What Makes It Hard to Apply Software Product Lines to Educational Technologies?

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Contact Profile (1/2)

- **Sridhar Chimalakonda, IIIT-Hyderabad, India**
  - PhD student at Software Engineering Research Lab
  - Served as Co-Editor for ISO standards on SPL (IS 26551 – Requirements, IS 26555 – Technical Management)
- **Summary of your focus and your interests**
  - Applying SPL to Accelerate Educational Technologies
  - Evolving SPL in a Societal Context
  - Integrating Lean, Agile Thinking and SPL
  - Global Software Product Lines

Contact Profile (2/2)

- **Objectives / Looking for**
  - What are you looking for at the workshop?
    - Share our experience on applying SPL to ET
    - Learn, discuss, debate and collaborate on SPL ideas
    - Potential collaborations with both academia and industry
  - What is your goal?
    - Apply SPL to ET while extending the state-of-art in SPL
    - Motivate and generate interest in the SPL community around our ideas and potentially start collaborative initiatives
  - What are your PLEASE 2013 “success criteria”?
    - A practical case and rigorous experience of applying SPL

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Product Line

- Societal Context - 287 million adult illiterates, 2.87 million teachers required
- 9 existing *e*Learning Systems for a decade developed by TCS
- Distributed environment
- No direct business case
- Structure, process largely similar but design, content vary
- Scale & Variety
  - 22 Languages, Variants
  - Diversified learners, teachers
  - Diversified environments
- Continuous feedback from field and several partners

The Adult Literacy Product Line

- *e*Learning Systems for 22 Indian Languages and several variants
- Continuous Evolution – content, design

Hindi

Tamil


Telugu

Bangla


Urdu

Oriya


Kannada


Gujarati

Marathi

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The Problem (1/3)

- Societal Context Vs Business Context
  - No direct business case
  - How to motivate for SPL?
- Dealing Non Technical and Diversified Stakeholders
  - Several non technical stakeholders from Govt., NGOs
  - No/minimal technical knowledge
- SPL Across Cross Organizations
  - Involvement of multiple organizations and most of them with no technical knowledge

The Problem (2/3)

- Developing SPL in a Global and Distributed environment?
  - How can we develop and maintain SPL in a distributed global environment?
- Process Diversity
  - Process Lines are required to synchronize across organizations and domains.
  - How to deal with processes that are manual and people oriented?
- What can be done for version management?

The Problem (3/3)

- DOMAIN CHALLENGES
  - Informal and evolving domain models. E.g. *"We persuade learners to come to centers to learn by giving them incentives"*
  - Invisible Variability
  - Updating on-the field product is another major challenge so is to model the domain without requirements and documentation.

Current Solution (s)

- TALES Approach – Standardization and Virtual Assembly Lines
- Ontology Based Modeling Framework
- Lean Software Product Lines
  - SPLs are *still heavy* despite light-weighted approaches
  - Agile Product Line Engineering
    - Works!, Needs a lot more research!
  - Pointers towards Lean
    - Strategic, Tactical or Operational
    - Not just a management perspective
- Global Software Product Lines

TALES Approach

Problem Domain Exploration

- A detailed analysis of the problem domain
- Designing SPL solution from the problem domain
- An underlying theory or basis of domain

Standardization

- Standardization provides an infrastructure to build a variety of similar but distinct systems.
- Types of standardization - Product Structure, Production Process, Raw Material

Virtual Assembly Lines

- Detailed standard and optimized processes
- Processes empowered by tools
- Automated and assembly tools

Supporting Repositories

- Components
- Tools
- Processes

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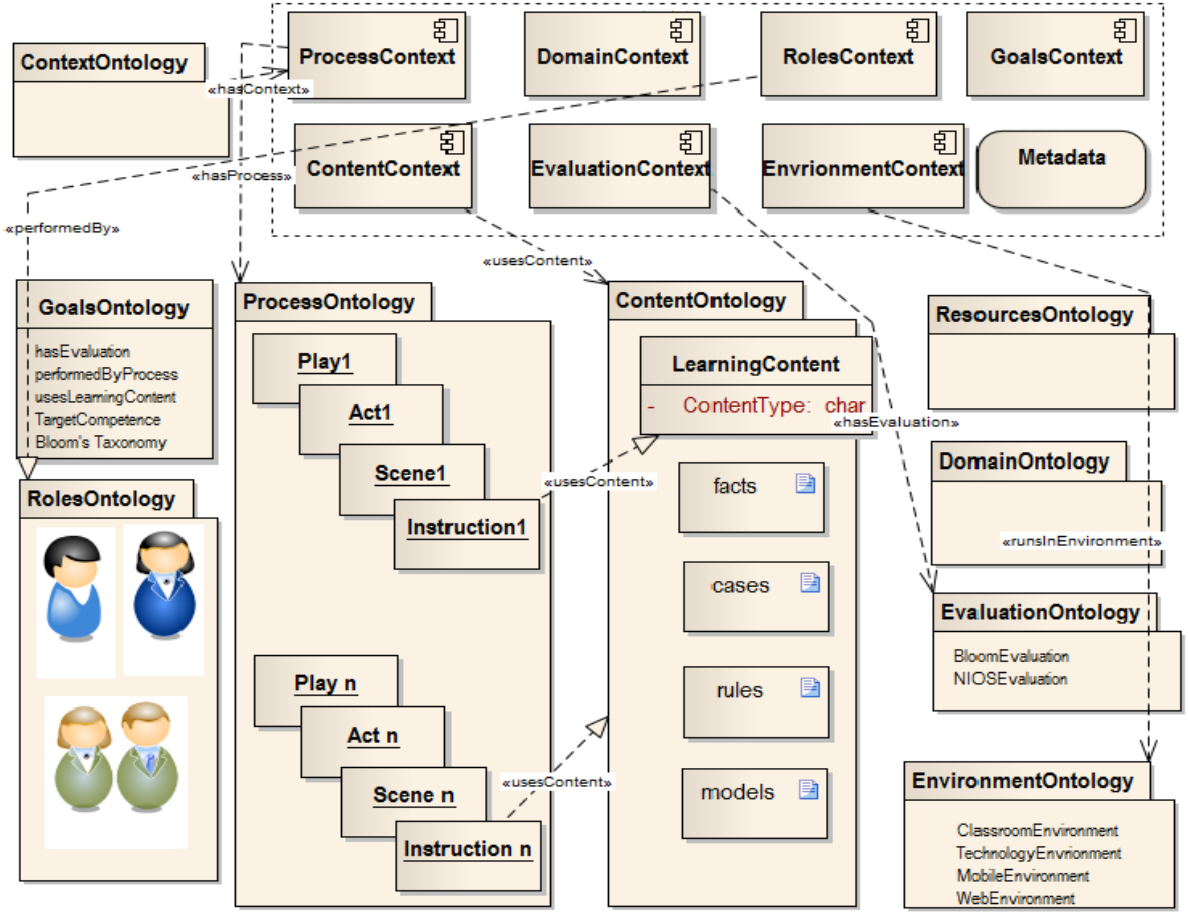
PLEASE2013
4th International Workshop on Product LinE Approaches in Software Engineering, May 20, San Francisco, California
held in conjunction with the 35th International Conference on Software Engineering (ICSE 2013)

Ontology Based Modeling Framework



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Why is it interesting?

- Real-life problem that can make significant academic, industry and societal contributions
- Need for multidisciplinary solution - This problem requires integration of multiple ideas from SPL, Lean, Agile, GSD, ET
- SPL in education domain is extremely critical but *largely unexplored!*

Discussion & Potential Collaborations

- Does SPL for societal context differ from traditional SPL and if so how should we adapt it?

- With everybody (esp. *Klaus Schmid*, *John McGregor* and all others for our emerging ideas)
- Mainly looking for collaborators for experimenting with our ideas in their domains
- Request everybody to critique my ideas! Mainly a fruitful debate on Lean SPL and Global SPL to see if these are potential research directions?

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Thank you!

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