

**EMMA:
The future of technical education
in the era of Hybrid Cloud**

Cameron Seay

The Eli Madison Memorial Apprenticeship

Agenda

- **Background of the Apprenticeship Model in the Mainframe Space**
 - **mainframe out of the colleges**
 - **industry hasn't a clue**
- **Gee, Why Don't We Try Apprenticeships?**
- **The Birth of EMMA**
- **Our Model**
- **The future**

About me:

In IT for 21 years as a programmer, analyst, project manager, and technical lead for several organizations.

I have an MBM, an MA in Economics, an MS in CIS, and a PhD in Education

I have been teaching at the college level since 2004 from grad school to community college at 7 public unis.

I have concluded that the bootcamp model is ideal for the mainframe space, and since 2015 I have been teaching and running mainframe bootcamps.

In the fall of 2014, I was contacted by someone telling me Steve Dodd of IBM was asking if I knew anything about tech apprenticeships. This presentation is about what happened after that that initial contact...

Tue, Nov 18, 2014, 10:45 AM

Hi Cameron,

I hope all is well. Do you have some time this week to schedule a call? I would like to bring you up to speed on some the initiatives Don Resnik and I are working on. I would also like to talk to you about a Mainframe Apprentice grant proposal that I working on with IBM. Department of Labor has \$100M available for 30 grants of \$3M - \$5M per grant. I am working with Stephan Dodd from IBM on the grant proposal. Stephan has been working closely with DOL Secretary Perez on the design of the Apprentice Program. The Mainframe Apprentice grant proposal may be an opportunity your organization may want to consider. I have complete control of my time so let me know if this week works for you.

Regards,
Ron

NCCU Years

Learned how to teach mainframe.

Was there between 2004 and 2009.

Program begun by two IBM sysprogs.

Placed over 50 students in 6 years

The A&T Years..

NC A&T was a cross between Valhalla and Camelot

I taught there for 9 years (2009-2018), and they were some of the best years of my life.

[Extreme IT Day](https://www.youtube.com/watch?v=ypvV3NBGpaM)://www.youtube.com/watch?v=ypvV3NBGpaM

We built an amazing IT program

Probably between 300-400 students have gotten mainframe or mainframe related jobs

IBM loaned us an IBM z9. We were one of only 4 schools in the nation that had one.

During Barack Obama's 2nd term, he and Sec of Labor Tom Perez decided to apply the apprenticeship model to the tech sector.

The result was hundreds of millions of dollars in funding for apprenticeships via contracts.

IBM was instrumental in getting funds to start a mainframe apprenticeship standard that could be used by any organization.

IBM then began to partner with unis and non-profits to secure contracts to train mainframers.

How did I get into this?

I was teaching mainframe at an HBCU. Don Resnik, who ran the IBM Academic Initiative for Mainframe was scheduled to make a presentation at NC State in Jan of 2005.

He was asked by Andy Rindos of IBM to drop by my campus on the way to NC State.

When I saw his presentation, it took about 30 seconds for me to see mainframe was a good fit for any HBCU.

With IBM's help I began teaching mainframe at NCCU.

So when Stephen Dodd needed a mainframe curriculum, several people sent him my way.

Stephen would identify RFPs for me to apply to, would assist in the writing of the proposal, and would sign on as a partner in the effort (this is why we got the money).

I was at NC A&T at the time. We did not get the first contract we applied for, a \$4.5m award that went to Wake Tech (with IBM involvement I assume).

But we did get awarded a \$7.5m, 5 year contract with the US Dept of Labor to build apprenticeships that focused on underrepresented populations, women, veterans, and people with disabilities.

I was lead on the contract. The agreement was IBM was to be a subcontractor and build a mainframe apprenticeship, to be rolled out in year 2 (we actually rolled it out in year 1).

LEAD-IT
(Leadership, Empowerment, Apprenticeship, and Diversity
in Information Technology)

It was a beautiful plan...

In year 1 we would identify 500 individuals for training (we actually signed up 862).

John Thompson, a former IBM executive, virtually lived in an airplane for the entire year going nationwide, setting up events for the community.

We had no trouble finding candidates. There were hundreds everywhere we went eager to sign up and most feeling this was too good to be true (that ended up being the case).

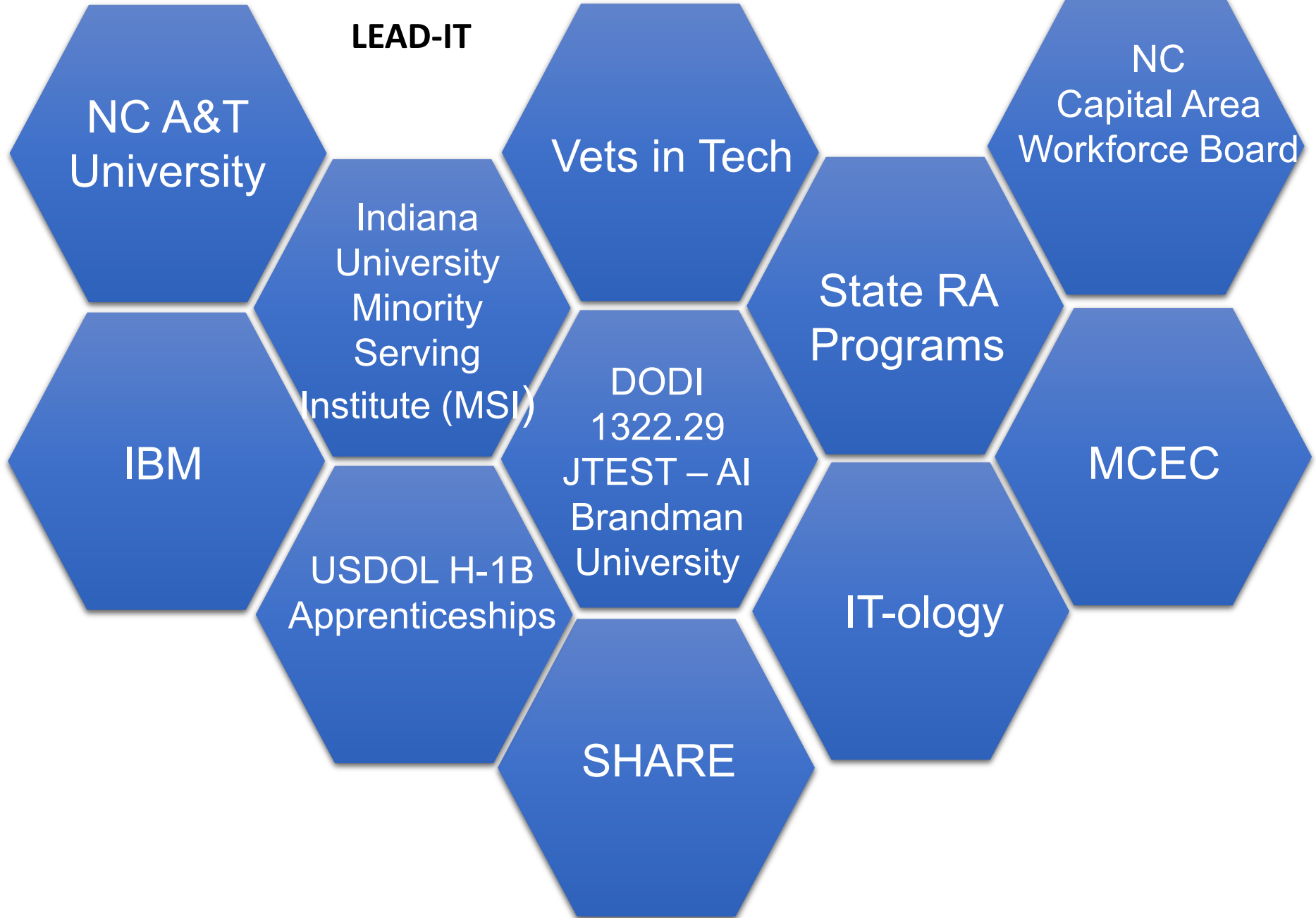
We were funded not only to provide free mainframe training, but childcare and transportation assistance as needed. Some of this did not come out of our contract. Many states has such funding available but no programs to use it for (smh). The point is there is a nation-wide apprenticeship structure ready to be deployed.

Help wanted: N.C. A&T to train a new generation of mainframe computer programmers

By John Newsom Jan 7, 2017 0



LEAD-IT





LEAD- IT on Campus Team

Dr. Cameron Seay,
Assistant Professor
Information
Technology

Dr. Loury Floyd,
Associate Dean,
College of Education

Dr. Karen Jackson,
Adjunct Professor
Leadership Studies

Dr. Anna K Lee,
Associate Professor
Psychology

Dr. Maya Corneille,
Associate Professor
Psychology

Dr. Evelyn Sowell,
Assistant Professor
Computer Systems
Technology

Dr. Gina Bullock,
Adjunct Professor
Computer Systems
Technology



Meeting with Dr. Cameron Seay on US DOL Award

Created by: Cameron Seay

Time

6pm - 7:30pm (Coordinated
Universal Time)

Date

Fri Sep 30, 2016

Where

408 IRC

**This is the meeting where the IBM
Mainframe Apprenticeship Program
was born in room 408 IRC on the A&T
Campus**



We brought in 40 or 50 B-school and IT students to IBM RTP for a two day deep dive into corporate tech.

NC A&T University NENC LEAD-IT Technology Workshops



This was a program run by two ladies in rural Eastern NC. Most of these students did not have a broadband connection at home. We should them something few people see in person: a running mainframe.

In Year 1, John Thompson went to 15 cities in 10 states to sign up potential apprentices.

No college degree was required; all you needed was to be able to read and understand 6th grade English and be willing to work your butt off.

IBM wisely decided to roll out the apprenticeship model in Year 1 not Year 2. They announced it in September of 2017.

That month the Trump Administration's Dept of Labor cancelled our contract without saying why other than "it was not needed." C'est la vie.

I was undeterred, because it had been proven to me that the apprenticeship model was not only the solution to the mainframe skills crisis but to all of IT.

IBM fleshed out the apprenticeship model and rolled out their Mainframe Apprenticeship Program in the fall of 2017.

Broadcom and Ensono and have similar programs, which further validates the model.

I began working with John Thompson on “ad hoc” bootcamps, not tied to any one company.

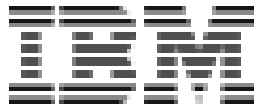
By this time the bootcamp model that John and I developed had placed students at several Fortune 100 Companies.

In September of 2021 Gary Gwaltney of Knowledge Transfer called me with the ridiculous idea of me teaching 6 hours a day, 5 days a week, for 10 weeks (that was not going to happen).

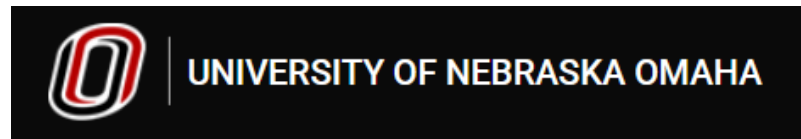
But there was a budget for the project that made it doable.

This is where it gets interesting.... [freestyle on what came next]

The Current EMMA Universe



EMMA



In August of 2024 I posted an email to LinkedIn about starting a mainframe apprenticeship. The first hand raised was Cable Rose, our current GM

Week 1*

- 1. Binary and Hexadecimal Numbers**
- 2. Addressing Storage**

Week 2

- 3. The Assembler Language Program**
- 4. Basic Assembler and XDUMP**
- 5. The IBM Reference Summary ("Yellow Card")**

Week 3

- 6. ABENDs and Reading Dumps**
- 7. Encoding and Decoding Instructions**
- 8. Compare Instructions and Branching**
- 9. Assembler Literals**

***This schedule assumes the student is already familiar with TSO/ISPF.**

Week 4

- 10. XREAD, XPRNT, XDECI and XDECO**
- 11. Binary Multiplication and Division**
- 12. MVC, CLC and More Load Instructions**

Week 5

- 13. EQUates and Extended Mnemonics**
- 14. Counter Branching**
- 15. Immediate Byte Instructions**

Week 6

- 16. Number Formats and Decimal Numbers**
- 17. Packed Decimal Instructions**

Week 7

- 18. STM, LM and Internal Subroutines**
- 19. Standard Linkage and External Subprograms**

Week 8

- 20. USING, DROP and DSECT**
- 21. Assembler Tables and Table Processing**

Week 9

- 22. Location Counter Value, ORG and CNOP**
- 23. Halfword Instructions**
- 24. More Character Instructions**

Week 10

25. Shift Instructions

26. Logical Instructions

27. Test Under Mask, Translate and Translate and Test

28. MVCL, CLCL and Execute Instructions

Weeks 11 and 12

Final Project in Assembler

If Time Permits

29. Hashing and Hash Tables

30. Introduction to Assembler Macros

The ASSIST Assembler – and its 24-bit addressing capability – is used along with its X-Type instructions to teach beginning Assembler students

An emphasis is made in understanding SOC ABENDs, especially SOC1, SOC4, SOC5, SOC6, SOC7, SOC9 and SOCB

Another is made in understanding how to interpret four parts of the Basic Control Mode PSW to assist in solving ABENDs

And finally, another is made in understanding registers as pointers with byte displacements and in addressing storage locations in interpreting dumps

It is important to realize that we do not move to a new topic before the entire class understands the current one

Students and instructor work closely together throughout the entire course

Students are required to complete at least six assignments, each more difficult than the previous

Students are required to complete a culminating and all-encompassing final project

Students are required to take a minimum of four quizzes, each worth between 10 and 25 points

Students are required to complete a midterm exam and a comprehensive final exam, each worth 100 points

Programming assignments make up 40% of the student's overall percentage and exams and quizzes make up 60%

???...