

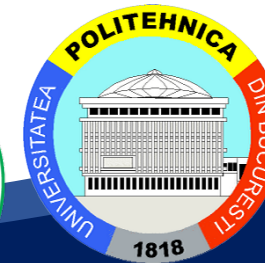


Co-funded by the
Erasmus+ Programme
of the European Union



Learning Experience from Teaching and Learning Methods in Engineering Education: Instructors' Viewpoint

Duangthida Hussadintorn Na Ayutthaya,
Pisut Koomsap,
Rui M. Lima,
Tomasz Nitkiewicz



Curriculum Development
of Master's Degree Program in
Industrial Engineering for Thailand Sustainable Smart Industry

Outline

- 1 MSIE 4.0 Project
- 2 Learning Experience
- 3 The Progression of Teaching & Learning Methods (T&Ls)
- 4 T&Ls on LOVE Grid
- 5 Research Methodology & Survey Participants
- 6 Results and Discussions



MSIE 4.0

SUSTAINABLE SMART INDUSTRY

ACQUISITION
ANALYSIS
EXECUTION



SUSTAINABILITY
STRATEGY
TECHNOLOGY



CO-CREATED
PRODUCT DESIGN



ADVANCED
MANUFACTURING
PROCESSES



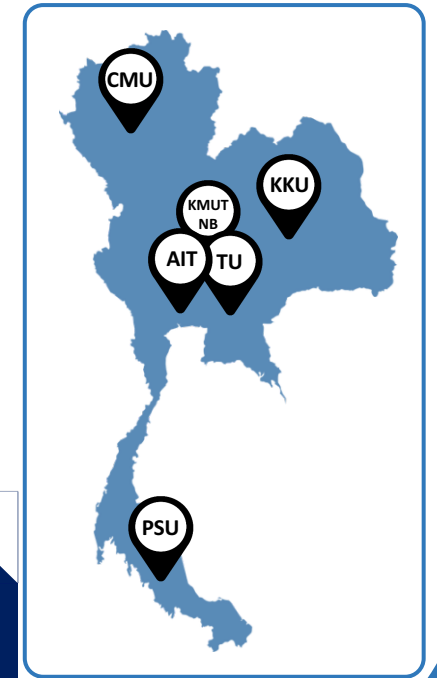
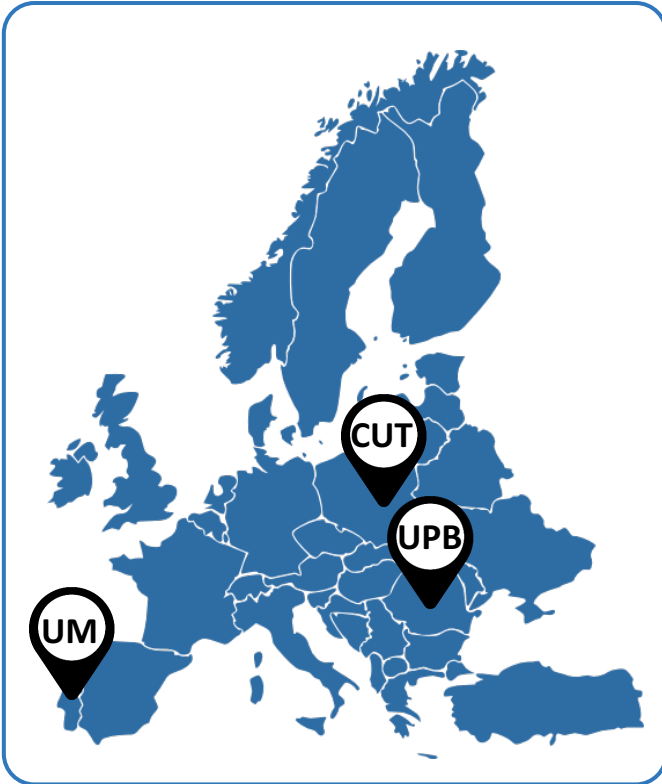
SMART
PRODUCTION

THESIS CONFERENCE

STUDENT-CENTERED
LEARNING

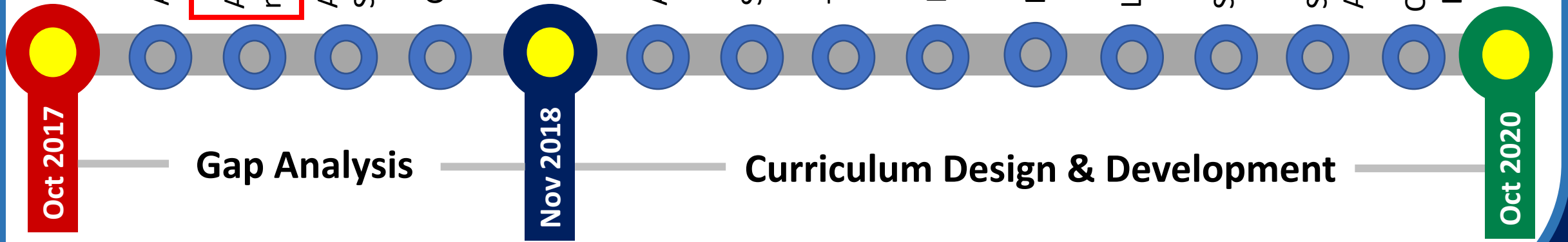
IE COLLOQUIUM

MSIE 4.0 Curriculum



Co-funded by the
Erasmus+ Programme
of the European Union





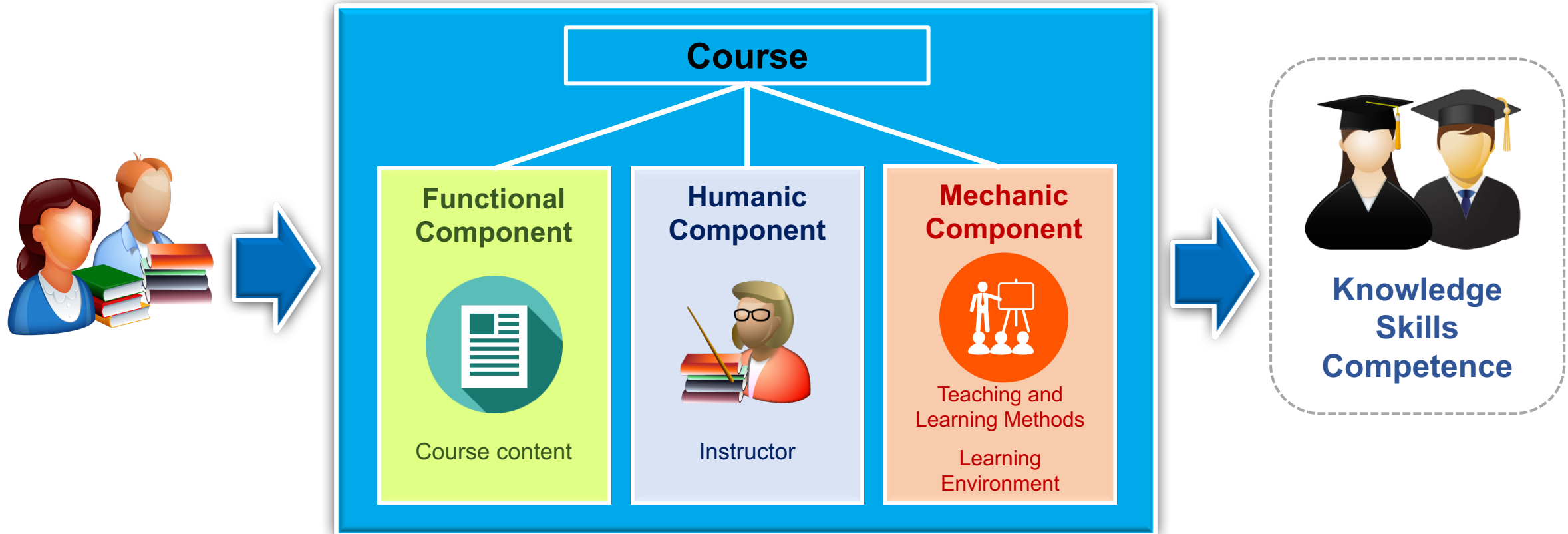
KEY OUTPUTS

- A Modernized MSIE Curriculum
- Syllabuses for All Courses
- Teaching & Learning Materials
- Pilot Teaching
- Platform for Online Learning
- Laboratory with Online Remote Access
- Short-Term Courses for Professionals
- Submission of the curriculum for Accreditation
- Organizing A Conference on Engineering Education

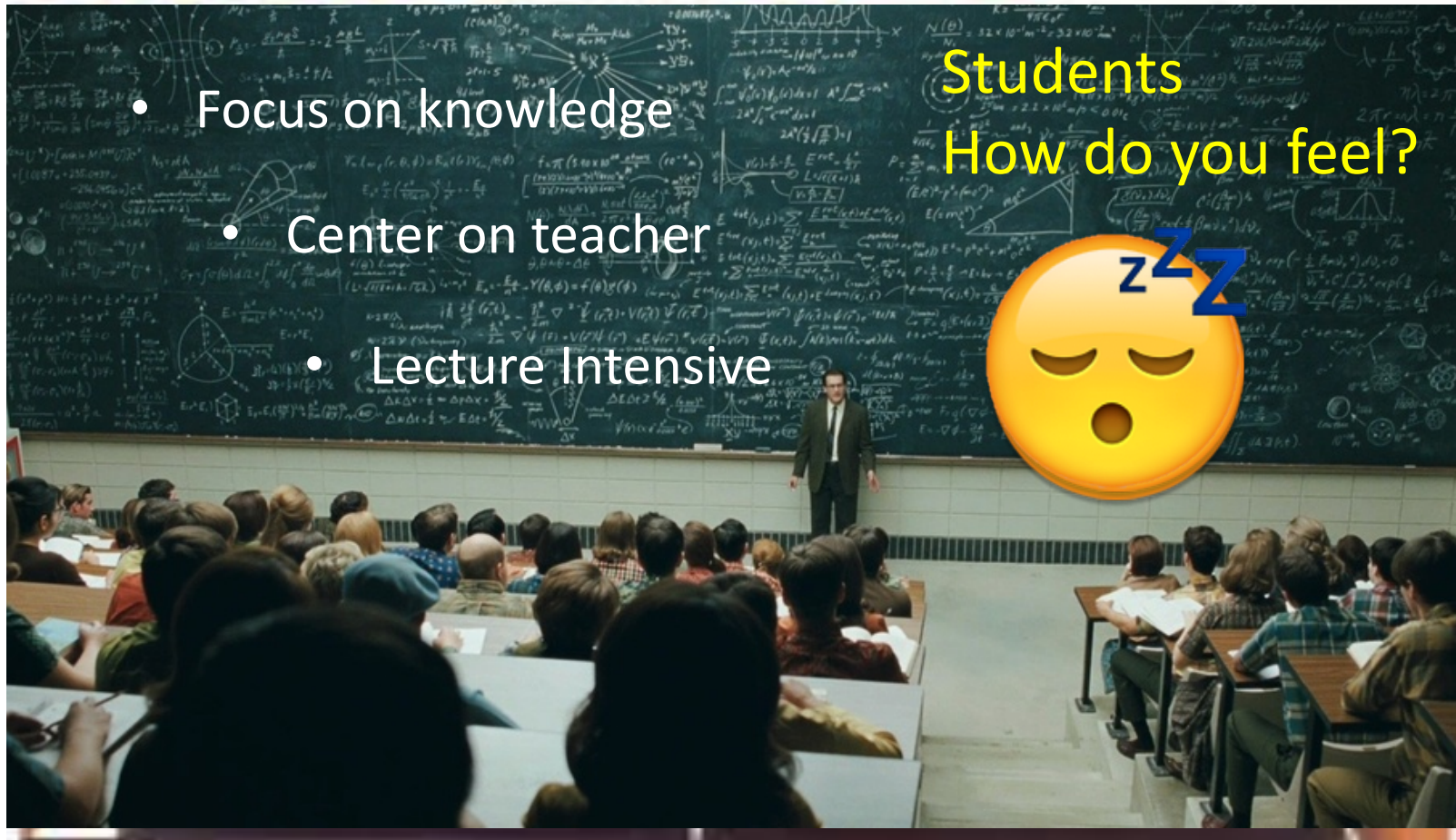
Co-funded by the Erasmus+ Programme of the European Union



Learning Process



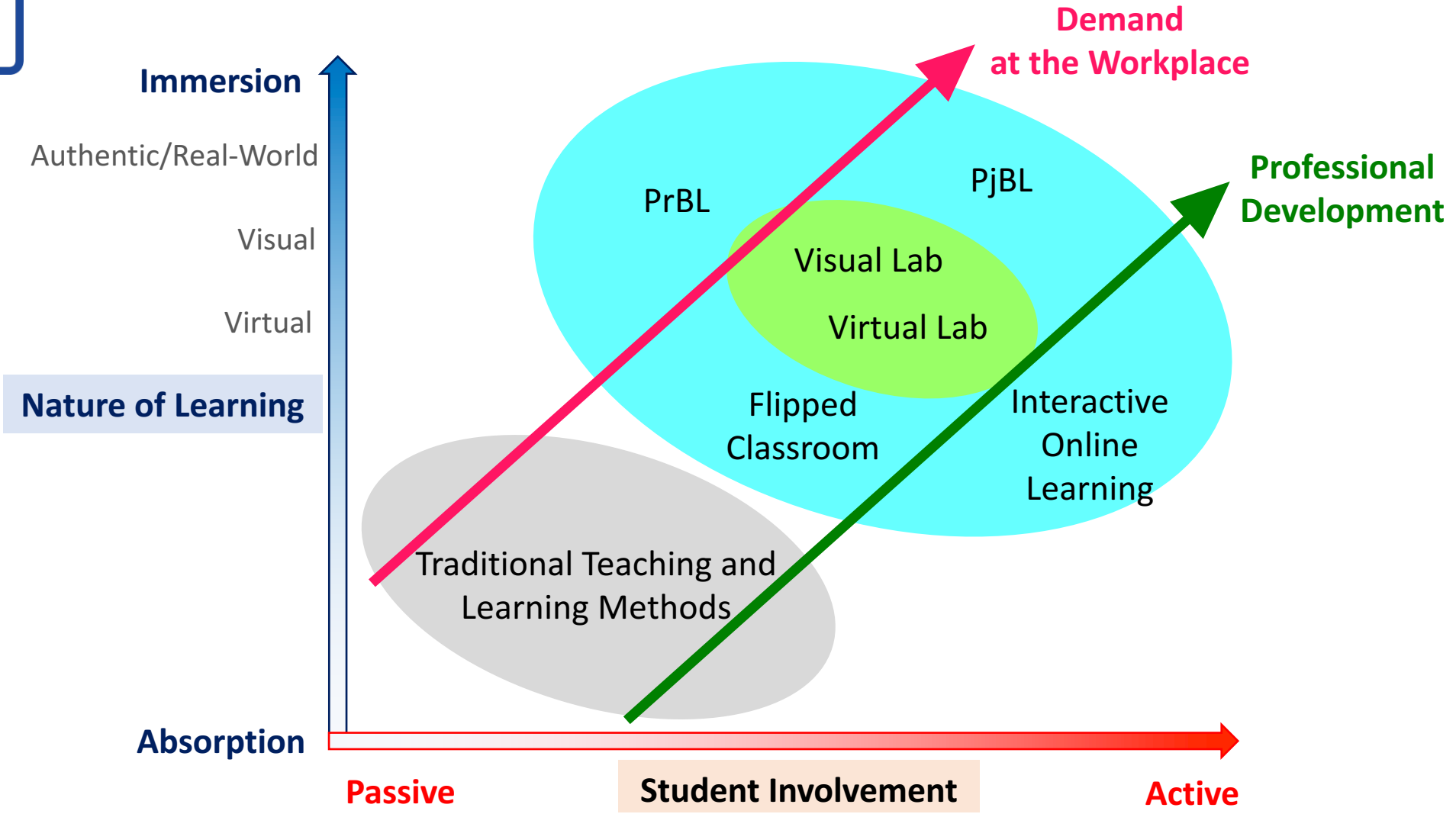
Conventional way of learning



Conventional way of learning



Progress of teaching and learning methods in the view of learning experience



Existing Teaching & Learning Methods

Teaching and Learning Methods	1. Assignments	11. Guided practical exercises	21. Role play
	2. Brainstorming	12. Individual presentation	22. Seminars conducted in class
	3. Case study	13. Integrated or interdisciplinary teaching	23. Showing video material
	4. Class debate	14. Laboratory classes	24. Simulation
	5. Conference	15. Lecture	25. Small group debate
	6. Demonstration with exercising	16. Live lecture from a remote place	26. Virtual laboratory
	7. Discussion	17. Online interactive learning	27. Virtual reality
	8. Field classes, trips and excursion	18. Problem-based learning (PrBL)	28. Workshop
	9. Game-based learning	19. Programmed teaching	
	10. Guided conversation	20. Project-based learning (PjBL)	





Sajjad, S. (2010). Effective teaching methods at higher education level. *Pakistan Journal of Special Education*, 11, 29-43.

Co-funded by the
Erasmus+ Programme
of the European Union

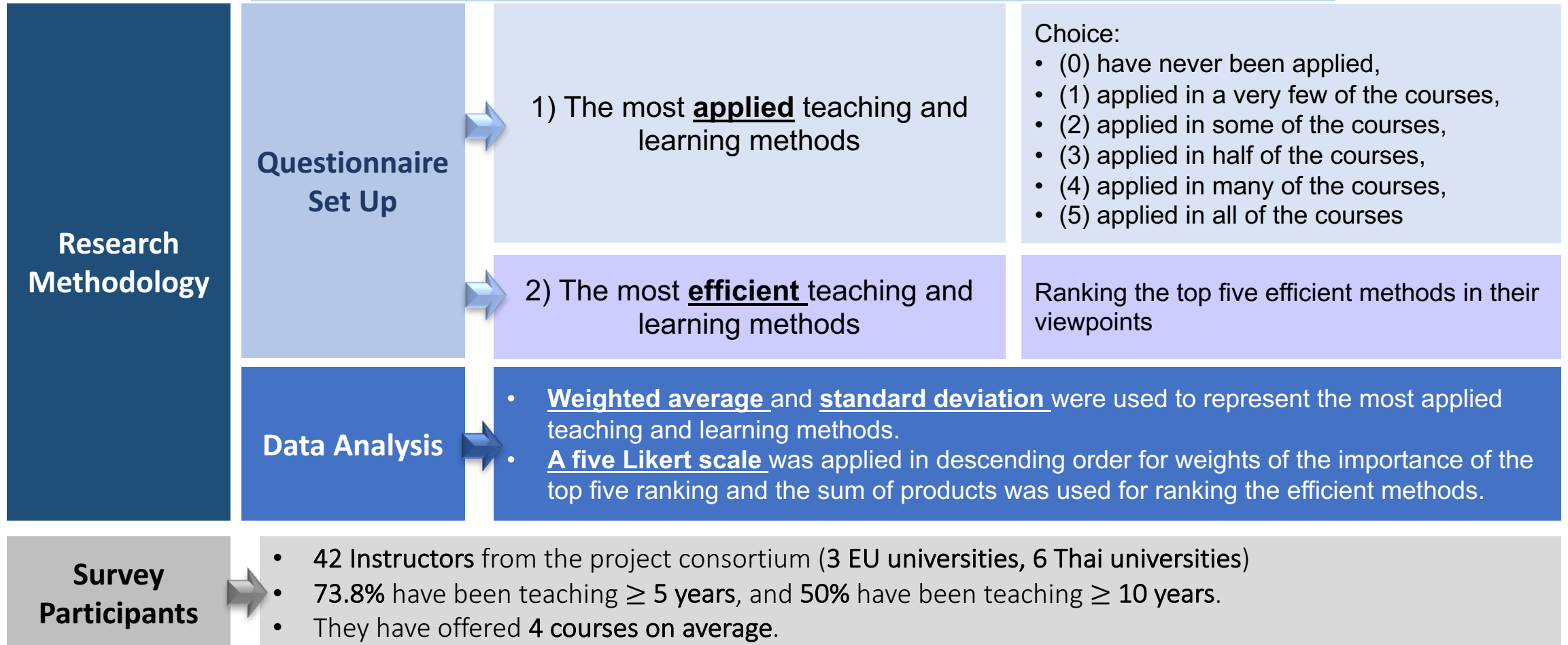


Močinić, S. N. (2012). Active teaching strategies in higher education. *Metodički obzori: časopis za odgojno-obrazovnu teoriju i praksu*, 7(15), 97-105.

Teaching & Learning Methods on LOVE Grid

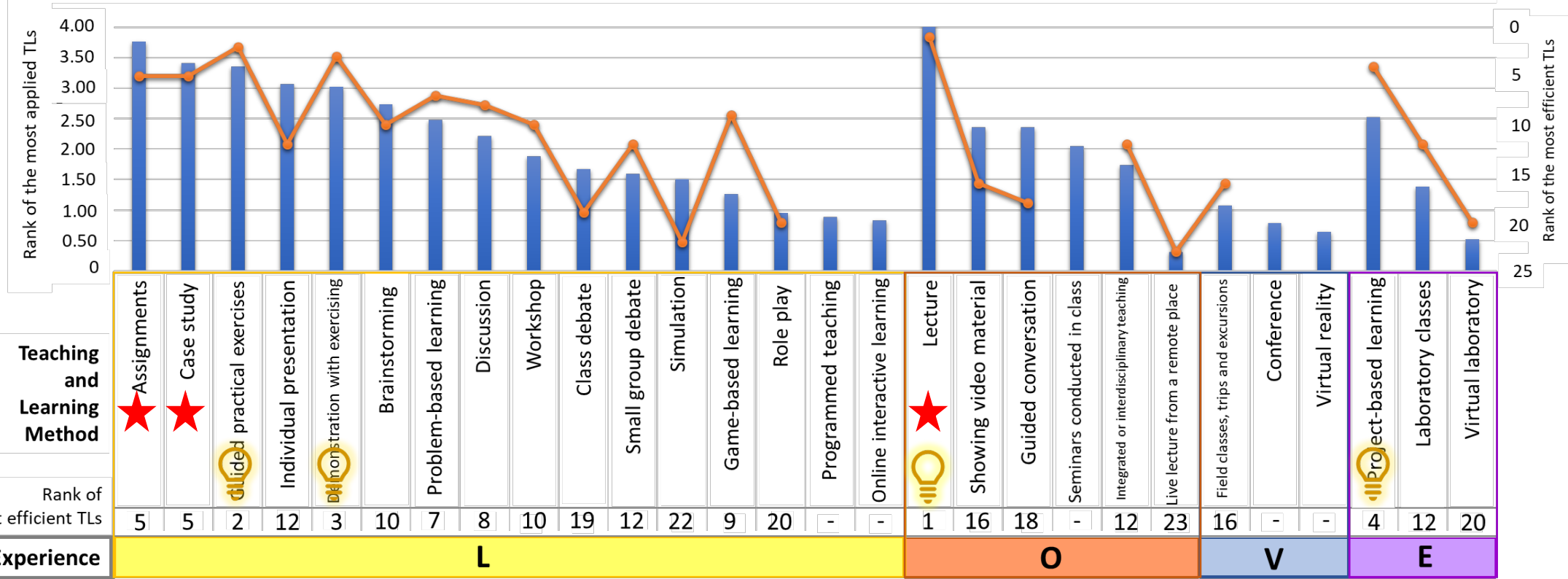
 <p>V-Visiting (passive immersion)</p>	 <p>E-Experimenting (active immersion)</p>																								
<ol style="list-style-type: none"> 1. Field classes, trips and excursions 2. Conference 3. Virtual reality 	<ol style="list-style-type: none"> 1. Project-based learning (PjBL) 2. Laboratory classes 3. Virtual laboratory 																								
 <p>O-Observing (passive absorption)</p>	 <p>L-Learning (active absorption)</p>																								
<ol style="list-style-type: none"> 1. Lecture 2. Guided conversation 3. Integrated or interdisciplinary teaching 4. Showing video material 5. Seminars conducted in classes 6. Live lecture from a remote place 	<table border="0"> <tbody> <tr> <td>1. Discussion</td> <td>13. Guided practical exercises</td> </tr> <tr> <td>2. Demonstration with exercising</td> <td>13. Role play</td> </tr> <tr> <td>3. Class debate</td> <td>14. Assignments</td> </tr> <tr> <td>4. Small groups debate</td> <td>15. Individual presentation</td> </tr> <tr> <td>5. Simulation</td> <td></td> </tr> <tr> <td>6. Problem-based learning (PrBL)</td> <td></td> </tr> <tr> <td>7. Programmed teaching</td> <td></td> </tr> <tr> <td>8. Workshop</td> <td></td> </tr> <tr> <td>9. Brainstorming</td> <td></td> </tr> <tr> <td>10. Case study</td> <td></td> </tr> <tr> <td>11. Online interactive learning</td> <td></td> </tr> <tr> <td>12. Game-based learning</td> <td></td> </tr> </tbody> </table>	1. Discussion	13. Guided practical exercises	2. Demonstration with exercising	13. Role play	3. Class debate	14. Assignments	4. Small groups debate	15. Individual presentation	5. Simulation		6. Problem-based learning (PrBL)		7. Programmed teaching		8. Workshop		9. Brainstorming		10. Case study		11. Online interactive learning		12. Game-based learning	
1. Discussion	13. Guided practical exercises																								
2. Demonstration with exercising	13. Role play																								
3. Class debate	14. Assignments																								
4. Small groups debate	15. Individual presentation																								
5. Simulation																									
6. Problem-based learning (PrBL)																									
7. Programmed teaching																									
8. Workshop																									
9. Brainstorming																									
10. Case study																									
11. Online interactive learning																									
12. Game-based learning																									

Research Methodology & Survey Participants



Results

The comparison between the most applied and the most efficient teaching and learning methods (TLs) in engineering education from instructors' viewpoint



■ Degree of the most applied teaching and learning methods
 — Rank of the most efficient teaching and learning method



Discussions

- There exists strong conformity of application level and efficiency rank.
- **Decreasing potential methods** – observer experience methods
- **Growing potential methods** – experimenter experience methods that are expected to have higher coverage but certainly need strategic, program-oriented development path,
- **Redefining potential methods** – learner experience methods that have outdated approaches and structure and visitor experience methods that have only supportive role in education



Conclusions

- The strong interrelation can be observed between the assessment level of teaching and learning methods and their actual use.
- From their opinion, majority of conventional teaching and learning methods are still efficient.
- The instructors still prefer to transfer knowledge to students and to encourage them participate in the transferring process.
- The approach can also be applied in other disciplines for their instructors to understand and properly make an adjustment to make student learning experience richer.





Acknowledgement

- This work is the outcome of project “Curriculum Development of Master’s Degree Program in Industrial Engineering for Thailand Sustainable Smart Industry (MSIE 4.0)” that has been funded with support from the European Commission (Project Number: 586137-EPP-1-2017-1-TH-EPPKA2-CBHE-JP).





Co-funded by the
Erasmus+ Programme
of the European Union



Thank You

Together We Will Make Our Education Stronger



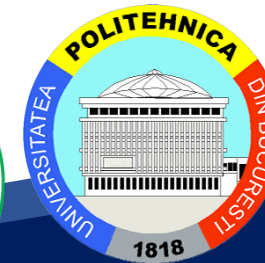
<https://msie4.ait.ac.th/>



@MSIE4Thailand



MSIE 4.0 Channel



Curriculum Development
of Master's Degree Program in
Industrial Engineering for Thailand Sustainable Smart Industry