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# Learning and Engagement Strategies (LESs) Workshop

Peter J. Clarke

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# Zoom Etiquette Guidelines

- Mute your microphone when you aren't speaking
- Turn on your camera
- All comments and discussions should be respectful of the participants
- Give everyone a chance to speak
- Use the “raise hand icon” if you have a question
- Avoid multi-tasking and focus your attention on the meeting

# Agenda

12:00-12:10 Introductions

12:10-12:30 Introduction to LESs

12:30-1:00 Collaborative Learning

1:00-1:10 Break

1:10-1:40 Gamification

1:40-2:10 Problem-Based Learning

2:10-2:20 Break

2:20-2:50 Social Interaction

2:50-3:00 Wrap Up

# Introductions

- Name
- Institution and department
- Research areas
- Fun fact about yourself

# Google Drive Folder

- Workshop slides
- Group notes slides
- Research paper from previous project
- Workshop attendees list

# Introduction to LESs

# Outline

- Think-Group-Share
- Overview of LESs
- LES Integration Model (LESIM)
- Summary

# Think-Group-Share

- Individuals in the team THINK about the question.
- GROUP discusses possible answers to the question and decides on the best answer.
- Team Leader (TL) SHAREs answers with the class (workshop attendees).
- Note Taker (NT) takes notes of the discussion in Google slides
- Time Keeper (TK) keeps track of the time.
- The team roles need to change for each Think-Group-Share

*Variant of Think-Pair-Share [1]*



# 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.” [2]

# 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 [3].
- There are three main types of cognitive load
  - **Intrinsic** – inherent level of difficulty associated with a specific instructional topic (*manage it*)
  - **Extraneous** – generated by the way information is presented to the learner (*reduce it*)
  - **Germane** – the processing, construction, and automation of schemas (*increase it*)

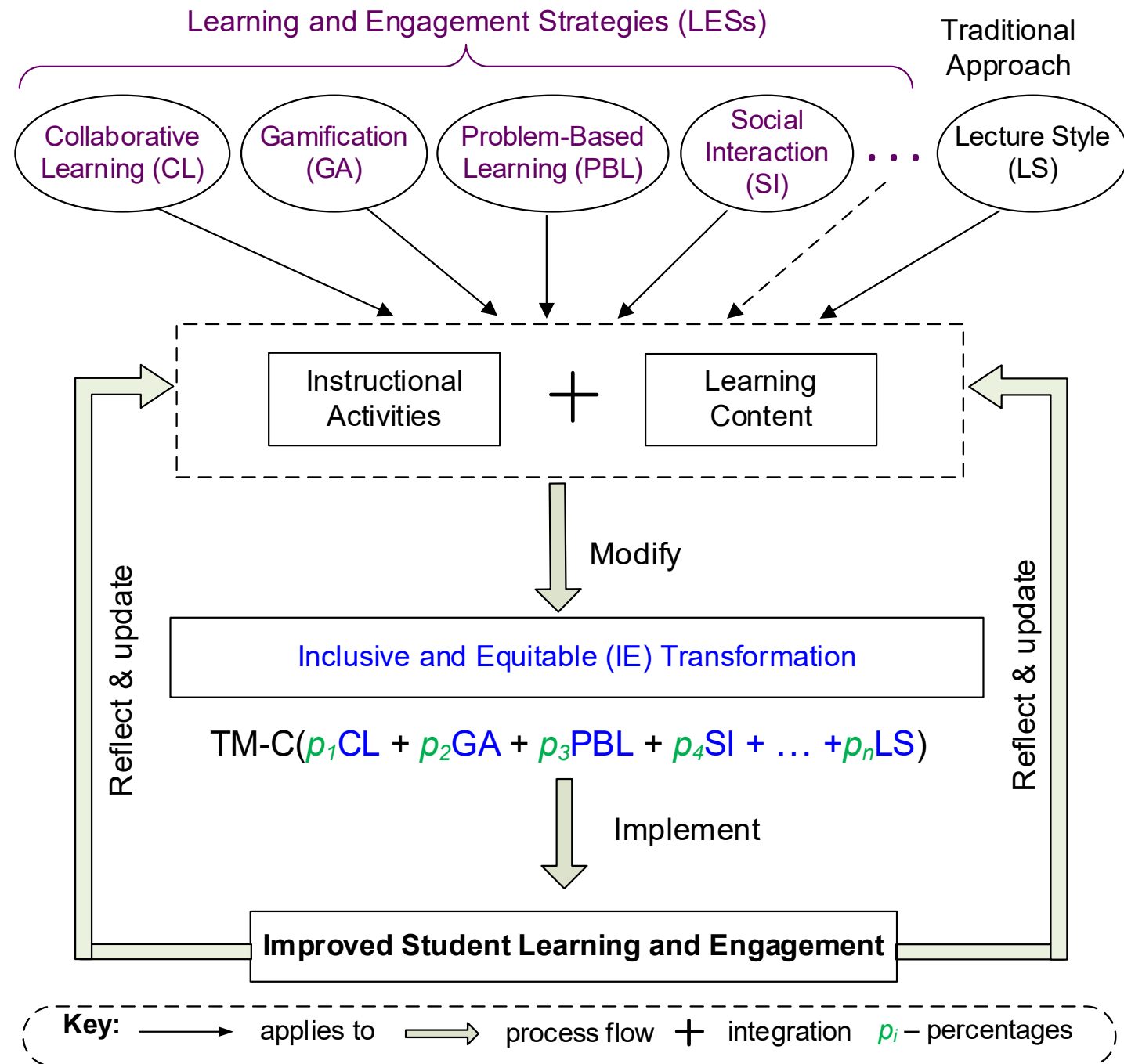
# Learning and Engagement Strategies (LESs)

- *Collaborative learning* is where two or more people work in groups mutually searching for understanding, solutions, or meanings, or creating a product [4].
- *Gamification* is the use of game design elements and game mechanics to improve user experience and engagement with a system, which may be applied to an educational context [5].

# Learning and Engagement Strategies (LEs) cont.

- *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 [6].
- *Social Interaction* is an approach that enhances knowledge acquisition through social activities, such as students establishing meaningful dialogue within student groups and with teachers [7].

# LES Integration Model (LESIM)



# Goal of Using LESIM

The main objective of the proposed model is, through research, to find the values of  $p_1, p_2, p_3, p_4, \dots, p_n$  in the equation:

$$\text{TM-C}(p_1\text{CL} + p_2\text{GA} + p_3\text{PBL} + p_4\text{SI} + \dots + p_n\text{LS})$$

that maximizes student learning and engagement. TM-C represents the teaching modality, e.g., face-to-face, fully online, hybrid, or online synchronous.

The values  $p_1, p_2, p_3, p_4, \dots, p_n$  may represent class time spent using LES.

# References

1. Lyman, F.T. (1981). The responsive classroom discussion: The inclusion of all students. In *Mainstreaming Digest*, ed. A. Anderson, 109-113. College Park: University of Maryland Press
2. Weltman D. (2007). *A Comparison of Traditional and Active Learning Methods: An Empirical Investigation Utilizing a Linear Mixed Model*, PhD Thesis, The University of Texas at Arlington, 2007
3. Chandler, P., and Sweller, J. (1991). Cognitive load theory and the format of instruction. *Cognition and Instruction*, 8(4), 293-332.
4. Smith, B. L. and MacGregor, J. T. (1992). What is Collaborative Learning? In A. Goodsell, M. Maher, and V. Tinto, editors, *Collaborative Learning: A Sourcebook for Higher Education*. National Center on Postsecondary Teaching, Learning, and Assessment, University Park, Pa., 1992

# References cont.

5. Deterding, S., Dixon, D., Khaled, R., and Nacke, L. (2011). From game design elements to gamefulness: Defining “gamification.” In Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments (MindTrek’11). Association for Computing Machinery, New York, NY, 9–15. <https://doi.org/10.1145/2181037.2181040>.
6. Schmidt H. G. (1993). Foundations of problem-based learning: some explanatory notes. *Medical Education*, 27(5):422–432.
7. Sandra Y. Okita. Social Interactions and Learning, *Encyclopedia of the Sciences of Learning*, pages 3104–3107. Springer US, Boston, MA, 2012 Weltman D. (2007).



# Collaborative Learning

# Outline

- What is Collaborative Learning?
- Properties of Collaborative Learning
- Benefits of Collaborative Learning
- Using Collaborative Learning in the classroom
- Think-Group-Share

# What is Collaborative Learning?

- Collaborative learning is where two or more people work in groups mutually searching for understanding, solutions, or meanings, or creating a product [1].
- Educational goals of Collaborative Learning :
  - *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.
  - *civic responsibility* - encourages students to participate in shaping their ideas and values.

# Properties of Collaborative Learning

- The teacher is usually more a facilitator than a “sage on the stage”
- Teaching and learning are shared experiences
- Students participate in small-group (3-5) activities
- Students must take responsibility for learning
- Students are stimulated to reflect on their own assumptions and thought processes, and
- Social and team skills are developed through the give-and-take of consensus-building

Kreijns et al. [2]

# Benefits of Collaborative Learning

Research shows that educational experiences that are active, social, contextual, engaging, and student-owned lead to deeper learning [2]. The benefits of collaborative learning include:

- Development of higher-level thinking, oral communication, self-management, and leadership skills
- Promotion of student-faculty interaction
- Increase in student retention, self-esteem, and responsibility
- Exposure to and an increase in understanding of diverse perspectives
- Preparation for real life social and employment situations

# Using Collaborative Learning (CL) in the Classroom

CL may occur both at the class level and at the group or project team level.

- At the class level, CL may involve
  - Students present solutions and answer questions during a class session that may benefit the entire class
- At the group or team level, CL may involve
  - Team members working on the class project. Students are required to keep a diary of all team meeting related to the class project.

# Think-Group-Share (10 mins)

1. Identify how you would use Collaborative Learning during an in-person class. Use the Google slides in the folder for your notes. Add additional slides if needed
2. On your return, the team leader should briefly describe two of your approaches.

# References

1. B. L. Smith and J. T. MacGregor. *What is Collaborative Learning?* In A. Goodsell, M. Maher, and V. Tinto, editors, *Collaborative Learning: A Sourcebook for Higher Education*. National Center on Postsecondary Teaching, Learning, and Assessment, University Park, Pa., 1992
2. Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: a review of the research. *Computers in human behavior*, 19(3), 335-353.
3. Center for Teaching Innovation. *Collaborative Learning*. Cornell University.  
<https://teaching.cornell.edu/teaching-resources/engaging-students/collaborative-learning>  
(retrieve 06/06/2019).



# Gamification

# Outline

- What is Gamification?
- Most Used Gamification Principles
- Using Gamification in the classroom
- Think-Group-Share

# What is Gamification?

- *Gamification* is the use of game design elements and game mechanics to improve user experience and engagement with a system, which may be applied to an educational context [1].
- Gamification involves applying elements of “gamefulness, gameful interaction and gameful design” with a specific interaction in mind [1].
- Note Gamification is not Game-Based Learning

# What is Gamification? cont.

- *Game-Based Learning* is a type of active learning experience within a game framework, which has specific learning objectives and measurable outcomes [2].
  - the learning experience is within a virtual game framework,
  - requires a high degree of student interaction, and
  - offers informative feedback on student performance

# Most Used Gamification Principles

- Based on the study by Dicheva et al. [3], the most used gamification design principles in an educational context are:
  - Visual status
  - Social engagement
  - Freedom of choice
  - Freedom to fail
  - Rapid feedback

# Using Gamification (Ga) in the Classroom

Ga may occur both at the class level and at the group or project team level.

- At the class level, Ga may involve
  - Students are given bonus points for answering a question correctly in class.
- At the group or team level, Ga may involve
  - All team members are awarded bonus points for solving a problem correctly in class.

# Think-Group-Share (10 mins)

1. Identify how you would use Gamification during an in-person class. Use the Google slides in the folder. Add additional slides if needed
2. On your return, the team leader should briefly describe two of your approaches.

# References

1. Deterding, S., Dixon, D., Khaled, R., and Nacke, L. (2011). From game design elements to gamefulness: Defining “gamification.” In Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments (MindTrek’11). Association for Computing Machinery, New York, NY, 9–15. <https://doi.org/10.1145/2181037.2181040>.
2. <https://blog.mindresearch.org/blog/game-based-learning-vs-gamification>
3. Darina Dicheva, Christo Dichev, Gennady Agre, and Galia Angelova. 2015. Gamification in education: A systematic mapping study. *Educ. Technol. Soc.* 18, 3 (2015), 75–88.



# Problem-Based Learning

# Outline

- What is Problem-Based Learning?
- Impact on Student Performance
- Using Problem-Based Learning in the classroom
- Think-Group-Share

# What is 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 [1].
- Problem-Based Learning [2]:
  - Helps students become active learners
  - Situates learning in real-world problems, usually ill-structured and open-ended, and makes students responsible for their learning

# Impact on Student Performance

- Problem-Based Learning has the potential to significantly increase student performance in the classroom by
  - a) activating prior knowledge
  - b) elaborating on prior knowledge through discussion
  - c) restructuring of knowledge
  - d) learning in context, and
  - e) engaging in open-ended discussion thereby increasing the student's curiosity

# Using PBL in the Classroom

PBL is used at the group or project team level.

- Team members working on the class project for which they are not familiar with the technology or domain.
- For example, Software Engineering – students creating an application in a domain not familiar to the students. It may require a mentor in the specific domain, e.g., creating an application to model rising sea levels in Miami.

# Think-Group-Share (10 mins)

1. Identify how you would use Problem-Based Learning during an in-person class. Use the Google slides in the folder for your notes. Add additional slides if needed
2. On your return, the team leader should briefly describe two of your approaches.

# References

1. H. G. Schmidt. 1993. Foundations of problem-based learning: Some explanatory notes. *Med. Educ.* 27, 5 (1993), 422–432.
2. Howard S. Barrows and Robyn M. Tamblyn. 1980. *Problem-based Learning: An Approach to Medical Education*. Vol. 1. Springer, New York.

# Social Interaction



# Outline

- What is Social Interaction?
- Instructional Outcomes of Social interaction
- Using Social Interaction in the classroom
- Think-Group-Share

# What is Social Interaction?

- *Social Interaction* in the context of pedagogy is an approach that enhances knowledge acquisition through social activities, such as students establishing meaningful dialogue within student groups and with teachers [1, 2].
- Social Interaction Learning Styles [3]:
  - peer learning (students teaching each other)
  - reciprocal teaching (students become teachers in small sessions)
  - learning by teaching
  - learning by observation, and
  - learning by doing

# Instructional Outcomes of Social Interaction

1. Interaction to enhance elaboration and retention
2. Interaction to support learner control/self-regulation
3. Interaction to increase motivation
4. Interaction for negotiation of understanding
5. Interaction for team building
6. Interaction for discovery

# Instructional Outcomes of Social Interaction cont.

7. Interaction for exploration
8. Interaction for clarification of understanding
9. Interaction for closure
10. Interaction to increase participation
11. Interaction to develop communication
12. Interaction to receive feedback

Wagner [4]

# Using Social Interaction (SI) in the Classroom

SI may occur both at the class level and at the group or project team level.

- At the class level, SI may involve
  - Students introduce themselves to the class and give a fun fact about themselves.
- At the group or team level, SI may involve
  - Allow team members working on the class project to take on different admin roles (TL, NT, TK) for the phases of the project.

# Think-Group-Share (10 mins)

1. Identify how you would use Social Interaction during an in-person class. Use the Google slides in the folder for your notes. Add additional slides if needed
2. On your return, the team leader should briefly describe two of your approaches.

# References

1. Beth Hurst, Randall Wallace, and Sarah B. Nixon. 2013. The impact of social interaction on student learning. *Read. Horiz.* 52, 4 (2013), 375–398.
2. Kamaruzaman Jusoff and Siti Akmar Abu Samah. 2012. Social Interaction Learning Styles. Springer US, Boston, MA, 3101–3104. [https://doi.org/10.1007/978-1-4419-1428-6\\_1785](https://doi.org/10.1007/978-1-4419-1428-6_1785)
3. Sandra Y. Okita. 2012. Social interactions and learning. In *Encyclopedia of the Sciences of Learning*. Springer US, Boston, MA, 3104–3107. [https://doi.org/10.1007/978-1-4419-1428-6\\_1770](https://doi.org/10.1007/978-1-4419-1428-6_1770)
4. Wagner, E. D. (1997). Interactivity: from agents to outcomes. *New Directions for Teaching and Learning*, 71, 19–26.

# Wrap Up



# Final Thoughts

- In this workshop, we reviewed the LESs – *Collaborative Learning, Gamification, Problem-Based Learning and Social Interaction*.
- The LESs should be guided by the LES Integration Model (LESIM).
- It is important to apply LESs in the context of Equity and Inclusion (EI) – upcoming workshop
- At a future workshop, we will review LESs in the context of Online Synchronous Learning Environments (OSLEs)