



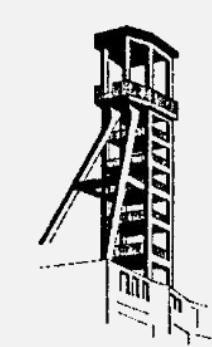
CAPACITY BUILDING AND TRANSFER KNOWLEDGE IN SUSTAINABLE MINING ENGINEERING PRACTICES

Introduction

Building capacity in Mining Engineering is challenging and complex as it demands continuous up-to-date, sustainable practices, appropriate technologies to fulfil the supply and scarcity of raw materials, including the substitution of critical raw materials.

Education and research in Mining Engineering at the University of Porto, Portugal, is committed to contributing to the sustainable supply of mineral resources to society.

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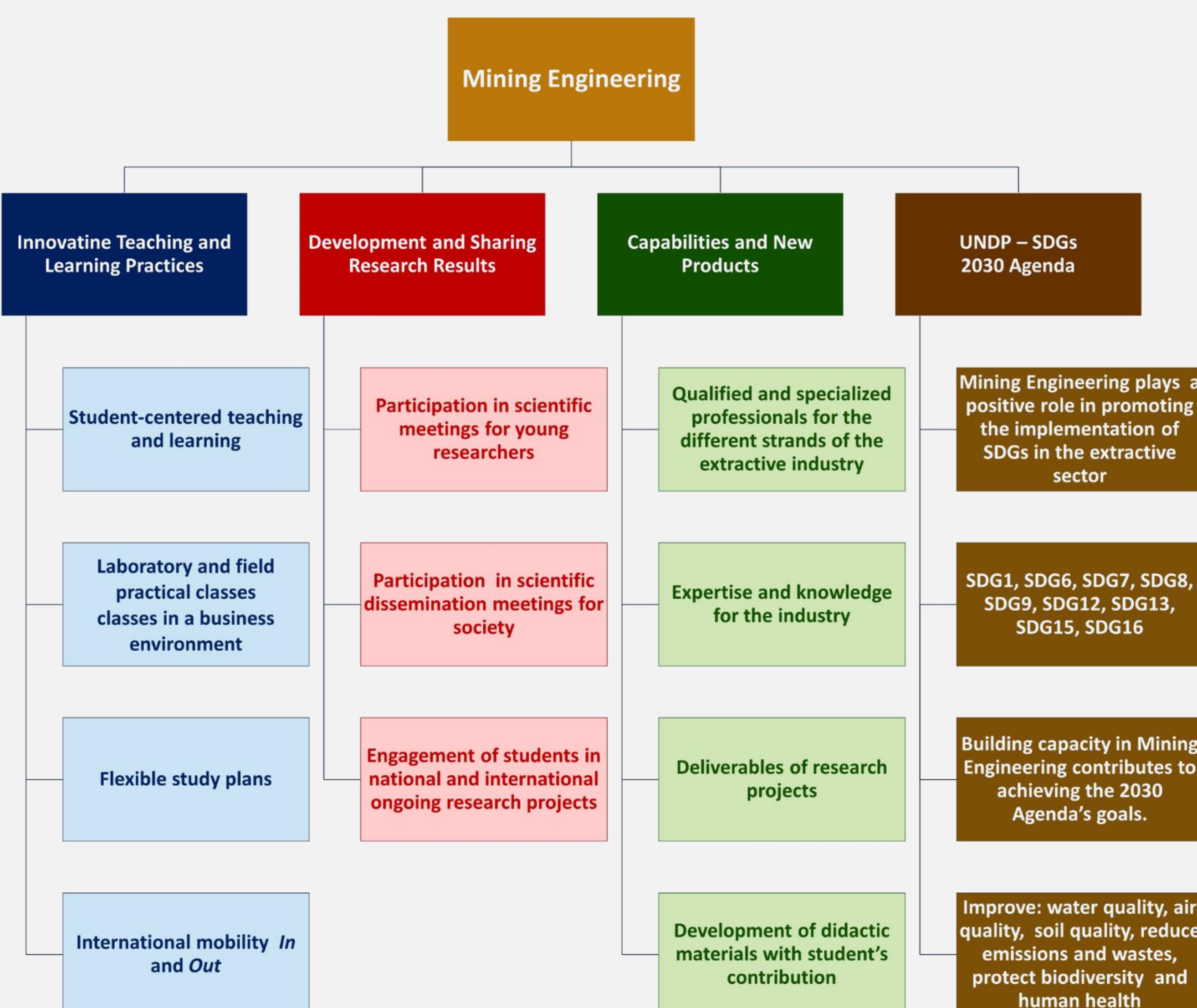
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Methods

Building capacity in Mining Engineering should follow a comprehensive approach that, in the case of the University of Porto, has prioritized the following aspects:

- Innovative experiences in teaching and learning practice;
- Development and sharing of research results;
- Capabilities and new products;
- Pursue the UNDP Sustainable Development Goals following the 2030 agenda.



Results

Innovative Teaching and Learning Practices

- Engagement with challenging situations.
- Students explore, explain, elaborate and evaluate.
- Laboratory skills in a “hands-on” approach: explore, make mistakes, question ideas, and expand knowledge to new levels.
- Competence acquisition through practical field training and short-term integration in business environment.
- Internships and excursions.
- Study plan adaptable to students’ undergraduate degree.
- International, intercultural skills.



Development and Sharing Research Results



- Student projects: IJUP – Young Research Meeting of Porto University.
- Master and PhD research work: DCE – Doctoral Congress in Engineering – Symposium on Mining Engineering and Geo-Resources.
- Nacional and international conferences and workshops.
- Social outreach programmes: European Research Night; National Meeting with Science and Technology; Scientifically Probable.
- Research and Industry related projects: Modeling radionuclides and metals airborne dispersion; PTW; REMINE; SUSMIN; FAME; BioCriticals.

Capabilities and New Products

- Qualified professionals, high employability: Almonty - Minas da Panasqueira; Almina - Minas do Alentejo, S.A.; SOMINCOR, S.A. - Mina de Neves-Corvo; ASSIMAGRA; ANIET.
- Consultancy to private and public sector.
- Start-ups; New products: new processing flowsheet (FAME); Risk assessment studies (ReMine).

UNDP – SDGs 2030 Agenda

- Environmental Sustainability [1,2]: mining impact land, water, climate, flora, fauna people that depend on these resources:



- Social Inclusion [1,2]: impact local communities, economic opportunities, challenges livelihoods, rights, resources.



- Economic Development: local, regional, national impact economic development, growth: leveraged to build infrastructure, technologies, workforce opportunities.



Discussion

Social, Environmental and Economic pillars of sustainability have been addressed within the funded research projects: ERA-MIN (SUSMIN, REMine, BioCritical), and HORIZON2020 (FAME). The extraction of mineral resources will continue to increase to supply society needs.

This trend is forecasted to steadily increase in the future with the Worldwide transitions towards clean energy and electric vehicles. Academia must train mining engineers capable of meeting the technological and social demands to accomplish the SDGs.

References

1. UNEP, United Nations Development Programme. Mapping Mining to the Sustainable Development Goals: An Atlas. White Paper, 2016.
2. Columbia Center on sustainable Investment, MINING and the SDGs a 2020 status update. Omdat Ontwerp, The Netherlands, 2020.