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A Framework for Self-Organized Learning Environments to Develop Soft Skills in Geographically Distributed and Multicultural Engineering Teams

DOI: 10.1109/EDUCON52537.2022.9766562

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Abstract
This paper presents a novel framework for self-organized learning environments implemented for a virtual summer program conducted jointly by two universities involving fifteen students from various engineering majors and countries. The framework comprises eight elements: competency-centered, challenge-based learning focused on sustainable development goals, self-organizing teams, domain frameworks such as cultural awareness and disciplined agile exploratory lifecycle, self-assessment, competency evaluation, academicians as coaches and consultants, and feedback by appreciation and coaching. The framework assessment consisted of initial and exit surveys. The survey results indicated that the students demonstrated improvements in multicultural perspective, intercultural communication, and working in multicultural teams. © 2022 IEEE.

Author Keywords
Diversity and inclusion in engineering education; Educational innovation; Higher education

Index Keywords
Computer aided instruction, Engineering education, Life cycle, Surveys; Challenge-based learning, Diversity and inclusion in engineering education, Educational innovations, Engineering teams, High educations, Learning environments, Self organized learning, Self-organizing teams, Soft skills, Summer program; Students

References

- Almansour, S.
  The challenges of international collaboration: Perspectives from princess nourah bint abdulrahman university

- Matthews, K.R.W., Yang, E., Lewis, S.W., Vaidyanathan, B.R., Gorman, M.
  International scientific collaborative activities and barriers to them in eight societies
  (2020) Accountability in Research, 27 (8), pp. 477-495.
  pMID: 32515609

- Appiah-Kubi, P., Annan, E.
  A review of a collaborative online international learning

- Baker, W.
  From cultural awareness to intercultural awareness: Culture in elt

- Kinginger, C.
  Telecollaboration and student mobility for language learning
  (2016) New Directions in Telecollaborative Research and Practice: Selected Papers from

- Laborde, F., Juárez, E., Cortés, R.  
  Ambientes de aprendizaje basados en simulaciones controladas: El bloque de ingeniería de software  

  From craftsmen into engineers during undergraduate education  
  J. Mejía, M. Munóz, á. Rocha, A. Pená, and M. Pérez-Cisneros, Eds. Cham: Springer International Publishing

- Juárez, E., Aldeco-Pérez, R., Velázquez, J.  
  Academic approach to transform organisations: One engineer at a time  
  April

- Tobón, S., Prieto, J., Fraile, J.  
  (2010) Secuencias Didácticas: Aprendizaje y Evaluación de Competencias,  
  Pearson

- Johnson, L.F., Smith, R.S., Smythe, J.T., Varon, R.K.  
  Challenge based learning: An approach for our time  
  (2009) New Media Consortium,

- Desa, U.  
  (2016) Transforming Our World: The 2030 Agenda for Sustainable Development,

- Pink, D.H.  
  (2011) Drive: The Surprising Truth about What Motivates Us,  
  Penguin

- Lines, M., Ambler, S.  
  (2019) Choose Your Wow!: A Disciplined Agile Delivery Handbook for Optimizing Your Way of Working (Wow), Ser. Choose Your WoW Series,  
  Independently Published

- Patall, E.A., Steingut, R.R., Vasquez, A.C., Trimble, S.S., Pituch, K.A., Freeman, J.L.  
  Daily autonomy supporting or thwarting and students' motivation and engagement in the high school science classroom  
  Feb.

- Olivares, S., Islas, J., Garín, M., Chapa, J., Hernández, C., Ortega, L.  
  Tec21 Educational Model: Challenges for a transformative experience  
  (2021) Editorial Digital Del Tecnológico de Monterrey,

- Stone, D., Heen, S.  
  (2014) Thanks for the Feedback: The Science and Art of Receiving Feedback Well (Even When It Is off Base, Unfair, Poorly Delivered, and Frankly, You're Not in the Mood). Viking,
Hofstede, G.  
**Dimensionalizing cultures: The hofstede model in context**  

Ries, E.  
**The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses**  
(2011) *Currency*.

Adkins, L.  
Pearson Education India

Laloux, F., Wilber, K.  
Nelson Parker

*Editors*: Jemni M., Kallel I., Akkari A.  
*Publisher*: IEEE Computer Society

*Conference name*: 13th IEEE Global Engineering Education Conference, EDUCON 2022  
*Conference date*: 28 March 2022 through 31 March 2022  
*Conference code*: 179170

*ISSN*: 21659559  
*ISBN*: 9781665444347  
*Language of Original Document*: English  
*Document Type*: Conference Paper  
*Publication Stage*: Final  
*Source*: Scopus

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