo 1983):

1. Summarizing is one of the best student methods for review.
2. It leads to improved ability to condense.
3. It forces a student to distinguish between main and supporting information.
4. It aids in recalling the main points of reading or listening.
5. It leads to the ability to organize and write more coherent and complete answers on written examinations.

In addition, we told them to try to create their own test questions, which caught our adult students by surprise. Once a unit was completed, we split students into groups and asked them to make-up their own questions they believe would be on the final exam. Some of the samples are given below.

Sample……..

Overall, the students had all the main concepts on their papers and it helped in their exam scores. Below is a sample of scores from years past. All final exams are out of 100 points

Final Exam 2012	**Final Exam 2013**	**Final Exam 2014**	**Final Exam 2015**	**Final Exam 2016**
76	89	95.5	86	60
76	64	89.5	94.5	90.5
82	93	45	67.5	85.5
80	51	67.5	44.5	90.5
74	91.5	48.5	75	80.5
86	96	74.5		89.5
92	83.5	48		95
32	65			74
86	52			82.5
90	68			84.5
83	91.5			
50				
94				
Mean	Mean	Mean	Mean	Mean
77	76.77272727	66.92857143	73.5	83.25

Our last few pieces of effective study skill was to make sure, while doing homework, avoid watching TV.

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