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Bridging Foundations and Innovation: Advancing Education in Dental Science

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Abstract

Objective: This article outlines the collaborative efforts between EIMS H.E.I., Columbia University, and Colorado State University in developing the Bachelor of Science (Honours) in Dental Science at EIMS. The programme integrates Dental Science with Biomedical Engineering and Health IT to address future trends in Dental Education. Building upon the accredited Award in Foundations of Dental Science (120 ECTS/MQF Level 6), the BSc DS adds an additional 60 ECTS, forming a cohesive programme totalling 180 ECTS. Pending accreditation by the Malta Further and Higher Education Authority (MFHEA), the programme aligns with European Qualifications Framework (EQF) standards and leverages advanced digital learning tools, including simulated environments and research-driven curricula. This article highlights the programme's structure, alignment with MFHEA recommendations, and its collaborative academic agreements.

Results: The programme incorporates interdisciplinary components, enabling students to pursue careers in Dental Science, Biomedical Engineering, and Health IT. Collaborations with Global College Malta facilitate seamless progression into a Master's in Health and Social Care Management (MQF/EQF Level 7), while a prospective partnership with Colorado State University establishes a pathway to an online master's programme in biomedical engineering. These collaborations position graduates for leadership roles in clinical practice, research, and technology-driven fields, addressing workforce demands and advancing healthcare innovation.

Conclusion: This collaboration represents a significant advancement in Dental Education, providing students with interdisciplinary training and future educational opportunities.

Keywords: EIMS; MFHEA; Dental science; Biomedical engineering; Health IT

Introduction

The Bachelor of Science (Honours) in Dental Science (BSc DS) at the European Institute of Medical Studies (EIMS) represents a ground-breaking initiative in European Dental Education. Under the visionary leadership of Prof. Andrea Mascolo, this programme bridges Dental Science with Biomedical Engineering and Health IT, addressing the rapidly evolving needs of the global healthcare sector. The BSc DS programme was conceptualized to prepare a new generation of Dental Professionals equipped to excel in clinical practice, research, and technological innovation. It draws significant inspiration from the D-BEST (Dental-Biomedical Engineering Scholars Training) Program at Columbia University, which pioneered the integration of Dental Science, Biomedical Research, and Advanced Technologies. Key principles of the D-BEST Program, such as interdisciplinary collaboration, a strong research foundation, and the use of cutting-edge technologies, have been adapted to create a unique educational framework for the BSc DS. By aligning with international best practices and anticipating workforce and technological demands, the BSc DS programme introduces an innovative curriculum that integrates Dental Science with Biomedical Engineering and Health IT. This approach addresses the emerging needs of the healthcare sector. The programme offers students an interdisciplinary education that equips them to adapt to future trends in dental science and healthcare technology.

Methods

The programme combines the two-year Award in Foundations of Dental Science (120 ECTS/MQF Level 6) with a one-year advanced Bachelor programme (60 ECTS), culminating in a comprehensive 180 ECTS pathway. The foundational course provides a robust curriculum emphasizing core scientific knowledge, while the advanced year focuses on interdisciplinary applications and research. The curriculum was structured to provide students with interdisciplinary training, equipping them with the necessary skills to navigate and contribute to both clinical and research environments. Key topics include anatomy, dental materials, biomedical engineering, health IT, and research methodologies. Feedback from international experts, including Prof. Sunil Wadhwa and Prof. Matt J. Kipper, was instrumental in shaping the programme's content and structure.

Results

EIMS has established an academic agreement with Global College Malta (GCM) to facilitate seamless progression for graduates of the programme. This collaboration ensures students are eligible to pursue postgraduate qualifications, such as a Master's in Health and Social Care Management (MQF/EQF Level 7). Additionally, A future partnership with Colorado State University will establish a pathway for students to continue their studies in an online master's programme in Biomedical Engineering. The programme now fully integrates Dental Science, Biomedical Engineering, and Health IT, allowing students to transition into diverse roles, including clinical practice, research, and technology development [1-10] (Table 1).

Table 1: *Key features and innovation.*

Feature	Description	Real-World Application
Comprehensive Interdisciplinary Curriculum	Combines Dental Science, Biomedical Engineering, and Health IT to address critical workforce gaps and drive technological advancements in healthcare.	Prepares students for leadership roles in clinical innovation and interdisciplinary research.
Advanced Simulated Learning Environments	Employs cutting-edge digital platforms to provide immersive, hands-on learning experiences in safe and controlled simulated settings.	Enables mastery of procedures and critical thinking in a virtual environment before transitioning to clinical settings.
Strong Research Orientation	Prioritizes evidence-based learning and independent research projects, fostering critical thinking and innovation in dental science.	Develops high-level research skills applicable in academic, clinical, and technological domains.
Diverse Career Pathways	Equips students for dynamic roles in research, public health, healthcare technology, and other non-regulated healthcare professions.	Graduates pursue careers in academic institutions, tech companies, and public health organizations.
Collaboration and Progression Opportunities	Enables graduates to access postgraduate opportunities through agreements with institutions like Global College Malta (GCM).	Students seamlessly transition to Master's programs, enhancing their academic and professional trajectories.

Discussion

The Bachelor of Science (Honours) in Dental Science (BSc DS) programme at EIMS represents a pivotal advancement in Dental Education, bridging disciplines such as Dental Science, Biomedical Engineering, and Health IT. By addressing global workforce demands, the programme prepares graduates to excel in clinical practice, research, and healthcare technology. A key aspect of the programme is its alignment with innovative principles drawn from the D-BEST Program at Columbia University. These principles, including interdisciplinary collaboration, evidence-based research, and the integration of advanced technologies, form the foundation of the curriculum, equipping students to contribute to advancements in dental biomaterials, healthcare IT, and biomedical research. Collaborations further enhance the programme's value. A future partnership with Colorado State University will establish a pathway for students to continue their studies in an online master's program in biomedical engineering, broadening their academic and professional opportunities. Additionally, the partnership with Global College Malta offers

seamless progression into a Master's in Health and Social Care Management (MQF/EQF Level 7), where students develop leadership, policy-making, and strategic management skills to address healthcare challenges.

Pending accreditation by the Malta Further and Higher Education Authority (MFHEA), the programme aligns with the European Qualifications Framework (EQF), ensuring its recognition across EU member States and beyond. Accreditation will solidify the programme's credibility, enhancing graduates' academic mobility and employability on a global scale. The programme also benefits from expert contributions. Prof. Sunil Wadhwa's insights into research methodologies and biomedical engineering have strengthened the research components, while Prof. Matt J. Kipper has guided the inclusion of advanced problem-solving and biomedical modules. These contributions ensure that the curriculum meets global academic and technological standards. By combining structured practical training, advanced digital tools, and interdisciplinary education, the BSc DS programme establishes itself as a benchmark in European Dental Education. Graduates are uniquely equipped to lead healthcare innovations, bridging the gap between clinical practices, research, and emerging technologies.

Conclusion

The Bachelor of Science (Honours) in Dental Science (BSc DS) programme at EIMS offers a distinctive and forward-thinking educational model within European dental education. By integrating interdisciplinary elements of Dental Science, Biomedical Engineering, and Health IT, the programme equips graduates with the competencies needed to excel in research, clinical practice, and healthcare innovation. Collaborations with renowned Academics and Institutions, such as Global College Malta and the prospective partnership with Colorado State University, have further strengthened its academic foundation and expanded postgraduate pathways for students. Reflecting broader trends in healthcare and technology integration, the BSc DS programme prepares students to tackle workforce and technological challenges in an increasingly dynamic global landscape. With pending accreditation by the Malta Further and Higher Education Authority (MFHEA), the programme will gain enhanced credibility and global recognition, positioning it as a benchmark in European dental education and a leader in interdisciplinary and innovative training for future healthcare professionals.

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