THE UNIVERSITY OF BUCKINGHAM

Standards for Technology-enhanced and Simulation based Learning

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Version History

Version	Approved by	Revisions made	Date
1.0	FMHS SLT	Established standards for the integration, delivery and quality assurance of technology-enhanced and simulation-based learning within FMHS undergraduate medical curriculum.	2nd April 2025
2.0	Faculty Executive Committee	Document reviewed and transferred to new standard policy template. Terminology, headings and content reviewed for consistency. No substantive changes made to standards, requirements or guidance.	September 2026

1.Purpose

The purpose of this standards document is to provide comprehensive guidance for Unit and Theme Leads on the integration of Technology-Enhanced and Simulation-Based Learning (TESBL) within Phase 1 of the Medical Course at the University of Buckingham.

Drawing on the expertise and operational oversight of the Simulation Based Education Committee, these standards aim to ensure the educational quality, consistency, and appropriate sequencing of TESBL activities across the curriculum. They support the alignment of TESBL with clinical best practice, curriculum outcomes, and faculty development priorities, and promote effective collaboration and sharing of practice across the University of Buckingham and its Local Education Providers (LEPs).

The document provides a structured framework for the development of immersive and effective learning environments that reflect current and emerging best practice in medical education and simulation-based pedagogy. It serves as both a strategic reference point and a practical guide, ensuring that TESBL is integrated consistently, responsibly, and effectively in support of learner development and patient-centred healthcare education.

These standards are underpinned by a commitment to continuous improvement, evidence-informed educational practice, and responsible innovation, ensuring that TESBL remains aligned with academic standards, learner needs, and the evolving requirements of healthcare education.

2. Scope

These standards apply to all Technology-Enhanced and Simulation-Based Learning (TESBL) activities delivered within Phase 1 of the Medical Course at the University of Buckingham.

The scope of this document includes TESBL activities used to support:

- Teaching and learning.
- Clinical and professional skills development.
- Formative and summative assessment.
- Feedback, reflection, and learner development.
- Inter-professional and team-based learning where applicable.

The standards apply to all TESBL modalities and levels of fidelity, including low-, medium-, and high-fidelity simulation, digital and blended learning approaches, and technology-enabled educational tools. They recognise that educational value may be achieved using a range of approaches and do not mandate the use of specific technologies.

While focused on Phase 1, the standards support alignment and continuity with subsequent phases of the medical programme and with TESBL activity delivered in collaboration with LEPs where relevant.

3. Policy statement

Definition of Technology-Enhanced and Simulation-Based Learning

Technology-Enhanced and Simulation-Based Learning (TESBL) refers to the use of digital technologies, simulation methodologies, and structured learning designs to enhance teaching, learning, and assessment in medical education. TESBL may incorporate, where educationally appropriate, e-learning platforms, simulation-based education, virtual, augmented, and mixed reality (VR/AR/MR), artificial intelligence (AI)-enabled tools, haptic technologies, serious gaming, telemedicine simulations, three-dimensional modelling, and learning analytics.
TESBL is used to support the development and assessment of clinical competence, professional behaviours, and clinical reasoning within controlled, supportive, and educationally purposeful environments.

Strategic Significance of Technology-Enhanced and Simulation-Based Learning

TESBL complements traditional medical education approaches, such as lectures, clinical placements, and skills teaching, by providing immersive and interactive learning opportunities that reflect real-world clinical practice.
Through structured experiential learning and facilitated reflection, TESBL supports the development of practical skills, decision-making, communication, teamwork, and professional confidence. It enables learners to practise, refine, and reflect on performance within safe environments, supporting preparedness for clinical settings and contributing to patient safety.
TESBL also supports adaptability and lifelong learning by familiarising students with technologies and practices that are increasingly embedded within modern healthcare systems.

Standards Details

These standards establish a comprehensive and adaptable framework for the integration of TESBL within Phase 1 of the Medical Course. The focus is on the proportionate and purposeful use of educational technologies and simulation methodologies to support effective learning, assessment, and skill development.
TESBL should be designed and implemented in ways that support individual learner development while encouraging collaboration, critical thinking, and adaptability, in line with the needs of modern healthcare practice.

Key Features of Technology-enhanced and Simulation-based Learning

The following features should be considered to enhance the educational value of TESBL:

- Personalised and adaptive learning approaches that respond to learner progress and support identification of learning needs.
- Flexible, self-paced access to educational materials, informed by Universal Design for Learning (UDL) principles.
- Use of simulation and immersive technologies, where appropriate, to support experiential learning in realistic contexts.
- Innovative approaches to assessment and feedback that support reflection and skills development.

- Consideration of scalability and sustainability in relation to cohort size and resource availability.
- Support for interprofessional and collaborative learning.
- Regular review and updating of digital content in line with established quality assurance processes.
- Use of learning analytics, where appropriate, to support learner monitoring and targeted support.

Curriculum Integration and Quality Assurance

The integration of TESBL within the medical curriculum must be strategic and structured and aligned with competency-based education principles. TESBL should complement theoretical learning and contribute to the development of clinical skills, critical thinking, teamwork, and professional competencies by providing hands-on experience in controlled environments that reflect real-world clinical practice.
A robust quality assurance framework is essential to maintain the relevance and effectiveness of TESBL. Continuous evaluation, using student feedback, performance data, learning analytics (where appropriate), and other sources of review, supports curriculum enhancement and ensures that TESBL activities respond to educational and technological developments. Effective resource management and sustainable strategies, supports equitable access to TESBL opportunities.

Curriculum Alignment with Competency-Based Education

TESBL activities must be mapped to the competencies outlined within the University of Buckingham medical curriculum. Each activity should be designed with clear learning outcomes that contribute to the development of both technical and non-technical skills.
TESBL activities should:

- Link TESBL activities to defined learning objectives and competencies.
- Ensure TESBL complements both foundational science and clinical training components.
- Use case-based simulations to support clinical reasoning and decision-making.

Progressive and Adaptive Learning Pathways

TESBL activities should support progression from simple to more complex tasks and scenarios to facilitate incremental skill development. Adaptive approaches may be used to meet individual learner needs and support flexible progression.
Where appropriate, TESBL should:

- Use performance-informed insights to support remediation or enrichment.
- Enable flexible and self-paced learning through digital or virtual simulation approaches.

Quality Assurance and Continuous Improvement

Maintaining standards in TESBL requires structured evaluation mechanisms supported by continuous quality improvement (CQI) processes. Feedback from students, faculty, and peer

reviewers should inform ongoing curriculum enhancement to ensure continued relevance and alignment with evolving educational standards.
Quality assurance processes should include:

- Multi-source feedback mechanisms.
- Regular review and CQI cycles.
- Alignment with relevant accreditation and educational standards.

Resource Optimisation and Scalability

Effective TESBL integration requires coordinated planning of facilities, equipment, and staffing. To support sustainability and scalability, cost-effective and shared solutions should be considered while maintaining educational quality and integrity.
Resource planning should include:

- Shared resource models to maximise access to facilities.
- Integration of virtual simulations where appropriate to reduce resource demands.
- Cost-benefit analysis to support the financial sustainability.

Integration into Assessment Frameworks

TESBL should be embedded within formative and summative assessment frameworks to support holistic evaluation of student competence. Where used for assessment, TESBL approaches should be piloted and supported by appropriate familiarisation.
Simulation-based assessment may be used to assess clinical reasoning, procedural skills, communication, teamwork, and professionalism, with timely and constructive feedback provided to support learner development.

Interdisciplinary and Team-Based Learning

TESBL should foster inter-professional education (IPE) through simulation scenarios that involve students from medicine, nursing, pharmacy, and allied health professions, promoting teamwork and collaborative problem-solving within realistic clinical contexts.
To support interdisciplinary and team-based learning, TESBL activities should include:

- Interdisciplinary simulation scenarios that reflect real-world healthcare environments.
- Role-based learning to strengthen communication, leadership, and shared responsibility.
- Structured debriefing sessions to support reflection on team dynamics, communication, and collaborative decision-making.

Fostering Faculty Development and Continuous Improvement

The effective delivery of TESBL relies on the expertise and ongoing development of educators and technical staff. Institutions should support faculty through structured professional development, mentorship, and access to relevant educational resources.

Continuous Professional Development (CPD)

Faculty members should have access to ongoing training programs that focus on emerging technologies, simulation methodologies, and evolving educational practices. CPD programs

should extend beyond technical skills to include adaptive learning strategies, data-informed education, and advanced simulation design.

- Provide structured CPD workshops focusing on VR/AR integration, AI-enabled tools, and simulation pedagogy.
- Encourage participation in accredited simulation-based education programs.
- Embed reflective and evidence-informed teaching practices within CPD provision.

Mentorship, Coaching, and Peer Learning

Mentorship and coaching are essential to faculty development. Experienced educators should support colleagues in simulation design, debriefing, curriculum integration, and assessment strategies.

- Implement mentoring schemes focused on TESBL design and curriculum integration.
- Encourage peer observation to support reflective practices.
- Establish faculty learning communities to share practice and drive innovation.

Access to Resources and Research

Faculty development is strengthened through access to current research and educational technologies, promoting scholarly and evidence-informed teaching practice.

- Provide access to medical education journals and simulation research databases.
- Support participation in conferences, workshops, and collaborative research.
- Establish a centralized resource hub for teaching materials and simulation scenarios.

Performance Evaluation and Feedback

A structured framework supports continuous improvement in teaching quality. Evaluation should incorporate student feedback, peer review, and self-reflection.

- Implement multi-source feedback systems.
- Use teaching portfolios to support reflection and goal setting.
- Schedule regular performance reviews integrating qualitative and quantitative data.

Promoting Innovation and Collaboration

An environment that encourages innovation and collaboration enables the development of innovative TESBL approaches. Cross-disciplinary projects enhance creativity and educational impact.

- Facilitate interdisciplinary faculty workshops.
- Establish funding opportunities to support TESBL innovation projects.
- Encourage engagement with cross-institutional networks.

Encouraging Innovation within Undergraduate Medical Education

Encouraging innovation within undergraduate medical education supports responsiveness to evolving healthcare demands Integrating emerging technologies, interdisciplinary perspectives,

and evidence-based education enhances engagement, critical thinking, and preparedness for complex clinical environments.

Innovation within TESBL and the wider curriculum should be supported by:

- Encouraging openness to new educational approaches.
- Promoting educational research and scholarship.
- Supporting collaboration between faculty, students, and external partners.
- Using pilot programmes prior to wider implementation.
- Actively involving students in development and evaluation.
- Providing appropriate resources, funding, and protected time.

General Standards for Integrating Technology-Enhanced and Simulation-Based Learning

To ensure the effective, ethical, and sustainable integration of Technology-Enhanced and Simulation-Based Learning (TESBL) within Phase 1 of the Medical Course, the following general standards apply:

- TESBL technologies should be user-friendly, accessible, and interactive.
- Appropriate training should be provided for students and educators.
- Support systems should be in place to assist adaption to innovative technologies.
- TESBL design should support engagement, self-direction, and motivation.
- Adequate infrastructure, funding, and resourcing should be secured.
- TESBL activities should be delivered by skilled educators and technical staff.
- Technologies should enhance clinical skills, knowledge retention, and confidence.
- TESBL should support hands-on learning in controlled environments.
- Innovative technologies should support existing teaching approaches.
- End user involvement should inform development where appropriate.
- TESBL should complement, not replace essential clinical experience.
- All TESBL activities must adhere to data protection, security, and ethical requirements.
- Evidence-informed evaluation should guide TESBL effectiveness.
- TESBL should support interdisciplinary and team-based learning.

Specific Technologies

TESBL may involve a range of educational technologies selected based on educational need and suitability. The following examples illustrate types of technologies that may be used to support TESBL activity; they do not mandate the use of specific platforms or products.

E-Learning Platforms

E-learning platforms may support digital and blended learning by enabling content delivery, learner monitoring, and feedback, while supporting flexible access and self-paced study.

Simulation-Based Education for Clinical Skills Training
Simulation-based education may include task trainers, manikins, standardised patients, and computer-based simulations to support clinical and professional skills development.

Augmented Reality (AR), Mixed Reality (MR), and Virtual Reality (VR)

AR, MR, and VR technologies may be used to support immersive learning, special understanding, procedural training, teamwork, and development of and non-technical skills.

Artificial Intelligence (AI) in Medical Education

AI-enabled educational tools may support personalised learning, adaptive assessment, and feedback and prepare students for engagement in digitally enabled healthcare systems.

4. Responsibility

Responsibility for the review, maintenance, and periodic updating of these standards lies with the Phase 1 and Phase 2 Leads, in collaboration with the Lead/Director of Medical Education and the Technology-Enhanced Learning (TEL) Committee.
Those responsible are expected to:

- Monitor developments in TESBL.
- Ensure alignment with educational frameworks, professional expectations, and institutional priorities.
- Oversee adherence to these standards within the medical programme.

Feedback from faculty involved in TESBL delivery, together with student evaluation data, should inform any revisions to ensure the standards remain current, relevant, and effective.