A Socio-Cultural Perspective of Enterprise Systems Education

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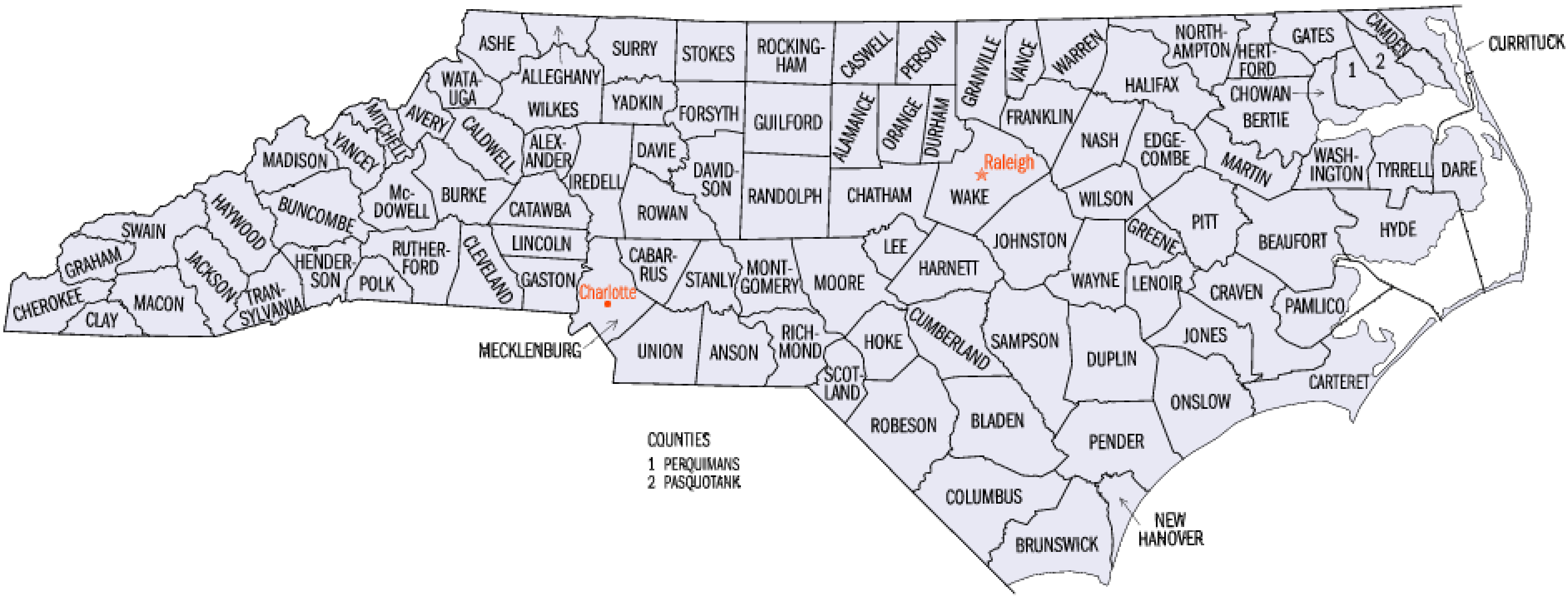
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Socio-cultural Learning Theory (SLT):

Was developed by Lev Vygotsky, a Russian Psychologist

Views learning as a social process and the origination of human intelligence in society or culture

Social interaction plays a fundamental role in the development of cognition

Everything is learned on two levels: First, through interaction with others, and then integrated into the individual's mental structure.

A predecessor of Vygotsky was Alfred Binet, A French Psychologist who was tasked with determining which French children would not be good candidates for public school education.

In his “The Development of Intelligence in Children,” Binet noted remarkable differences between the knowledge of Parisian schoolchildren and children from the countryside of the same age.

He came to the conclusion, borne out through his extensive study of hundreds of children, that differences in exposure led to dramatic differences in knowledge

A foundational concept in SLT is the “Zone of Proximal Development.” (ZPD)

The ZPD is the area of exploration for which the student is cognitively prepared, but requires help and social interaction to fully develop

A teacher or more experienced peer is able to provide the learner with "scaffolding" to support the student’s evolving understanding of knowledge domains or development of complex skills

Learners should be provided with socially rich environments in which to explore knowledge domains with their fellow students, teachers and outside experts

Okay: so what does all of this psych stuff have to do with Enterprise Computing?

Aug. 25, 1991: Hello everybody out there using minix —
I'm doing a (free) operating system (just a hobby, won't be big and professional like gnu) for 386(486) AT clones. This has been brewing since april, and is starting to get ready. I'd like any feedback on things people like/dislike in minix, as my OS resembles it somewhat (same physical layout of the file-system (due to practical reasons) among other things).
linus (torvalds@klaava.helsinki.fi)

This is, of course, the now famous e-mail of Linus Torvolds announcing Linux to the world.

My contention is that Linux, and the entire open source software movement, is a classic example of SLT in action. I further contend that SLT concepts can be used to further the development of Enterprise Systems skills.

So..... my paper poses the following research question:

How do we formalize an SLT-based model for the development of Enterprise Systems (ES) skills? And once this model is developed, how to do deploy it?

Tasks required:

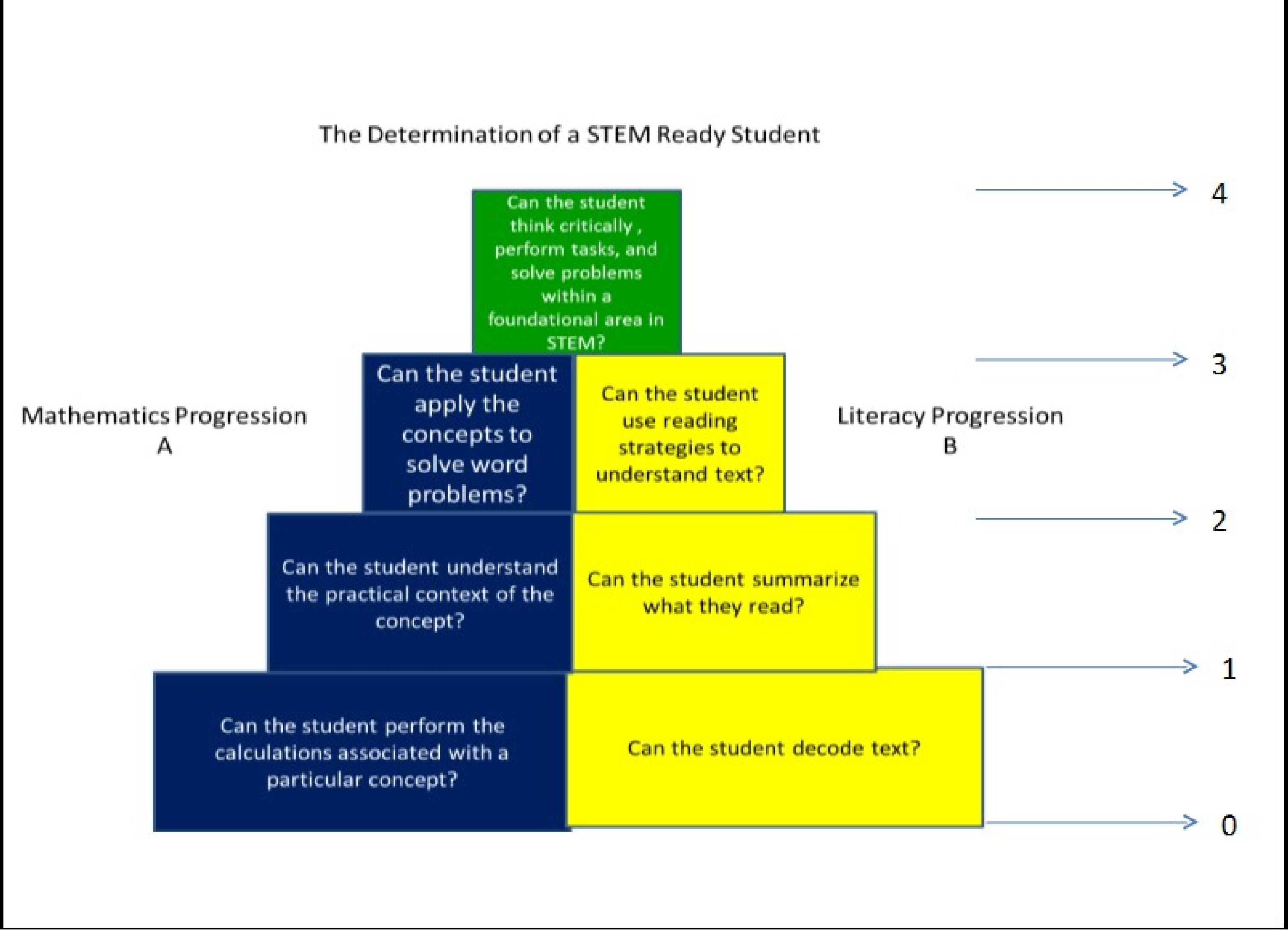
Deconstruction of the constituent skills of the expertise to be acquired

An Assessment Model

Identification of domain experts

Identification of the community of practice

A methodology to “connect the dots” (curriculum)



Deconstruction of Constituent Skills

Looking at a Specific Skill in ES- Programming:

Breakdown:

1. General Processor Input/Output (GPIO)

2. Procedural Programming Concepts (loops, conditionals, etc).

3. An OOP tool (Alice, Scratch)

4. OOP Concepts (class, object, method, data)

5. Development Projects

Note that we apply the concepts (GPIO, Alice) BEFORE we have a detailed discussion of the concepts behind the tool.

We feel this establishes a context more meaningful to the novice than discussing the concepts without a context in which to apply them.

Assessment Model:

Item Response Theory (IRT) has been with us for a while (perhaps beginning with Binet's study in 1905), but is very much underutilized as a tool in educational assessment.

IRT allows you to develop items that identify specific competencies. For example, do you understand what a foreign key is in a relational database?

The items allow a statistically accurate prediction that if you can answer a certain item, you can answer easier items in the domain. For example if you know what a foreign key is, you also know what a primary key is, so we don't have to ask you that.

This testing model has the potential for much greater efficiency and specificity.

Identification of Domain Experts:

The Zone of Proximal development presupposes a body of expertise available to move novices toward expertise. In a sophisticated domain like ES, it is essential to have access to this expertise.

Not only can the gurus answer the hard questions, they can also define the path that novices need to take.

They are needed to develop the assessment items.

They are needed for mentoring and apprenticeships.

Connecting the Dots!

First, Industry, the universities and the K-12 environment all must participate in a seamless continuum, all singing from the same sheet of music, if you will.

The Extreme IT Day event at NC A & T is a good example of the entire community of practice coming together in one place at one time.

A & T maintains ongoing partnerships with numerous high schools with continuous interaction

A & T also maintains ongoing partnerships with numerous industry partners.

We are now in the process of formalizing an ES curriculum for both middle and high schools

The Craven County Enterprise Systems Club

Craven Co. is a very rural county in Eastern NC

The students have little opportunity for exposure to ES concepts and practice.

We will begin this fall with 20-30 11th and 12th grade students, 3 days per week, 2 hours per day.

2/3 of the time will be on ES concepts and activities, 1/3 of the time on assessment and skill building.

Classes will be taught by local teachers and using remote video conferencing.

We will measure gains within the domain

Thanks!