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Academia Open

Vol. 11 No. 1 (2026): June
DOI: 10.21070/acopen.11.2026.13493

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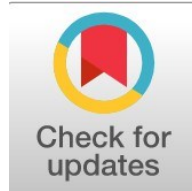
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Gamification Approaches in Undergraduate Histology Learning: Pendekatan Gamifikasi dalam Pembelajaran Histologi pada Tingkat Sarjana

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Abstract

General Background: Histology is a fundamental component of preclinical medical education that requires mastery of microscopic interpretation and integration of structure–function relationships. **Specific Background:** First-year medical students frequently perceive histology as challenging due to high cognitive load, abstract visual content, reliance on memorization, and limited motivation associated with conventional lecture-based teaching. **Knowledge Gap:** Although gamification has been increasingly applied in medical education, there remains limited synthesis focusing specifically on its application, outcomes, and limitations within undergraduate histology learning, particularly regarding standardized evaluation and long-term sustainability. **Aims:** This narrative literature review aims to examine the relevance of gamification in basic histology education, identify commonly used gamification tools, and summarize reported educational outcomes across undergraduate medical curricula. **Results:** The reviewed literature indicates that gamification strategies, including points, badges, leaderboards, interactive quizzes, and digital challenges, are associated with improved learner engagement, motivation, knowledge retention, self-confidence, and active classroom participation across cognitive, affective, and behavioral domains. **Novelty:** This review consolidates evidence on gamification specifically within histology education while simultaneously highlighting methodological limitations, novelty effects, competitive risks, and design heterogeneity reported in existing studies. **Implications:** Carefully designed, theory-driven, and context-adapted gamification frameworks, integrated with digital microscopy and evaluated through longitudinal research, may support more interactive and meaningful histology learning experiences for early-stage medical students.

Highlights:

- ♦ Interactive game-based strategies are consistently associated with higher learner participation and motivation in microscopic science learning.
- ♦ Reported outcomes span cognitive, affective, and behavioral domains, including retention, satisfaction, and active learning behaviors.
- ♦ Design variability and limited long-term evaluation remain key challenges in current implementations.

Keywords : Gamification, Histology Education, Medical Students, Engagement, Preclinical Learning

Pendahuluan

Histologi merupakan salah satu disiplin ilmu dasar kedokteran yang esensial dalam membangun fondasi pengetahuan struktural tubuh manusia sebelum memasuki fase klinis. Mata kuliah ini menuntut mahasiswa untuk menguasai kemampuan interpretasi struktur jaringan secara mikroskopik serta menghubungkan bentuk dan fungsi organ secara mendalam, yang sering menjadi tantangan utama dalam pembelajaran awal pendidikan kedokteran [1], [2].

Kompleksitas visual jaringan serta dominasi metode ceramah konvensional menyebabkan mahasiswa sering bergantung pada hafalan dan merasa kurang termotivasi dalam mempelajari histologi [3], [4]. Dalam konteks tersebut, pendekatan pembelajaran inovatif yang meningkatkan keterlibatan mahasiswa diperlukan.

Gamifikasi, yaitu penggunaan elemen desain permainan dalam konteks non-permainan, telah diperkenalkan sebagai strategi pedagogik yang mampu meningkatkan motivasi internal dan keterlibatan belajar mahasiswa dalam pendidikan kesehatan [5], [6]. Pendekatan ini mengintegrasikan komponen seperti poin, badge, dan papan peringkat untuk menciptakan lingkungan belajar yang lebih menarik dan interaktif [7], [8].

Metode

Metode tinjauan pustaka ini menggunakan pendekatan narrative review dengan prinsip seleksi literatur dari database ilmiah seperti PubMed dan sumber jurnal peer-review lain yang relevan. Kata kunci yang digunakan termasuk “*gamification*”, “*medical education*”, “*histology education*”, “*gamebased learning*”, dan “*student engagement*”. Artikel yang dikaji mencakup studi empiris, review sistematis, dan deskriptif yang membahas gamifikasi dalam pendidikan kedokteran secara umum atau dalam konteks pembelajaran anatomi dan histologi secara khusus.

Hasil dan Pembahasan

A. Tantangan Pembelajaran Histologi

Histologi sering kali menimbulkan beban kognitif tinggi yang berdampak pada retensi pengetahuan dan tingkat keterlibatan mahasiswa dalam proses belajar [11], [12]. Ketidakmampuan untuk menggabungkan konsep teoritis dengan pengalaman praktis (misalnya melalui pengamatan mikroskopis) dapat menurunkan motivasi belajar, terutama pada mahasiswa tahun pertama yang belum sepenuhnya memahami relevansi klinis histologi [13].

B. Konsep Gamifikasi dalam Pendidikan Kedokteran

Gamifikasi dipahami sebagai penggunaan mekanisme permainan dalam konteks pendidikan untuk meningkatkan motivasi dan keterlibatan. Sistem poin, feedback instan, tantangan kompetitif, serta elemen sosial seperti kolaborasi kelompok adalah komponen umum dalam strategi ini [3], [14]. Penggunaan gamifikasi dalam pendidikan telah dikaitkan dengan peningkatan keterlibatan mahasiswa pada level motivasi dan perilaku yang lebih tinggi [15], [16].

C. Bukti Empiris Gamifikasi di Pendidikan Kedokteran

Studi pionir menunjukkan bahwa penggunaan platform game-based seperti Kahoot® dapat meningkatkan keterlibatan dan motivasi belajar mahasiswa dalam pembelajaran histologi dasar, termasuk pada konteks tim dan diskusi [17]. Responden dalam penelitian ini menunjukkan peningkatan motivasi belajar dan persepsi positif terhadap materi setelah kegiatan gamifikasi diterapkan [10].

Meta-review sistematis juga menunjukkan bahwa strategi gamifikasi dalam pendidikan profesi kesehatan dapat meningkatkan penggunaan materi pembelajaran dan, dalam beberapa kasus, hasil belajar mahasiswa [18].

Contoh lain dalam literatur gamifikasi mencakup modul gamified online yang meningkatkan pemahaman konsep klinis serta penilaian keterlibatan mahasiswa di berbagai disiplin kedokteran [8], [19].

D. Dampak Gamifikasi terhadap Outcome Pembelajaran

1) Kognitif

Gamifikasi sering dihubungkan dengan peningkatan penguasaan konten akademik melalui strategi pembelajaran interaktif yang mendukung pengulangan terstruktur dan umpan balik langsung [20]. Gamified e-quizzes, misalnya, telah memperlihatkan efek positif pada retensi jangka pendek dan pemahaman materi kompleks [21].

2) Afektif

Gamifikasi meningkatkan keterlibatan emosional mahasiswa, termasuk kepuasan belajar, minat untuk mengeksplorasi materi lebih dalam, dan keyakinan diri dalam konteks pembelajaran berbasis teknologi [3].

3) Perilaku

Tingkat partisipasi aktif dalam kegiatan pembelajaran meningkat pada mahasiswa yang terlibat dalam aktivitas gamifikasi, baik dalam kelas tatap muka maupun platform digital [22]. Studi juga menunjukkan dampak positif pada kebiasaan belajar jangka panjang dan praktek mandiri siswa.

E. Tantangan dan Keterbatasan

Walaupun banyak bukti mendukung efek positif gamifikasi, beberapa tantangan dilaporkan dalam literatur. Heterogenitas desain dan konteks gamified menyebabkan variasi hasil yang signifikan antara studi. Selain itu, beberapa studi menekankan perlunya desain berbasis teori yang kuat untuk memastikan keberhasilan implementasi yang berkelanjutan [23], [24]. Ada pula risiko efek negatif (misalnya motivasi yang menurun setelah efek kebaruan hilang) yang perlu ditangani dalam strategi pengajaran jangka panjang.

Simpulan

Gamifikasi merupakan pendekatan pedagogik yang menjanjikan untuk meningkatkan keterlibatan, motivasi, dan hasil belajar mahasiswa kedokteran terutama dalam mata kuliah histologi dasar. Dengan mengintegrasikan elemen permainan ke dalam kegiatan pembelajaran, mahasiswa cenderung menunjukkan perilaku belajar yang lebih aktif, level motivasi yang lebih tinggi, serta pemahaman konsep yang lebih baik. Namun, desain yang sistematis dan berbasis teori sangat penting untuk memastikan dampak jangka panjang dan standar evaluasi yang jelas terhadap hasil belajar.

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