



Learning and Engagement Strategies (LESSs)

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Outline

- Overview of LESs
 - Collaborative Learning
 - Gamification
 - Problem-Based Learning
 - Social Interaction
- Using LESs in SEP-CyLE
- Theoretical Framework
- Summary

Overview of LESs

- Learning and engagement strategies (LESs) are grounded in active learning.
- Active learning is "a method of learning in which students are actively or experientially involved in the learning process and where there are different levels of active learning, depending on student involvement." Wikipedia (Weltman 2007)

Overview of LESs cont

- In our context LESs are limited to: *collaborative learning, gamification, problem-based learning, and social interaction.*
- We attempt to relate LES to Cognitive Load Theory (Chandler and Sweller, 1991).
- There are three main types of cognitive load
 - Intrinsic
 - Extraneous
 - Germane

Overview of LESs cont

- Intrinsic
 - Addition, subtraction, multiplication, division
 - Element interactivity
 - Manage it
- Extraneous (Irrelevant)
 - Gamification, teamwork, online, etc.
 - Reduce it
- Germane (Relevant)
 - Schema construction
 - Increase it

Collaborative Learning

Collaborative learning promotes several education goals including (Smith & MacGregor, 1992):

- *involvement* - students are more involved in the learning process by interacting significantly more with other students and teachers;
- *cooperation and teamwork* - students working together will be confronted with different views and will therefore need to resolve these differences and build consensus in their teams; and
- *civic responsibility* - encourages students to participate in shaping their ideas and values.

Gamification

- *Gamification involves applying elements of “gamefulness, gameful interaction and gameful design” with a specific interaction in mind.*
(Deterding et al. 2011)
 - *Gamefulness* (ludus) refers to the qualities of gaming (captures playing structured by rules and competitive strife toward goals)
 - *Gameful design* refers to the practice of crafting a gameful experience
 - *Playfulness* (paidia) refers to the experiential and behavioral qualities of playing

Gamification cont

- Gamification focuses on extrinsic motivation while gameful design focuses intrinsic motivations
 - *Extrinsic motivation* – where external rewards such as money or status are offered in exchange for engagement in particular behaviors or activities
 - *Intrinsic motivation* – where a behavior is enacted or an activity is undertaken because it aligns with one's inner values

Gamification cont

- Gamification in **education**: the use of “game-based mechanics, esthetics and game thinking to engage people, motivate action, promote learning, and solve problems (Kapp 2012)
- Game interface design patterns includes badges, leaderboards, and level
- Most used gamification design principles in an educational context are: visual status, social engagement, freedom of choice, freedom to fail and rapid feedback (Dicheva et al. 2015)

Problem-Based Learning

- Problem-based learning (PBL) is an approach to learning and instruction in which students tackle problems in small groups under the supervision of a tutor (Schmidt, 1993).
- Shim et al. (2003) describe an approach to promote collaborative learning that includes the following characteristics:
 - using real world problems
 - encouraging students' active participation
 - integrating diverse view points
 - encouragement of self-oriented learning
 - encouraging collaboration

Social Interaction

- An approach that enhances knowledge acquisition is social activities, e.g., using Online Learning Communities (OCLs). A successful OCL uses positive reinforcement, presents new information in motivating ways, and encourages group collaboration (Hara and Kling 1999)
- Social interaction within an online framework can help university students share experiences and collaborate on relevant topics (Liccardi et al. 2007)

Social Interaction cont.

- There are 12 instructional outcomes of Interaction according to Wagner (1997). Below are some outcomes:
 - Interaction to enhance elaboration and retention
 - Interaction to increase motivation
 - Interaction for team building
 - Interaction for discovery
 - Interaction to increase participation
 - Interaction to develop communication
 - Interaction to receive feedback

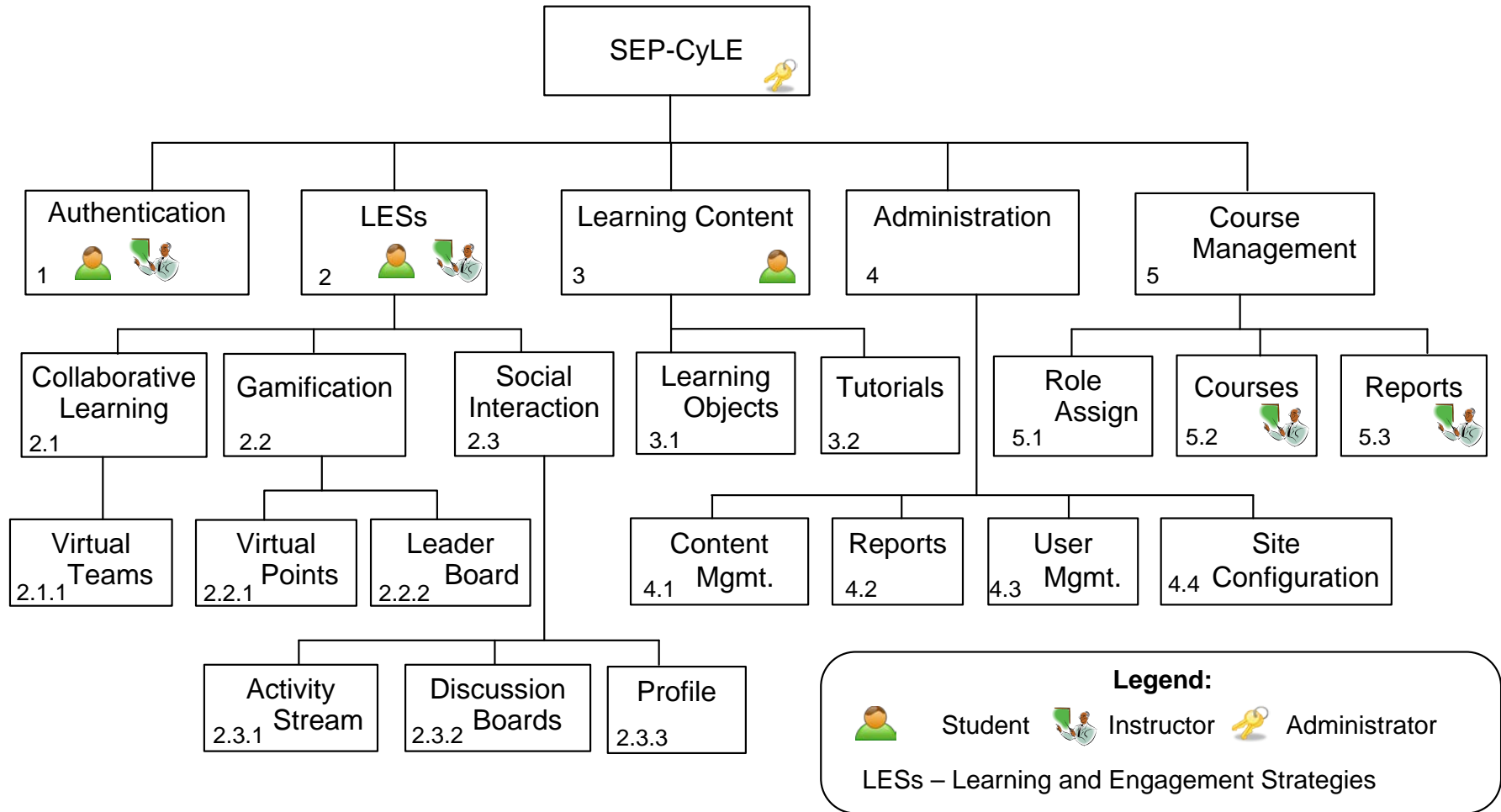
Using LESs in SEP-CyLE

- SEP-CyLE (Software Engineering and Programming Cyberlearning Environment) provides students access to digital learning content using embedded LESs
- SEP-CyLE uses LESs in the following ways:
 - *Collaborative learning* – use of virtual teams, teams collaborating to complete online assignments, posting comments on the work of other teams.

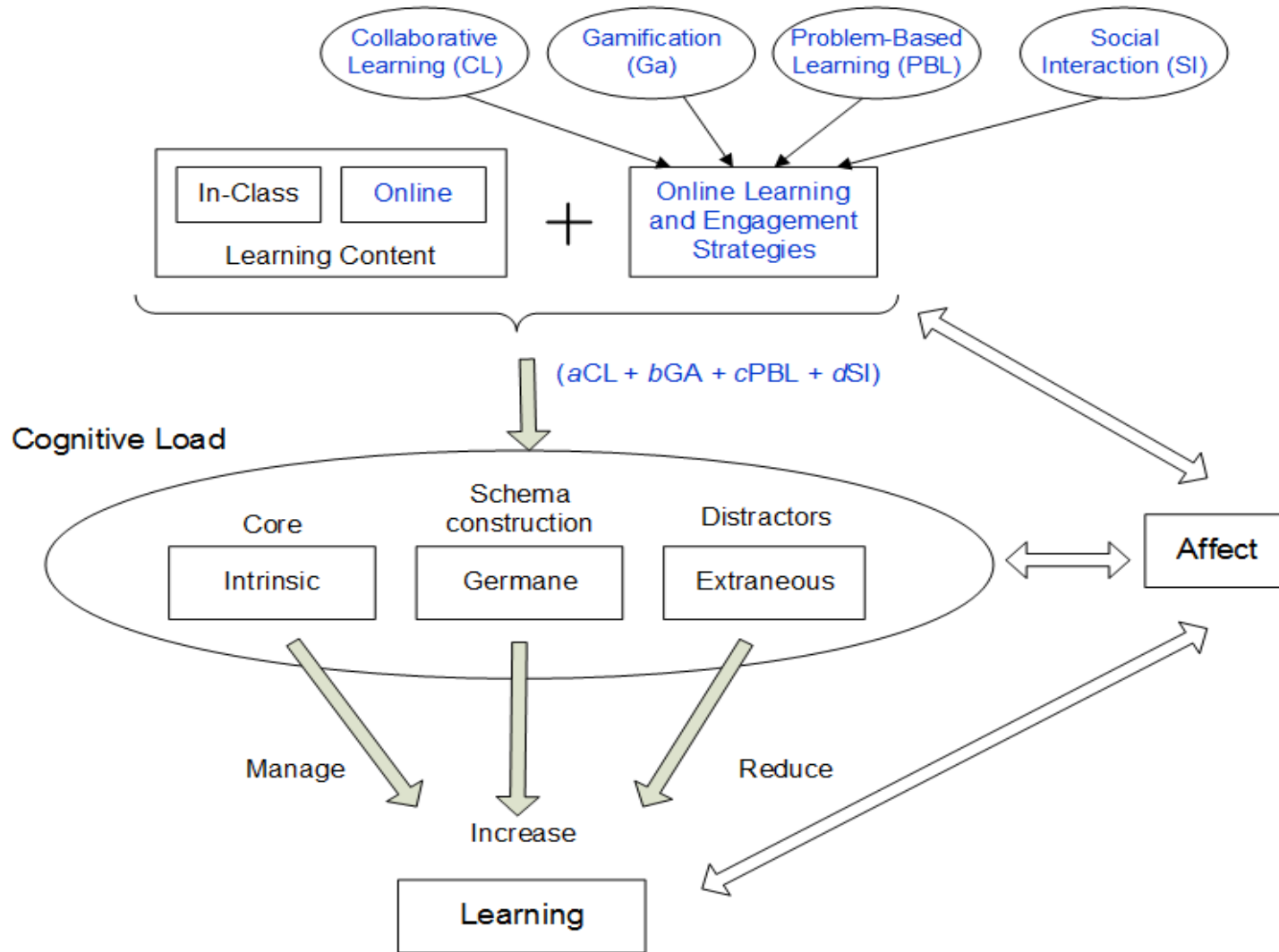
LESSs in SEP-CyLE cont

- *Gamification* - virtual points, a leader board, allocations of points based on various activities, e.g., completing assignments, posting to a forum, completing a user profile, and posting helpful learning content that benefit others)
- *Problem-based learning* – solving problems using the virtual problem-based environments, e.g. Eclipse Che IDE
- *Social interaction* - user profiles, message forums, group/individual chat, ratings and comment of learning content.

SEP-CyLE



Initial Theoretical Framework



Key

→ Delivered by → Learning flow ↔ Impact on learning a, b, c, d – percentage of LES used

CL – Collaborative Learning **Ga** - Gamification **PBL** – Problem-base Learning **SI** – Social Interaction

Summary

- Introduced the concept of LESs
- Briefly introduced: collaborative learning, gamification, problem-based learning, social interaction
- Described how LESs are used in SEP-CyLE
- Introduced initial version of theoretical framework for using LESs in WReSTT

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