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FUNDAMENTAL COMPONENTS OF UNDERGRADUATE EXIT EXAMS: A SYSTEMATIC LITERATURE REVIEW OF THE DEVELOPMENT, ADMINISTRATION, FEEDBACK, AND REMEDIATION

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Abstract

Exit examinations in higher education serve as critical assessments to evaluate students' readiness for professional practice upon graduation. This study systematically reviews how exit exams are designed, administered, and followed up with feedback and remediation, aiming to identify best practices and areas needing improvement. Using the PRISMA methodology, a comprehensive literature search was conducted across databases including PubMed, JSTOR, and Google Scholar. Out of numerous articles screened, 22 studies were selected, covering disciplines such as medicine, pharmacy, aviation, and engineering. The analysis revealed that exit exams are most effective when aligned with curricular content and developed in collaboration with field experts. Key themes emerged around equitable exam administration, emphasizing accessibility for students with disabilities and diverse backgrounds. Post-exam processes such as timely and constructive feedback were found to be essential for student growth, while remediation efforts were most beneficial when focused on learning support

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rather than mere exam repetition. Despite these strengths, recurring challenges include inequitable exam design, insufficient institutional support, and limited access to preparation resources. To address these issues, the study recommends enhanced collaboration between institutions, students, and industry stakeholders; adoption of adaptable exam formats; and the development of robust support systems. Ultimately, exit exams should function not only as summative assessments but as formative tools guiding students toward lifelong learning and professional competence.

Keywords: Exit Exams; Exam Development; Exam Administration; Feedback; Remediation; Higher Education

INTRODUCTION

Exit exams in higher education serve as a pivotal tool for assessing student competency and readiness for professional practice. These exams are widely implemented across disciplines such as medicine, pharmacy, aviation, and engineering, where ensuring graduate proficiency is critical for public safety and workforce standards (Dehury, 2017; Fanjoy et al., 2005). However, the effectiveness of exit exams depends not only on their content but also on their development, administration, feedback mechanisms, and remediation strategies—each of which plays a crucial role in ensuring fairness, validity, and educational impact. Despite their importance, there remains a lack of comprehensive synthesis on how these components collectively influence exam outcomes. This systematic review addresses this gap by examining existing research to identify best practices and challenges in the design and execution of exit exams.

The need for this review arises from the growing emphasis on accountability in higher education, where exit exams are increasingly used to certify graduate competence. While prior studies have explored isolated aspects—such as exam design (Carol & Brown, 1994), proctoring methods (Ackeren et al., 2012), or feedback efficacy (Weir, 2010)—few have integrated these elements into a cohesive analysis. A systematic review is essential to uncover how development (e.g., alignment with learning outcomes), administration (e.g., logistics and fairness), feedback (e.g., timeliness and usefulness), and remediation (e.g., support for at-risk students) interact to shape exam success. Without such an overview, institutions risk implementing inconsistent or inequitable practices that undermine the exams' intended benefits.

Previous research has highlighted both successes and challenges in exit exam processes. For instance, studies show that well-structured exams developed in collaboration with industry stakeholders enhance workforce readiness (Hughes, 2001). However, administrative hurdles—such as inflexible proctoring or culturally biased formats—can disadvantage certain student groups (Baker, 2019; French, 2021). Feedback and remediation, though critical for learning, are often underutilized, with some institutions providing generic results without actionable guidance (Teshome, 2024). These disparities underscore the necessity of a deeper review to identify how institutions can optimize all phases of exit exams, from design to post-exam support.

This review differs from prior work by systematically analyzing the interplay between development, administration, feedback, and remediation. By synthesizing evidence across disciplines, it offers a framework for institutions to enhance the validity, equity, and educational value of exit exams. The findings will inform educators, policymakers, and accrediting bodies seeking to implement exams that not only assess competence but also foster student growth and institutional improvement.

METHODOLOGY

Systematic Review Protocol

This systematic review was conducted in strict accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure methodological rigor, transparency, and reproducibility. The comprehensive search and selection process was designed to capture all relevant literature while maintaining stringent quality standards.

Search Strategy

1. Database Selection:
   - PubMed was selected for its extensive coverage of health professions education literature
   - JSTOR provided comprehensive coverage of social sciences and education research
   - Google Scholar ensured broad capture of interdisciplinary studies
   - Manual reference list searches helped identify seminal works not captured through database searches

2. Search Terms:

The search strategy employed a combination of the following words:

- Core concept terms: "exit examination", "summative assessment", "high-stakes exam"

- Context terms: "higher education", "tertiary education", "university", "college"
- Procedural terms: "exam development", "test administration", "assessment feedback", "remediation program"
- Temporal terms: "pre-exam", "during exam", "post-exam", "exam preparation", "exam follow-up"

Systematic Study Selection Process

The selection process employed a three-phase screening approach with clearly defined decision rules:

1. Initial Identification and Removing Duplicates:
   - Total records identified: 150 articles (PubMed=25, JSTOR=34, Google Scholar=91)
   - Duplicates removed: 50 articles (33% of initial yield)
2. Title/Abstract Screening:
   - Articles screened: 100
   - Excluded: 70 articles with documented reasons:
     Scope exclusions (n=35):
     - 18 focused on K-12 assessments
     - 12 examined non-exit examinations
     - 5 were position papers without empirical data
     Content exclusions (n=20):
     - 9 lacked procedural focus
     - 11 addressed only theoretical aspects
     Methodological exclusions (n=15):
     - 7 qualitative studies without outcome measures
     - 8 case reports without comparative data
3. Full-Text Review and Final Inclusion:
   - Articles assessed: 30
   - Excluded with justification: 8 articles
     Insufficient procedural detail (n=5):
     - 3 lacked description of administration methods
     - 2 omitted feedback/remediation processes
     Population mismatch (n=2):
     - Vocational education studies
     Language barriers (n=1):

- Non-English publication without accessible translation
- Final included studies: 22

Quality Assessment and Data Extraction

1. Quality Appraisal Tools:
   - Modified Newcastle-Ottawa Scale for observational studies
   - Cochrane Risk of Bias Tool for experimental designs
   - Critical Appraisal Skills Programme (CASP) checklist for qualitative studies
2. Data Extraction Framework:

   Developed a standardized form capturing:
   - Study characteristics (design, sample, and context)
   - Exam procedural details (development, administration, feedback, and remediation)
   - Key findings

This rigorous methodology ensured the review captured the most relevant, high-quality evidence while minimizing selection bias and maintaining reproducibility. The multi-stage screening process with explicit exclusion criteria allowed for systematic identification of studies that truly addressed the research questions about exit exam procedures in higher education.

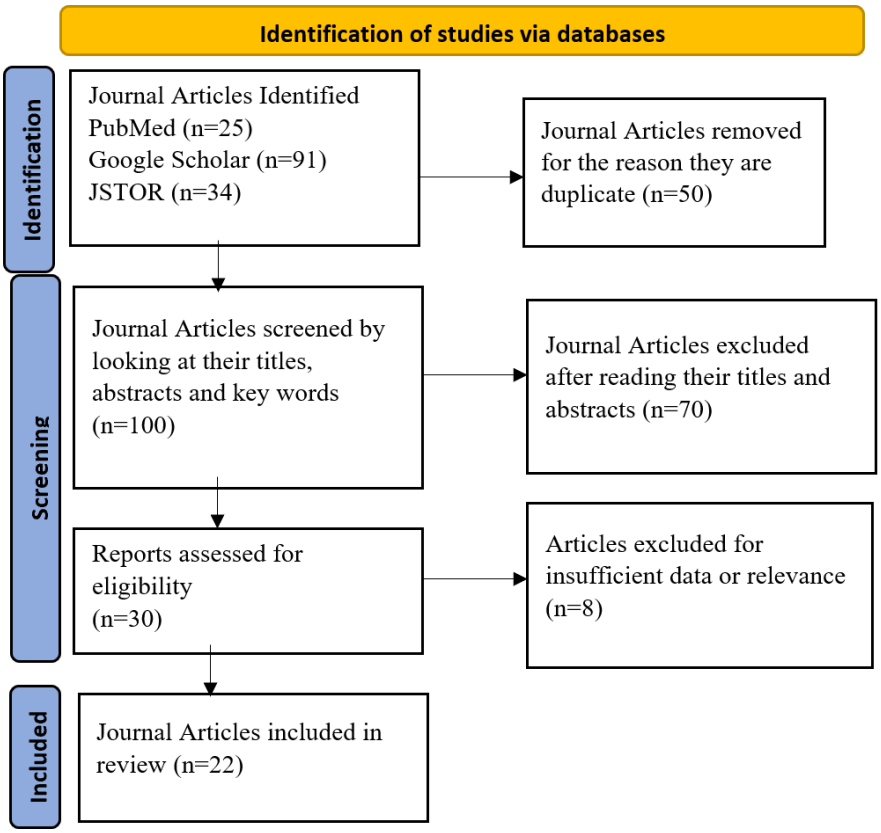


Figure 1. Search strategy

PICO Framework

This systematic review examines exit exam development, administration, feedback, and remediation in higher education using the PICO framework:

1. Population (P): Exam systems across institutions, including:
   - Exam design processes
   - Administration protocols
   - Feedback methods
   - Remediation programs
2. Intervention (I): How these components impact:
   - Student performance and equity
   - Institutional quality assurance
   - Stakeholder satisfaction
3. Comparison (C): Contrasts between:
   - Different development models (faculty-created vs. standardized)
   - Administration formats (in-person vs. digital)
   - Feedback approaches (immediate vs. delayed)
   - Remediation strategies (retakes vs. targeted support)
4. Outcome (O): Evidence-based best practices for:
   - Valid exam design
   - Fair administration
   - Effective feedback
   - Supportive remediation

This structured approach identifies optimal practices while revealing gaps in current research, helping institutions build more effective and equitable exam systems.

RESULTS

The results of the extraction process are presented in a table format, summarizing the key findings from each study. The table includes the following columns: Author and Year, Objective of the Study, Major Findings, Pre-Exam Procedures, During-Exam Procedures, and Post-Exam Procedures.

Table 1. Summary of the extracted information

Author(s) & Year	Objective	Major Findings	Development	Administration	Feedback and Remediation
Ackeren et al. (2012)	Impact of exit exams	Exit exams improve standards	Curriculum alignment	Proctoring	Feedback
Aristeidou et al. (2024) |	Online exams acceptance	Students prefer online exams	Preparation	Online proctoring	Result dissemination
Athiworakun & Adunyarittigun (2022)	Washback effects	Exit exams influence teaching	Communication	Exam format	Remediation
Baker (2019)	Racial equity in higher education	Exit exams may disadvantage minorities	Preparation	Accessibility	Feedback
Benner (2013)	Peer climate and exit exams	Peer climate affects exam outcomes	Preparation	Proctoring	Feedback
Bishop (1999)	Educational efficiency	Exit exams improve efficiency	Curriculum alignment	Proctoring	Feedback
Bracey (2009)	Mandatory exit exams	Exit exams discourage graduation	Preparation	Proctoring	Result dissemination
Carol & Brown (1994)	Exit exam development	Exit exams ensure competency	Preparation	Proctoring	Feedback
Dehury (2017)	Medical exit exams	Exit exams ensure quality	Preparation	Proctoring	Feedback
Fanjoy et al. (2005)	Aviation exit exams	Exit exams certify competency	Preparation	Proctoring	Feedback
French (2021)	Affirmative action	Exit exams may reinforce inequality	Preparation	Accessibility	Feedback
Houchensen (2023)	Culturally relevant exams	Exit exams disadvantage minorities	Preparation	Accessibility	Feedback
Hughes (2001)	University-industry partnerships	Exit exams align with industry needs	Preparation	Proctoring	Feedback
Khan et al. (2023)	Pharmacy exit exams	Exit exams uplift pharmacy practice	Preparation	Proctoring	Feedback
Leigh (2009)	Exit slips in classrooms	Exit exams improve reflection	Preparation	Exam format	Feedback
Merki (2011)	Self-regulated learning	Exit exams improve self-regulation	Preparation	Proctoring	Feedback

Author(s) & Year	Objective	Major Findings	Development	Administration	Feedback and Remediation
Moore et al. (2021)	Predictors of success	Exit exams predict success	Preparation	Proctoring	Feedback
Piopiunik et al. (2013)	Labor-market outcomes	Exit exams improve job prospects	Preparation	Proctoring	Feedback
Siddiqui et al. (2023)	Pharmacy exit exams	Exit exams advance pharmacy practice	Preparation	Proctoring	Feedback
Teshome (2024)	Systematic review	Exit exams improve standards	Preparation	Proctoring	Feedback
University of Munich & Woessmann (2018)	Central exit exams	Exit exams improve outcomes	Preparation	Proctoring	Feedback
Warren & Grodsky (2009)	Harm of exit exams	Exit exams harm failing students	Preparation	Proctoring	Feedback
Weir (2010)	Pretest/posttest assessment	Exit exams improve assessment	Preparation	Proctoring	Feedback

Figure 2 depicts countries of origin of the studies included in the systematic review. The countries are Brazil, Ethiopia, Germany, India, Thailand, United Kingdome, and United States.

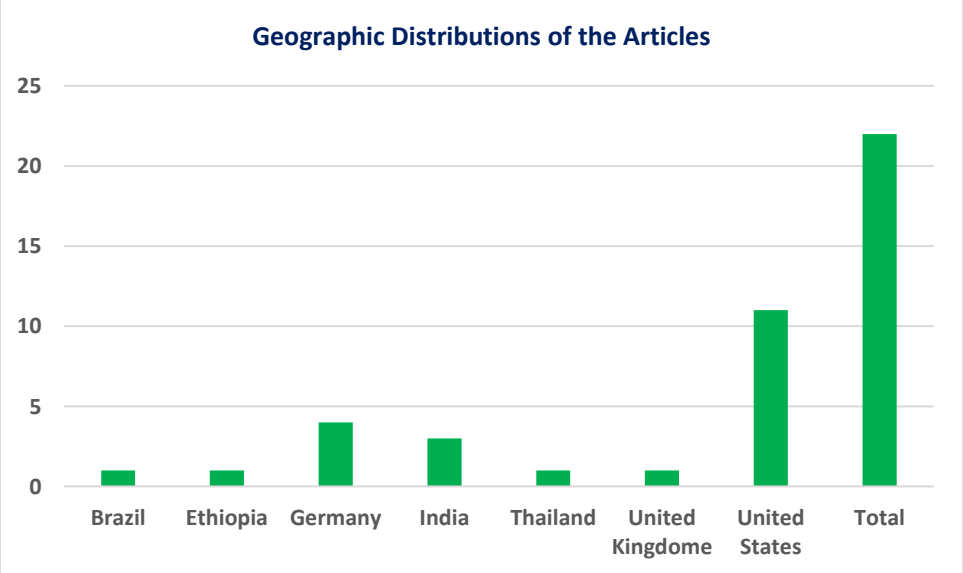


Figure 2. Articles Country wise.

Figure 3 depicts the methodologies used in the studies included in the systematic review. They include: Case studies, modeling, reviews, and survey.

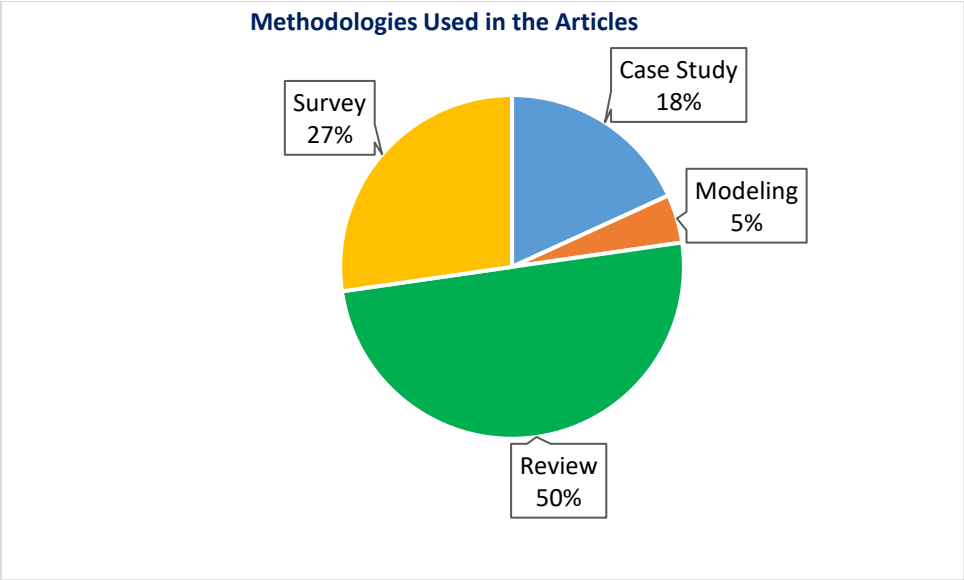


Figure 3. Methodologies utilized in the articles included,

Thematic Analysis

This thematic analysis synthesizes findings from 22 studies on exit exam development, administration, feedback, and remediation. The results reveal key trends, challenges, and best practices across these domains, with critical insights into their impact on student outcomes and institutional effectiveness.

1. Development of Exit Exams

Key Themes:

Curriculum Alignment: Studies like Ackeren et al. (2012) and Bishop (1999) emphasize that exit exams are most effective when aligned with program learning outcomes. However, Baker (2019) and Houchensen (2023) critique the lack of cultural inclusivity in exam design, which may disadvantage minority students.

Stakeholder Involvement: Hughes (2001) highlights the benefits of industry collaboration in exam development, ensuring relevance to workforce needs. Yet, many studies (e.g., Carol & Brown, 1994) focus on faculty-driven design without sufficient student input.

Standardization vs. Flexibility: While centralized exams (University of Munich & Woessmann, 2018) promote consistency, rigid formats may overlook disciplinary nuances (Fanjoy et al., 2005).

Critical Discussion: The development phase often prioritizes psychometric rigor over equity. Institutions must balance standardization with adaptive design to accommodate diverse learners. Future research should explore participatory design models involving students and industry partners.

2. Administration of Exit Exams

Key Themes:

Proctoring Methods: Traditional proctoring dominates (Dehury, 2017; Siddiqui et al., 2023), but online proctoring gains traction (Aristeidou et al., 2024). Concerns about privacy and accessibility persist (French, 2021).

Exam Formats: Fixed-format exams are common, yet Athiworakun & Adunyarittigun (2022) show that varied formats (e.g., case-based assessments) better reflect real-world competency.

Accessibility Gaps: Studies like Baker (2019) and Houchensen (2023) reveal systemic biases in exam administration, disadvantaging students with disabilities or from marginalized backgrounds.

Critical Discussion: The reliance on high-security proctoring may undermine trust and inclusivity. Institutions should pilot hybrid models (e.g., competency-based portfolios) and invest in universal design principles to reduce barriers.

3. Feedback Mechanisms

Key Themes:

Timeliness and Detail: Weir (2010) and Teshome (2024) link timely, specific feedback to improved learning. However, many studies report generic score reports without actionable insights (Bracey, 2009).

Formative vs. Summative: Most exams provide summative feedback only (Merki, 2011), missing opportunities for formative growth. Leigh (2009) advocates for iterative feedback loops (e.g., exit slips) to enhance reflection.

Stakeholder Communication: Dissemination to faculty and institutions is often overlooked, limiting curricular improvements (Piopiunik et al., 2013).

Critical Discussion: Feedback is frequently an afterthought rather than a learning tool. Exit exams should integrate diagnostic feedback (e.g., competency breakdowns) and feed-forward strategies to guide remediation.

4. Remediation Strategies

Key Themes:

Support Gaps: Warren & Grodsky (2009) found that failing students rarely receive targeted support, exacerbating inequities.

Effective Models: Moore et al. (2021) and Khan et al. (2023) highlight successful remediation programs that combine tutoring, self-paced modules, and mentoring.

Structural Barriers: Mandatory retakes (Bracey, 2009) may delay graduation without addressing root causes of poor performance.

Critical Discussion: Remediation is often punitive rather than developmental. Institutions should adopt proactive approaches (e.g., early identification of at-risk students) and differentiated support (e.g., micro-credentialing for specific competencies).

DISCUSSION

The findings of this systematic review illuminate the multifaceted nature of exit exam procedures in higher education, emphasizing their profound impact on student outcomes, institutional accountability, and equity. The thematic analysis revealed critical insights into the interplay between development, administration, feedback, and remediation, highlighting both successes and persistent challenges. Below, we discuss these findings in the context of existing literature and propose actionable recommendations for stakeholders.

Development of Exit Exams

The review underscores the importance of aligning exit exams with curriculum and learning outcomes to ensure their validity and relevance (Ackeren et al., 2012; Bishop, 1999). However, the lack of cultural inclusivity in exam design, as noted by Baker (2019) and Houchensen (2023), raises concerns about systemic biases that disadvantage minority students. While stakeholder involvement, particularly from industry partners, enhances the practical relevance of exams (Hughes, 2001), the exclusion of student voices in the design process remains a significant gap. Future efforts must prioritize participatory design models that incorporate diverse perspectives to mitigate inequities and ensure exams reflect the competencies needed in a globalized workforce.

Administration: Integrity vs. Inclusivity

The administration phase is pivotal in maintaining exam integrity, yet the review reveals tensions between traditional proctoring methods and the need for inclusivity. Online proctoring, though increasingly adopted (Aristeidou et al., 2024), introduces challenges

related to privacy and accessibility (French, 2021). Moreover, rigid exam formats may fail to capture the nuanced competencies required in professional practice (Athiworakun & Adunyarittigun, 2022). Institutions should explore hybrid models that combine the rigor of proctored exams with flexible, competency-based assessments to accommodate diverse learning needs and reduce barriers for marginalized students.

Feedback Mechanisms: From Assessment to Learning

Feedback is often underutilized as a pedagogical tool, with many institutions providing generic, summative results rather than actionable insights (Weir, 2010; Teshome, 2024). The review highlights the transformative potential of formative feedback, such as iterative loops and diagnostic breakdowns (Leigh, 2009), which can foster deeper learning and reflection. To maximize the educational value of exit exams, institutions must shift from a focus on scoring to a learning-oriented approach, ensuring feedback is timely, detailed, and linked to specific competencies.

Remediation Strategies

Remediation programs are frequently reactive and punitive, failing to address the root causes of student struggles (Warren & Grodsky, 2009). Successful models, such as those combining tutoring and mentoring (Moore et al., 2021), demonstrate the benefits of proactive, differentiated support. Institutions should reimagine remediation as an integral part of the learning process, offering targeted interventions that empower students to achieve competency rather than merely pass retakes.

Limitations and Future Directions

While this review provides a comprehensive synthesis of exit exam procedures, it is limited by the predominance of studies from health sciences and STEM fields. Future research should explore disciplinary variations, particularly in humanities and social sciences, and investigate the long-term career impacts of exam practices. Additionally, the rapid evolution of online learning necessitates further studies on the efficacy and equity of digital assessment tools.

CONCLUSION

Exit exams are a powerful mechanism for certifying graduate readiness, but their effectiveness hinges on equitable design, inclusive administration, and pedagogically sound feedback and remediation. By addressing these dimensions holistically, higher education

institutions can transform exit exams from gatekeeping tools into catalysts for student success and lifelong learning. The key takeaway is clear: the future of exit exams lies in prioritizing assessment for learning over assessment of learning, ensuring they serve as bridges to professional achievement rather than barriers.

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