An Adaptive Approach for Training Software Developers

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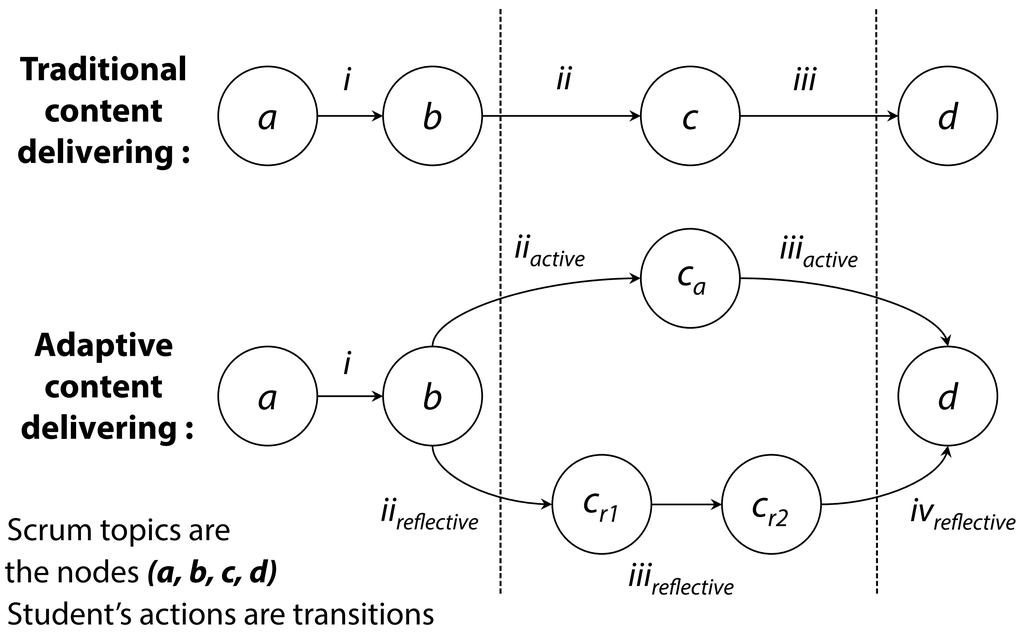
Introduction

- **Scrum** is widely used in software **industry** and **academic** research
- Scrum is simple to understand, yet **difficult to master**
- There are many ways to introduce Scrum such as **traditional lectures** and **capstone projects**
- However, they neglect the **personalization** of the learning process
- **Adaptive Virtual Learning Environments** are promising tools for achieving personalization

Objectives

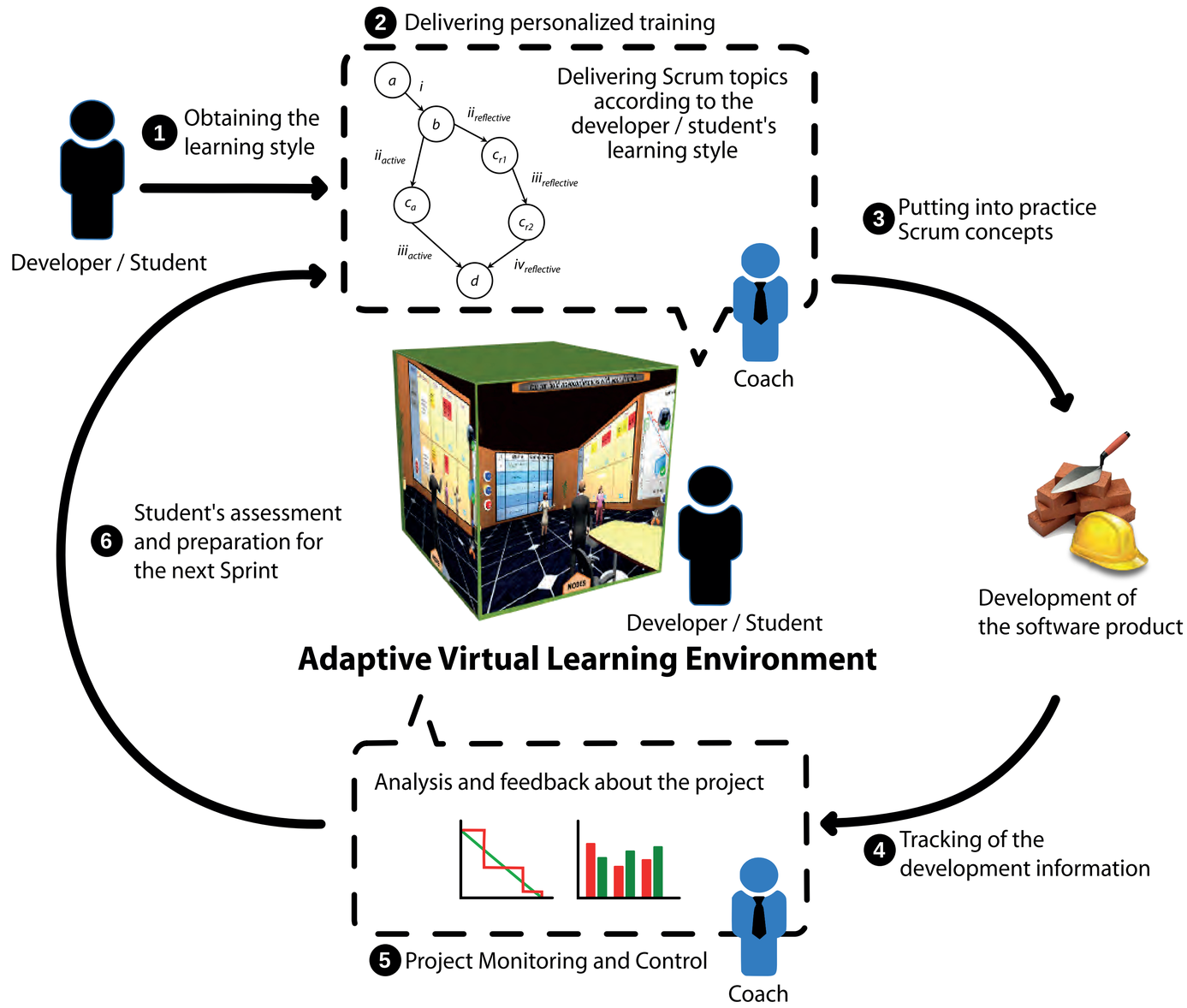
- Providing an **adaptive approach** for Scrum training
- Achieving adaptation by using **Felder-Silverman** learning style model
- Assessing the students' **learning outcomes**
- Analysing the students' **performance** on software development

The *adaptive effect*

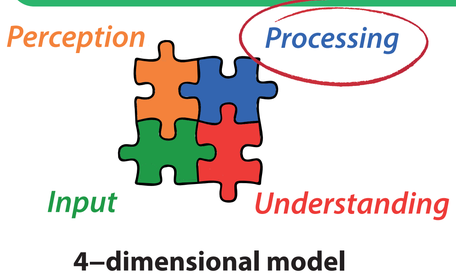


- Scrum topics are the nodes ***(a, b, c, d)***
- Student's actions are transitions between each pair of nodes ***(i, ii, iii, iv)***
- c_a depicts the active instructional method for topic ***c***
- c_{r1} and c_{r2} depict the reflective instructional methods for topic ***c***

Our approach



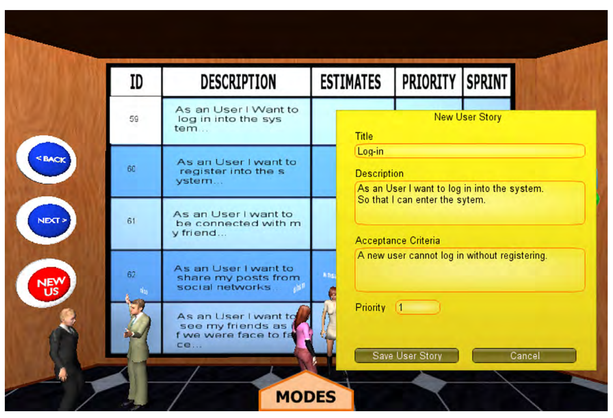
Why Felder-Silverman learning style model?

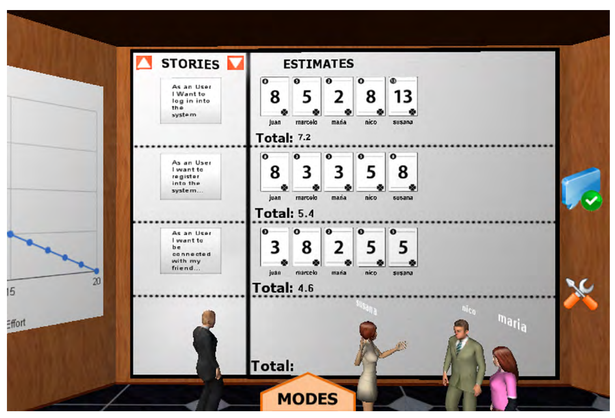


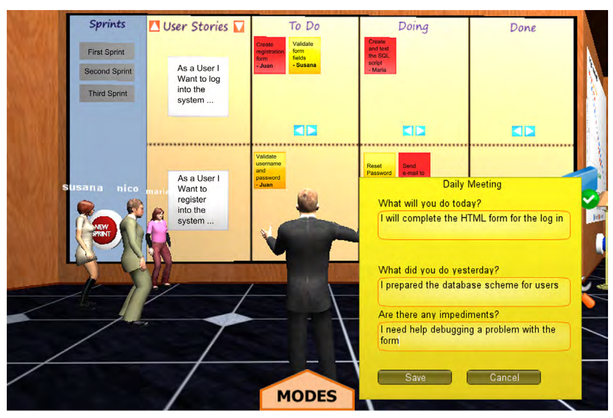
4–dimensional model

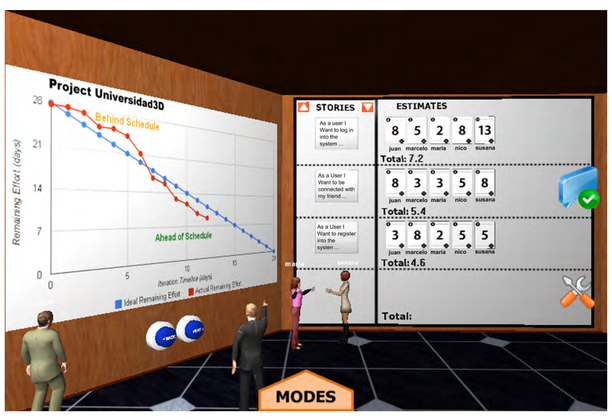
- This model is **strongly related** to Scrum practices[2]
- Using it when teaching Scrum has shown **better learning**[1]
- ***Active students*** prefer **talking** about the topics, **exchanging ideas**, and **putting into practice** concepts
- ***Reflective students*** prefer **thinking** about the topic, making **summaries**, and **reading** extra bibliography

The Scrum artifacts in the Adaptive Environment



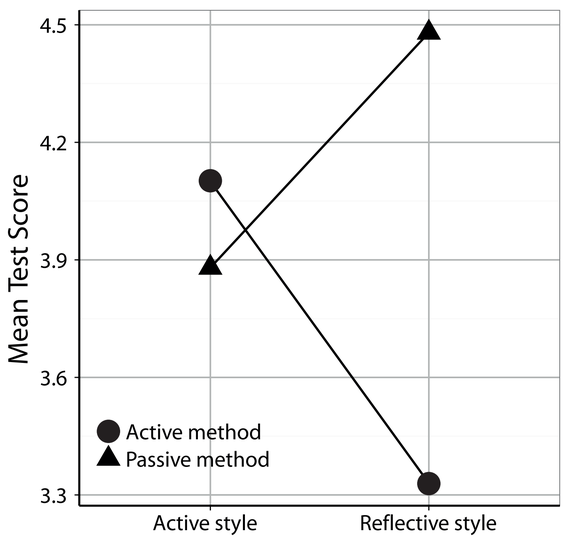




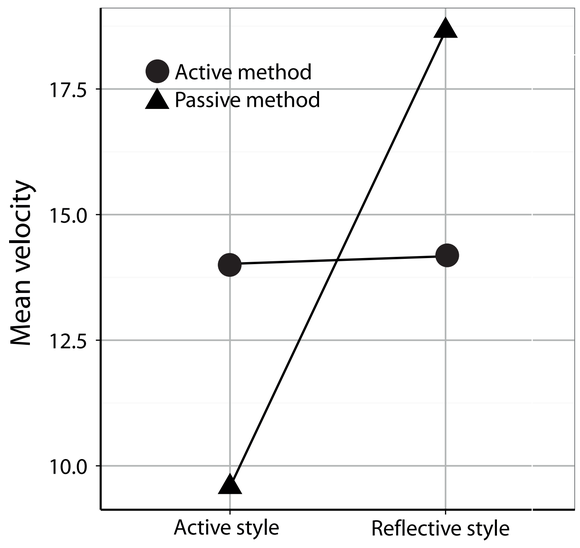


Experimental Results*

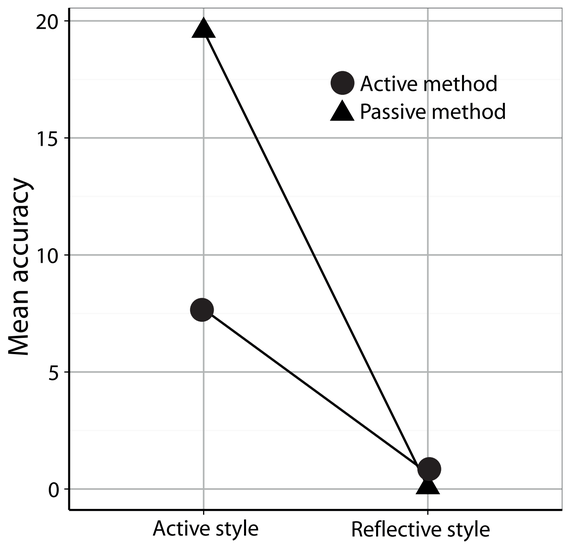
Students' learning outcomes



Students' work capacity



Students' accuracy of estimation



(*) Controlled experiment (N=41; 1st. Sprint; 2016)

Conclusions

- Felder-Silverman model is useful for modeling the developer's profile
- Adaptation allows for delivering personalized instruction in Scrum
- Adapting instructional strategies according to learning styles introduce improvements:
  - on students' learning outcomes
  - on students' performance when developing software

Bibliography

1. **E. Scott**, G. Rodríguez, Á. Soria, and M. Campo. "Towards better Scrum learning using learning styles." **Journal of Systems and Software.** 111 (2016): 242-253.
2. **E. Scott**, G. Rodríguez, Á. Soria, and M. Campo. "Are learning styles useful indicators to discover how students use Scrum for the first time?" **Comp. in Human Behavior.** 36 (2014): 56-64.