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REVIEW

A Scoping Review of Grading Practices in Health Professions Education

Karmen Chenoweth, Eric Walradth, Alexis Carpenter, Kasey Edwardson *

Department of Clinical Laboratory Sciences, University of Kansas Medical Center, Kansas City, KS 66160, USA

ABSTRACT

Health sciences, or health professions, education aims to develop students into competent professionals. This responsibility necessitates examination of the training and assessment of these future professionals to improve programs and patient care. However, grading can be fraught with issues, leading to misunderstanding, and grading health professions students comes with its own unique challenges, such as preparing students for certification exams and assessing clinical skills. A scoping review of the literature was performed through a search of EBSCO, including Academic Search Premier, APA PsycINFO, Education Abstracts, ERIC, and Vocational and Career Collection databases. Combinations of the terms grading practices, assessment practices, assessment tools, assessment methods, health sciences education, allied health and health professions education were used. There was no restriction on the date of article publication, yielding 328 articles. After removing duplicates and screening titles, abstracts, and full-texts, 34 articles were included. This review revealed a patchwork of literature in which it was difficult to find common themes. Nonetheless, we categorized these studies, finding that they fell into many disparate groups and themes, including theory-based papers emphasizing grading reform, tools for grading student clinical practice, assessment of certain learning modalities, student feedback on the fairness and relevance of assessment practices, and others. The literature on grading practices in health sciences is rather heterogeneous, with some programs unrepresented altogether. Therefore, increased study of this subject is needed, particularly in health professions fields that have little to no published research.

Keywords: Assessment; Evaluation; Grading; Health Professions Education; Health Sciences Education; Grading Reform

*CORRESPONDING AUTHOR:
Kasey Edwardson, Department of Clinical Laboratory Sciences, University of Kansas Medical Center, Kansas City, KS 66160, USA;
Email: kedwardson@kumc.edu

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1. Introduction

Healthcare systems heavily rely on the competence of qualified healthcare professionals to provide safe and effective care to patients. It is therefore expected that healthcare professionals attend education programs that prepare them to provide such care, and these programs are expected to assess the knowledge, skills, and competence of their students. Health professions education programs may assign course grades to didactic, laboratory, and clinical coursework to reflect students' mastery and competence in their given field. However, course grades are based on multiple factors that the educator deems appropriate and not all these truly represent the achievement of learning outcomes [1].

While grading is a crucial tool in determining career readiness, grading practices lack standardization between educators and institutions, and the purpose of grading often depends on the individual. Anderson [2] claims that the purpose of grading is to communicate about student achievement, and this is understood by both students and faculty. Ekstrom et al. [3] reported that faculty perceived the purpose of their grading as a method of providing feedback to, and information about, students. Particularly, they believe grading facilitates improved student performance and that grades are used as a tool by colleges and universities to make decisions, including admissions for advanced degree programs. Students, however, can take that communication and interpret it as an indication of their intellect and even their worth [4]. While it is important to provide feedback on a student's understanding of course materials and growth in class, some grading practices may be counterproductive and take away from learning. Students can be more concerned about getting good grades than truly learning the course material [5–8], and some researchers suggest grading can be a barrier to learning [9, 10]. Additionally, there is a lack of grade standardization across departments, institutions, and even different sections of the same course, making it difficult to interpret the information being communicated through grades [3].

It is commonly accepted that "high grades are 'good' and low grades are "bad' ", yet the true meaning of a grade differs between teachers [2]. In one class, a high grade may demonstrate a student's ability to memorize the material, while in another, a high grade might be assigned simply when an assignment is turned in on time [2]. In some cases, grades may represent more than performance on or completion of class assignments and exams. Course grades are often determined by a variety of factors, including behavioural factors [11–13], which differ by instructor [14–18].

Grading is an important tool in any health sciences education program. Therefore, this scoping review explores the grading and assessment practices commonly used in health professions education and attempts to answer the question: What grading practices are most commonly used and effective in health professions education programs? Reviewing the literature on student assessment in health professions education will help educators understand the various approaches they can use in their courses, as well as determine if there is a grading practice that is most appropriate for health professions students. Such a review will also shed light on where and how to further explore grading in more specific health professions fields, beyond nursing and medical education.

There is an abundance of literature on grading and assessment, but much of it is generalized to the level of education, such as primary, secondary, post-secondary, and graduate education. Each of these academic levels has different concerns and goals for its learners. Primary educators want to ensure that students are developing foundational knowledge in reading, writing, and arithmetic that will prepare them for the next grade. In higher education, however, many courses are specific to the major or profession the learner has chosen. Some fields have added pressure on students to perform well because they have certification or licensing examinations to complete after graduation. Such is the case for health professions students. This review provides an overview of the current grading practices commonly used for assessing student performance in undergraduate health professions education.

2. Materials and Methods

This review used the search, appraisal, synthesis, and analysis (SALSA) [19] framework and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [20] checklist to determine common grading and assessment practices that are used in health professions education, and to identify which of these practices are most effective. This review includes articles that had a central focus on grading or assessment practices in health professions education.

2.1. Search

A literature search was performed using EBSCO, including Academic Search Premier, APA PsycINFO, Education Abstracts, ERIC, and Vocational and Career Collection. Combinations of the terms grading practices, assessment practices, assessment tools, assessment methods, health sciences education, allied health and health professions education were used. There were no restrictions on article type or date of publication.

2.2. Appraisal

To be included in the review, articles had to have a focus on grading and assessment practices for evaluation in health professions education. Articles were excluded from the review if they did not discuss grading practices for student evaluation, were not set in higher education, or were not on undergraduate health professions education. Articles on medical education were excluded unless they focused on undergraduate medical education, because graduate and undergraduate education are often assessed differently. Similarly, international studies were included if they were focused on undergraduate settings or preclinical education. Articles that were not in English or not translated into English were excluded.

Abstracts were first screened for inclusion and exclusion criteria, followed by a screening of the full texts. Agreement on inclusion had to be made between at least two of the authors for an abstract to move to full-text screening, and for full-texts to be included in the review. Any disagreement was discussed by the four authors to determine a consensus on the inclusion or exclusion of an article. Covidence was used to manage the title, abstract, and full-text reviews.

2.3. Synthesis and Analysis

Articles that were determined to meet the inclusion criteria after the full-text screening were further reviewed by the authors. The authors took notes on the articles, identifying the focus, question, or tool presented in each. Preliminary themes were identified, discussed, and agreed upon. Articles were assigned to the themes, which were divided among the authors to synthesize and analyse. After the authors individually synthesized and analysed their assigned themes, the four authors discussed the findings and their implications. **Figure 1** outlines the number of articles screened, included, and excluded at each step of the search, appraisal, and synthesis and analysis steps.

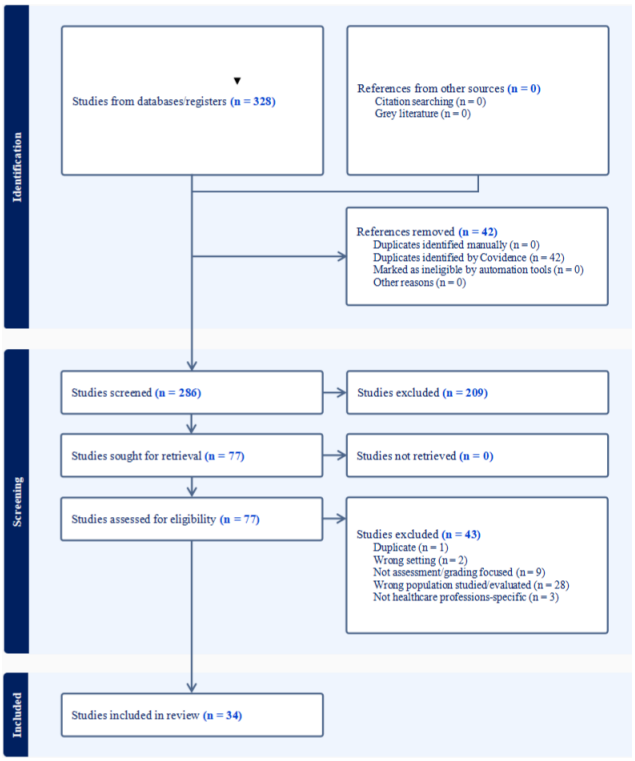

Figure 1. PRISMA Flowchart of the review process.

3. Results

The search yielded 328 articles, 42 of which were duplicates. The final review included 34 articles. This review began as an exploration of grading practices in health professions. However, the literature search yielded articles that discussed tools used to grade learners, how to grade learners' clinical practice, and general considerations for assessment in health professions education. It is evident from the resulting articles that the sentiment on grading varies between institutions, professions, and faculty, as do the grading practices utilized. Through this scoping review, we found several important practices and theories on grading and assessment in health professions education. **Table A1** summarizes the articles included in this study.

3.1. Grading and Assessment

Although assessment and grading are not the same, they are related and several of the articles in this review discussed

them simultaneously. Assessment, as it pertains to student evaluation, is remarkably similar to grading, often involving grading a student's ability to regurgitate knowledge or objectively assigning a grade based on observation of the student's workflow through a practicum. However, the term assessment can also be used to evaluate learning modalities, learning programs, instructor-learner feedback, and curriculum, among others. The literature in this review explored these assessment themes, while also providing insight into grading concerns and practices in health professions education. We will note that oftentimes these terms are used interchangeably within the literature. When discussing these papers, we will use the terminology that the authors use.

3.1.1. Assessment of Learning Modalities

The literature presented various learning modalities that can be used in health professions education instead of traditional lecture-style lessons and discussed evidence of their effectiveness. Team-based learning (TBL) and problem-based learning (PBL) were two modalities suggested. Through a systematic literature review on TBL in health professions education, Reimschisel et al.[21] found that most often learners preferred TBL to lecture-style learning. Learners felt they gained more insight from the active group discussion compared to what they would have received while in a lecture format. Seven percent of the studies discussed even reported higher attendance in TBL environments compared to lecture-style environments. Learners were the most discontented with the peer assessment that is part of the TBL modality. When comparing exam scores between the two learning modalities, students involved in TBL had higher test scores specific to their program. They scored either the same as or higher on midterms and final exams compared to lecture-based learners.

Similarly, Kelley et al.[22] explored diverting from the traditional lecture model used previously within a pharmacy program and using PBL. During the first seven years of the PBL program, the instructor found that although students benefited from the PBL style of learning, they still struggled to answer open-ended questions. In year eight of the program, the instructor made changes to the curriculum after working with an instructional designer. This redesign offered two new goals to the PBL design. The two goals for students were to document group-related thought processes during the collaboration for case study resolution and then to allow each student to reflect on their own ability to problem solve throughout the process. It was felt that this type of curriculum offered the students more structure and encouraged engagement with peers and feedback from the instructor.

Another learning modality presented was competency-based education (CBE), which is based on outcomes and the skills a learner can perform. Nagai et al.[23] found that supervisors reported professional communication, clinical decision-making skills, and engagement in professional development in nurses who were CBE-educated compared to those who were objective-based educated. However, despite this, CBE-educated nurses were reported to have weaker clinical skills[23].

3.1.2. Student Assessment of Education and Curriculum

Health professions education programs utilize various assessments to prepare students and determine their career readiness. The literature explored student perspectives on the appropriateness of assessments and curricula. Masava et al.[24] evaluated the impact of a nursing administration module in low-income African nursing programs to determine if the assessment was effective, while Mugimu and Mugisha[25] evaluated a new curriculum implemented in a Medical Technology Laboratory program in Uganda. Masava et al.[24] reported that 39% (n = 14) of respondents felt that the nursing administration module did not adequately prepare them for a real-world scenario. Additionally, 65% (n = 23) felt incompetent when they had to integrate classroom content into real-life practice. The majority of respondents (n = 28; 77%) stated that they valued the learning activities that were assessed but 86% (n = 31) felt the written assessments did not equate to what the real-world experience offered. The authors concluded that written tests and direct observation used for student assessment were not relevant to the clinical environment, did not follow best practices, and were outdated. Conversely, Mugimu and Mugisha[25] reported that the program was following the standards for setting assessment tools and that their students were achieving the curriculum objectives. For the eight-year period evaluated, 2000–2007, the average passing rate for each class of students was 74% satisfactory performance and an indicator of high learning outcomes when compared to the curriculum objectives. Furthermore, during the implementation period of the curriculum, Mugimu and Mugisha[25] reported that

learners felt curriculum guidelines were being followed and that assessment strategies were appropriately aligned with curriculum elements and of high quality.

Student assessment of education and program curriculum was also studied by D'Amato-Palumbo et al.[26]. They viewed assessment through the lens of using various assessments, such as capstone projects and portfolios, to reflect programmatic performance. Additionally, they found that students who participated in programmatic assessment contributed to program improvement[26].

3.1.3. Instructor-Learner Feedback and Assessment of Students

Few of the articles included in this review covered overall methods of assessing students. However, Oermann et al.[27] reported on a survey of nursing faculty that provided some insight into how nursing programs assessed cognitive and affective domains. They found that written assignments and case studies are commonly used for assessing both cognitive and affective domains. Similarly, Giri and Stewart[28] reported from a systematic review that multiple-choice questions were the most common tool used to assess theoretical knowledge in medical, dental, and nursing education. They found that short-answer questions, modified essays, and oral examinations were also used[28]. Additionally, nursing faculty reported commonly using projects, care plans, faculty-designed tests, standardized tests, and self-assessments to assess the cognitive domain. Mugimu and Mugisha[25] also reported the use of written and oral exams and observations to assess students. Despite using multiple tools to assess student learning, Oermann et al.[27] found that student grades are most impacted by tests and papers. Furthermore, the types of assessments used and the practice of grading may vary based on the instructor's conception of assessment[29].

The reviewed articles presented a handful of tools used for student assessment, including the Australian Clinical Performance Assessment Tool (CPAT)[30], the Objective Structured Clinical Examination (OSCE)[31], and the Lasater Clinical Judgment Rubric (LGJR)[32]. While the Australian CPAT was validated to assess interprofessional skills across disciplines, and the application of the OSCE has been identified in several health professions, other assessment tools were discipline-specific. The LGJR was applied in a study with nursing students[32] and other tools, such as the Student Practice Evaluation Form-Revised (SPEF-R), the Assessment of Physiotherapy Practice (APP), and the Competency Assessment in Speech Pathology (COMPASS), were used specifically for the assessment of occupational therapy, physiotherapy, and speech pathology students[33]. Despite the recognition of validated tools, the creation of new tools, such as the workplace learning inventory[34], and study-specific or institution-specific assessment methods were common[31, 32].

More commonly discussed than specific assessment tools or grading approaches was the use of formative and summative assessment and their impact on student learning. Mugimu and Mugisha[25] explained that formative assessment often does not get graded and is more focused on generating feedback for the students. Summative assessment, on the other hand, generates a mark or grade. Both forms of assessment serve as feedback to the student and should aid in their learning and development. However, some of the literature suggests that feedback could be improved. For example, Brits et al.[35] found a lack of formal feedback to the students, which is an important function in improving patient care. The findings from their focus group suggested that formal feedback sessions would be of benefit to students and could happen post-assessment.

Formative assessment has gained favourable attention from health professions educators, as one paper included in this review suggested that increased high-stakes, or summative, assessments have not increased the quality and safety of patient care[36]. On the other hand, some forms of formative assessment also have their drawbacks. Competency-based assessment is prevalent throughout medical and health professions education, but this approach may have some unintended consequences. Eva et al.[36] expressed that students can pass a competency-based assessment, but that these assessment tools do not consider external factors that may arise in live healthcare environments. Furthermore, they reported that articles on assessment have dichotomized summative and formative assessments. They suggest that summative evaluations do not provide formative guidance and can thus be detrimental to the students' knowledge and practice ability. Similarly, Brits et al.[35] found that teaching and learning coordinators felt that summative assessments should be limited because one measurement is a poor indicator of competence and assessment may not be standard in all classes. One of the most concerning issues, though, is that assessment and clinical practice are assumed to be linked. This assumption

does not always come with evidence of reliability and validity, and so educators may be using flawed assessments to estimate clinical practice ability.

3.2. Grading Concerns

The articles in this review highlighted four main concerns or needs, including the need for standardization, improving the quality of assessments, grade inflation, and calls for grading practice reform.

3.2.1. Grading Definitions and Standardization

Several of the articles exposed the differences in how educators define grades. For example, Brits et al.[35] held focus group interviews with teaching and learning coordinators of an undergraduate medical program in South Africa. They found that competence was assessed as receiving a mark of 50% or higher, but that participants were not sure of what that 50% means. Participants recommended that further clarification of what 50% means should be made and that educators should blueprint their assessments to provide content validity. Donaldson and Gray[37] found in a literature review that the definition of grading ranged from a single event or assignment to overall marks. The lack of standardization was echoed in another scoping review by Gordon et al. that looked at how clinical reasoning is assessed in health professions education[38]. However, during their review, they found that various health professions define and conceptualize clinical reasoning differently[38]. Therefore, more explicit criteria and definitions of grades are needed[35, 37, 38].

3.2.2. Quality of Assessments

There was a consensus among the articles that grades assigned need to adequately reflect students' learning and competence, which can be achieved through high-quality assessments. Del Prato and Bankert[39] suggested that the effectiveness of grading practices is rarely addressed in the literature. Furthermore, Boulet and Durning[40] stressed the importance of high-quality assessments that align with competency-based education, highlighting that valid assessments are crucial for meeting educational learning outcomes.

Oermann et al.[27, 41] found through a national survey of nursing educators that standardized tests and multiple reviewers are used to ensure fair and consistent assessments of students. They also reported that nursing faculty often received formal training on evaluation. Despite these measures to ensure reliable and valid assessments, the findings of the survey underscored the variability in grading practices, and the authors advocate for standardized criteria to enhance assessment validity[27, 41]. While nursing educators may receive formal training on student evaluation, Mugimu and Mugisha[25] explained that other health professions educators do not have the basic skills to develop appropriate assessment tools. Masava et al.[24] similarly addressed the challenges posed by inconsistent grading practices in health professions education, particularly as educational environments rapidly change. Collectively, the reviewed articles argue that grading needs to accurately reflect student performance and that educators need to ensure the validity of assessments to maintain the credibility and effectiveness of health professions education.

3.2.3. Grade Inflation and Grade Reform

The phenomenon of grade inflation in health professions education was a recurring theme across the reviewed articles, and several articles discussed the relationship between grade inflation and the quality of assessments[40, 42, 43]. Authors were particularly concerned about how grade inflation may undermine educational standards and the preparedness of graduates. Grade inflation may be a result of institutional and external factors, faculty experience, faculty-student relationships, and grading tools as influences on grade inflation[37, 39]. However, several articles emphasized that grade inflation is related to the quality of assessments and grading practices[24, 27, 36, 40–43].

The reviewed articles suggested that rigorous and high-quality assessment programs need to accurately measure student competencies to mitigate unreliable grades, and that current grading practices may contribute to grade inflation. Uijtdehaage et al.[43] explored the implications of grade inflation on the validity of assessments, arguing that inflated grades may distort the true measure of student abilities and competencies. This sentiment was echoed by Roberts et al.[42], who examined the complexities of reforming assessment practices to mitigate grade inflation, indicating that existing grading systems might not adequately reflect student performance and mastery of skills.

Additionally, Oermann et al.[27, 41] provided evidence from national surveys in nursing education that indicates significant variations in grading practices that could con-

tribute to grade inflation. These surveys called for more standardized and transparent grading criteria to maintain the integrity of academic evaluations in nursing education. Furthermore, Masava et al.[24] discussed how inconsistent assessment practices contribute to grade inflation, which can impact the credibility and quality of health professions education.

The validity and diversity of grading practices may not be the only contributing factor to grade inflation. The training of faculty on how to assess students may also increase grade inflation, as faculty might not be using valid and reliable assessments[27, 41]. Similarly, Del Prato and Bankert[39] found in a scoping review of grading practices in nursing education that many faculty are afraid to fail students because they do not want to face grievances or poor evaluations. The issue of grade inflation is not unique to American health professions programs, as Mugimu and Mugisha[25] highlighted similar challenges in Ugandan institutions. Therefore, a lack of standardization and inconsistent grading practices are widespread issues, which may lead to inflated grades that do not accurately represent student competencies. To combat grade inflation and ensure standardization and consistency in grading practices, much of the literature called for grade reform[24, 25, 27, 40–43].

3.3. Recommendations for Reform

Several of the papers included in this review provided recommendations on ways that grading and assessment practices in health sciences education can be improved. This includes arguments on what should be measured in health sciences education, arguments on how to reform grading and assessment practices, and how various tools and techniques can be utilized to improve practices, such as new technological assessment methods, cognitive diagnostic modelling, polarity thinking, and programmatic assessment. The authors cited in the following section recognized the limitations of current grading and assessment practices and offered a review of their recommendations on how to improve the practice.

3.3.1. Recommended Practice Changes

The reviewed literature suggested programmatic assessment, with continuous, longitudinal assessment and multiple assessment formats (e.g., workplace-based assessment), as an approach to assessment reform and acknowledged the complexity of reforming assessment systems[42, 43]. Uijtdehaage and Schuwirth[43] explained that programmatic assessment has three fundamental aspects—meaningful triangulation across assessment tools, proportionality of decision making, and diversity of quality assurance processes—and can be broken down into four sequential stages using Kane's validity framework: (1) scoring, (2) generalization, (3) extrapolation, and (4) implication. They further explained the importance of building a coherent and plausible argument using evidence from each of these stages. The authors believe this flexible approach to assessment validity provides justice to a complex, multifaceted process like programmatic assessment.

Roberts et al.[42] used a critical realist approach to evaluate assessment in medical education with the goal of addressing the complexity of conditions that influence reforming assessment systems. They identified four themes regarding assessment practice implementation. These included promoting student engagement and agency, orienting validity frameworks to argumentative validity, developing assessment tasks within an integrated framework, and consistently applying and using a shared approach to assessment[42]. The authors argue that a critical realist approach can help educators reflect, implement, and evaluate assessment practice reforms and can help identify how innovative practices, such as programmatic assessment, work across multiple contexts, how the practice works, and which aspects work for whom.

Boulet and Durning argue that assessment practices can be improved by moving toward more longitudinal, programmatic delivery methods, implementing technological improvements in simulation and scoring, and performing additional rigorous studies to support the validity of scores[40].

3.3.2. Recommended Models

In the review by Collares[44], the author introduces the use of cognitive diagnostic modelling in healthcare professions education and discusses the implications of this assessment technique for competency-based curricula and programmatic assessment. Cognitive diagnostic modelling, or diagnostic classification modelling, uses discrete or categorical measurements to measure large numbers of latent variables that are generally dichotomous or polytomous[44]. This model differs from the traditional response theory model that establishes a formal relationship between the examinee's ability level and their probability of success and instead es-

timates the relationship between the examinee's cognitive attributes and those required to solve test items [44]. Any item can represent more than one latent variable with cognitive diagnostic modelling, unlike previous psychometric paradigms, allowing multidimensionality, which is a desirable trait of assessment tools. When applied to healthcare education, the cognitive diagnostic model's strengths include inductive reasoning item evaluation for the educators and inclusion of feedback in test results for the students. Drawbacks of this technique include increased computational times, implicit assumptions of the model need to be critically analysed, and careful analysis of student feedback of the domain or conduct [44].

Govaerts et al. [45] argue for the use of the Polarity Thinking™ model to address the multiple recurring tensions in assessment programs. They argue that traditional "fix-the-problem" solutions are generally inadequate to address the tensions felt when trying to address multiple recurring tensions in assessment programs – such as fulfilling formative and summative assessments, being effective and efficient, and meeting the needs of learners and institutions. The Polarity Thinking model centres around the core principle that the assessment tensions being debated by the healthcare professions education community do not represent problems that can be solved, but rather are polarities that need to be managed [45]. By reframing problems as polarities (i.e., values interdependent and both needed to achieve a goal), this allows healthcare educators to manage increasingly complex issues around assessment reform and adapt to the rapidly changing demands of learners and organizations [45].

3.4. Trends and Innovations in Assessment

The COVID-19 pandemic and advancements in technology and artificial intelligence (AI) have facilitated changes in higher education, including how we assess learning.

Giri and Stewart [28] found through a systematic literature review that assessments of theoretical knowledge were done online during the COVID-19 pandemic. While practical skills assessments were primarily conducted through online formats, in-person and hybrid skills assessments were also used [28]. Many health professions programs implemented the virtual OSCE, though hands-on skills could not be assessed with this approach [28, 46]. While there were some positive outcomes using the virtual OSCE, educators and students question if it is an appropriate replacement for assessing physical examination and other hands-on skills [28, 46].

As the COVID-19 pandemic led to an increase in online and hybrid assessment approaches, advancements in AI capabilities have similarly begun to reshape assessment in health professions education. Educators remain apprehensive about the use of AI in education and there is speculation that it will decrease students' learning. However, the potential application of AI in scoring student work and providing feedback to students has been acknowledged. AI can be used to improve efficiency and create assessments that are more tailored to the student [47].

Although new technology may bring about new challenges, it can also be used to make the process of assessment easier for educators. As discussed by Boulet and Durning, assessments need to be constantly updated to remain relevant to clinical practice; however, making these updates can be time and resource-intensive and thus they advocate for the use of technology (e.g., simulation-based assessment) to make the process more efficient and effective [40]

Another trend may be seen with the assessment of self-directed learning (SDL), which requires the student to be active in their learning. Health sciences programs utilize SDL to promote life-long learning that is crucial in maintaining their clinical knowledge over time, which translates into competent patient care [48]. While the implementation of SDL varies between programs and institutions, the assessment of SDL is often accomplished through student surveys and knowledge exams [48].

4. Discussion

This scoping review revealed that the current research surrounding grading and assessment practices in health professions education is extremely heterogeneous. We found it difficult to identify thematic throughlines within the papers included, which was telling of the nature of this research. Nonetheless, we feel that this review and its included papers have important implications for educators in the health sciences as well as educational researchers.

4.1. Types of Literature

Many types of papers have the potential to help us understand grading practices; however, we expected that our

search would primarily yield papers that surveyed how instructors are grading students and if those grades aligned with other measurements of student success. In other words, we were hoping to uncover what grading practices are being used and if they are achieving their intended purposes. However, this type of broad research study was only represented in a small fraction of the papers that we reviewed. We categorized 20.5% of the papers as text and opinion, which represents a great pool of information from which to draw ideas and future study. 32.3% of the papers were scoping or systematic reviews, which synthesized information on a variety of typically narrow topics, such as grade inflation in certain programs or techniques such as team-based learning. This left a little less than half (47.2%) of the studies as various forms of primary research. Qualitative studies were more prevalent than quantitative studies. Of the primary research studies, most were limited to one or a few institutions and one or a few degree programs and focused on the study of a particular technique, tool, or intervention. We believe there are substantial opportunities to expand this body of work, particularly through broad quantitative primary research.

4.2. Unifying Major Themes

As previously described, the literature in this space is highly variable, which makes it challenging to identify and define major themes. Despite the variability, there were concepts and concerns that emerged in many of the papers. Literature included in this review can generally be categorized into one or several of these five main themes:

1. Concerns about or study of grade reliability, grade inflation, and standardization [36, 37, 39].
2. How to evaluate complex competencies such as clinical judgement [31, 32, 38, 40].
3. Understanding student's and/or educators' perceptions of grading practices or grading practices [24–27, 29, 41, 49].
4. Determining which techniques, tools, and philosophies are best for improving assessment or learning as evidenced through assessment [21–23, 30, 33, 34, 43–45, 48, 50–53].
5. Reform of grading and assessment practice and/or emerging trends and technologies [28, 35, 42, 46, 47, 54].

The emergence of these major themes gives us some insight into what is on the minds of health professions educators and researchers. First, educators are concerned that grades are not doing what they are intended to do, which is, for many educators, providing a reliable and fair measure of competence for acting as an entry-level healthcare provider. There are several reasons for this concern, with one of the major concerns being that grade inflation is making it such that grades do not separate those who will ultimately make a successful health practitioner from those who will not.

Next, health professions educators often struggle with how to grade more intangible or abstract concepts. Health professionals are often trained to be more quantitative in nature and grading things that are more nebulous, such as clinical judgement, communications, and teamwork, can introduce discomfort. The preponderance of literature in this area suggests that educators are looking for more tools and resources on how to make this grading more objective and fairer.

The literature in the third theme is what we primarily expected to find in our search, that is, how health educators are actually grading. Interestingly, this also tended to be paired with investigations of educator and student perceptions on how they assess/were assessed. While student perceptions should not be taken as the sole measure of assessment validity, student buy-in is an important factor in student motivation and performance. Collectively, these studies suggest that grading practices are shaped not only by pedagogical goals but also by the perceived fairness, transparency, and consistency of the assessment process.

Most of the literature reviewed fit into our fourth major theme, which primarily comprised the development and/or study of a particular tool or technique that could be used to assess or where assessment was used to evaluate a teaching technique or tool. Several of these focused on widely used modes of assessment, such as OSCEs, while others focused on a tool or practice implemented in a particular program or institution. While these studies ranged from very broad to quite narrow, they all emphasized the role of structured and evaluated assessments in health professions programs. Many highlighted the importance of validity, reliability, and feasibility. Although some tools were context-specific and not readily generalizable, they offered practical insights that could inform assessment in other settings.

Finally, the last category focused on reform, emerging methods and new technologies. As health professions pro-

grams and very likely their accrediting bodies are interested in continuous improvement, it is perhaps not surprising that a significant effort has been expended on working to improve grading and assessment systems. It has been shown that student-to-faculty ratios are increasing worldwide [55]. We anticipate that technology that increases grading efficiency will become more of an area of active research in the future.

4.3. Areas of Disagreement or Non-Consensus

While most of the literature reviewed was unified by several themes discussed in the previous section, that is not to say that there is a strong body of evidence that supports one particular practice, tool, or technique as being a solution to the types of issues raised. The goal of healthcare education is to equip students with the knowledge and skills they will need to be effective practitioners in their field. This goal remains the same across institutions and nations, yet there is little consensus on the best way to grade and assess students in a way that directly demonstrates their future success as healthcare professionals. Techniques such as team-based learning, formative vs. summative assessment, and learner/instructor feedback were cited as successful learning tools across multiple papers, but a consensus on the most effective learning and assessment tools cannot be identified within the results of this review.

Additionally, theorists on this topic have proposed that novel schematics of assessment and grading practices could be more effective in evaluating students' competence, such as cognitive diagnostic modelling, polarity thinking, and programmatic assessment. While these models address the inadequacies identified in traditional grading and assessment approaches, implementation outcome studies need to be conducted to prove their claims of success.

Differences in the value of formative vs. summative assessment are commonly discussed when evaluating grading and assessment practices. While both forms of assessment serve as feedback to students, focus groups and surveys from learners indicate that formative feedback from educators in a formal manner is valuable to learners, which summative assessment cannot fully provide. The dichotomy of summative and formative assessment that has developed can be problematic. This is particularly apparent in health science education, where assessment and clinical practices are assumed to be linked, but this assumption is unreliable and can produce flawed conclusions of clinical competence.

There is also disagreement on the incorporation of new technologies into grading and assessment, with some literature suggesting using AI tools to improve efficiency of grading while others highlight the new challenges that such technology brings.

4.4. Implications for Educators

Health professions educators hoping to find a comprehensive study which includes best practices in grading and assessment are likely to be disappointed, but this is not to say that there isn't a wealth of high-quality information available with which to improve specific practices. A best one-size-fits-all grading practice is not likely to emerge even with broader and more thorough study. While the major goal of all health professions programs is to graduate competent entry-level practitioners, the wide variety of programs encompassed by this general definition and their specific professional and accreditation requirements means that by necessity there will be significant variety in grading and assessment. The literature included here may, however, improve knowledge needed to implement a certain technique that may be appropriate in a specific program; it may also generate ideas on how to implement your own tool or practice. By keeping the focus on quality grading and assessment, we can improve health professions programs for all stakeholders.

4.5. Future Research and Limitations

A key takeaway from our review is that there is still much work to be done on this topic, and thus, we will devote significant attention to areas that we see as having the most potential for future research. We also note that there are several limitations of the studies included and therefore there are limitations to the conclusions that we can draw from our review.

4.5.1. Expand Representation of Health Professions in Grading Practices Research

The most obvious route for future studies that could improve knowledge of grading practices in the health professions is to expand survey, interview, and observational studies to include multiple institutions and multiple degree programs. Of the studies included, several were limited to one institution and one program, while others included mul-

tiple degree programs at one institution [24, 25, 35, 49–52]. Only one of the included studies was conducted nationally, but was limited to nursing degree programs [27, 41]. To understand grading practices in the health professions collectively, expansion upon these studies and addition of more studies that include a broad assortment of institutions and degree programs is needed.

4.5.2. Increased Study of Grading Practices in Allied Health Programs

Another clear insufficiency in the body of research is that there is little research including certain degree programs. For example, only one study included in this review was focused on medical laboratory students [25]. Other similar undergraduate degree programs for which it is difficult to find information on this topic include respiratory therapy, sonography, dietetics, cytotechnology and others. While nurses and physicians do indeed comprise a substantial segment of healthcare employment, estimates suggest that 60% of the healthcare workforce may be employed in an allied health field [56]. These professionals play significant roles in providing care to patients as well as providing essential information used to diagnose and treat patients. For this reason, knowledge about how they are trained and assessed is essential to improving programs and ultimately patient care.

4.5.3. Increased Study of Currently Available Grading Tools

Another common theme in the papers included in this review was the call for increased study of grading and assessment tools. Several studies centred on the development of new tools used to aid in grading. Two papers focused on the development of tools to grade clinical practice [50, 54]. It is not surprising that our search uncovered tools that focused on grading practice, as this area can be problematic due to inconsistencies between assessors and subjectivity. However, there appears to be limited follow-up of these tools to determine if intended outcomes are being met. Future research could follow the use and outcomes of these tools over time and could be expanded to include multiple institutions.

4.5.4. Adaptation of Currently Available Grading Tools and Development of New Tools

Another avenue of future work could be to adapt currently available assessment tools. For example, the tools developed by Way [53] and Annesley et al. [50] could be used as models for developing grading tools for clinical practice of students in other healthcare fields. However, tools can be adapted from fields outside of healthcare as well. Plack et al. [52] called for adapting existing assessment tools for systems-based thinking to better fit healthcare education. Grading tools could also be improved using existing models, as argued by Collares [44], who suggested that cognitive diagnostic modelling should be used to develop and improve assessment tools. Other authors from papers included in our review advocate for increased development of grading tools to mitigate problems. Donaldson and Gray [37] suggest that grading tools such as rubrics may help reduce grade inflation but caution that careful study of these tools is warranted.

4.5.5. CBE, New Formats, and AI Incorporation

Health professions education has changed, and will continue to change, over the years. The COVID-19 pandemic was a facilitator in shifting how course content is delivered and how student learning, particularly in health professions, is assessed. Competency in health professions is often dependent on practical skills acquisition and hands-on skills performance. The transition of learning to online and hybrid formats demanded health professions programs to implement fully online assessments of theoretical knowledge, and even practical skills [28]. Although the virtual OSCE was used by many programs, it could not assess the hands-on skills that health professionals need to master. Therefore, it is imperative that health professions educators consider how to adequately assess hands-on skills if programs continue in online formats.

AI has been integrated into our daily lives for many years, but the advances in its application and utility have led to increased attention. In health professions education, it is important for us to reflect on how AI is implemented in our grading and assessment practices. While there is apprehension about the impact of AI use on students' learning [47], it can be used as a tool to improve the learning process. For educators, this means creating better assessment tools through AI, increasing efficiency in the grading process, and tailoring assessments to the individual learner [47]. Health professions educators can embrace this advancing technology to enhance their assessment tools and practices, but

should evaluate the use of AI in grading and assessment to determine its impact.

The technological advances we are experiencing, with a shift to more online learning, highlight considerations that health science programs should make when grading and assessing student learning. CBE has proven to be an effective learning modality [23], but the popularity of online education may impact how CBE is delivered and assessed. CBE is an appropriate approach to learning in health sciences because we are preparing students to perform specific skills as competent health professionals. It has also been found to have favourable outcomes [23]. However, it is difficult to assess these hands-on skills if not performed in person. It is therefore imperative that educators in health sciences programs strategically utilize CBE and study the effectiveness of virtual CBE assessments.

5. Conclusions

The need to evaluate students efficiently and effectively is a crucial aspect of education. Efforts to standardize practices of evaluating students continues to be a multifaceted challenge and undergraduate health sciences education is no exception. Lack of consensus around the purpose of grading, standardizing grades across departments, and measuring competence and performance continue to be prominent issues that need to be addressed. Calls for grading reform efforts were seen consistently across the articles, with several offering recommendations for reform based on theories that have been successful in other fields. Through this review, we provide an updated view of the literature regarding this complex topic and found a variety of information regarding the evaluation of current grading and assessment practices, recommendations on addressing the systemic issues, and areas of further research that are needed.

Health sciences education is a dynamic field whose purpose is to equip students with the skills and knowledge they need to adequately care for patients. The significance of this goal is understood by the stakeholders within these fields and provides motivation to build educational systems that accomplish this aim. This scoping review provides evidence of inconsistencies of grading and assessment practices, but it also highlights the work of passionate professionals striving to address these concerns. The heterogeneous nature of this research demonstrates that work still needs to be done, but also provides opportunities for determined health sciences professionals to improve their grading practices to ensure that their students are well equipped to provide safe and effective care to all.

Author Contributions

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Data Availability Statement

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Conflicts of Interest

The authors declare no conflict of interest.

AI Use Statement

The authors declare that no artificial intelligence (AI) tools were used in the preparation of this manuscript.

Appendix A

Table A1. Summary of Included Articles.

Author(s) and Year	Title	Study Design	Population (Location)	Purpose
Annesley et al. (2023) [50]	Grading practice as a strategy to improve proficiencies in undergraduate nurse education: Modelling key areas of competence	Text and opinion	Nursing students (United Kingdom)	Test online grading practice tool; determine relationship between final practice grade and OSCE grade.
Bau et al. (2024) [30]	An evaluation of the psychometric properties of the Australian Collaborative Practice Assessment Tool	Instrument development and assessment	Healthcare practitioners and students (Australia)	Validate the Collaborative Practice Assessment Tool (CPAT) and evaluate its psychometric properties.
Boulet and Durning (2019) [40]	What we measure... and what we should measure in medical education	Text and opinion	Health professions/medical education students (United States)	Considerations for developing assessments; assessing competencies that are difficult to measure; discuss what should be assessed, who should do the assessment, and what evidence is needed to support the assessment; provide overview of new assessment methods and the role of technology
Bourassa et al. (2024) [31]	Psychomotor skills assessment in healthcare education: A scoping review	Scoping review	Medicine, nursing, and rehabilitation-based healthcare students and practitioners (Not Identified)	Scoping review on the instruction, development, or assessment of psychomotor skills in healthcare.
Brits et al. (2020) [35]	Quality assessment in undergraduate medical training: how to bridge the gap between what we do and what we should do	Qualitative research	Undergraduate medical students (South Africa)	Qualitative study to provide practical recommendations on best assessment practices
Bussard et al. (2024) [32]	Current practices for assessing clinical judgment in nursing students and new graduates: A scoping review	Scoping review	Undergraduate nursing students and first-year registered nurses (Not Identified)	Scoping review of assessment practices for clinical judgement in nursing students and new graduates.
Chan et al. (2023) [46]	Implementation of virtual OSCE in health professions education: A systematic review	Systematic review	Health professions students and faculty (Not Identified)	Systematic review of experiences with virtual OSCE in health professions education.
Collares (2022) [44]	Cognitive diagnostic modelling in healthcare professions education: An eye-opener	Text and opinion	Health professions students (Netherlands)	Describe the applications of cognitive diagnostic modelling
D'Amato-Palumbo et al. (2024) [26]	Correlations between dental hygiene students' participation in program assessments and program improvements	Survey	Dental hygiene program administrators (United States)	Determine if there is a correlation between dental hygiene students' participation in program assessments and program improvements.
Del Prato and Bankert (2021) [39]	Academic grade inflation in nursing education: A scoping review of the qualitative and quantitative literature	Systematic review	Nursing students (United States)	Systematic review of grade inflation in nursing education
Donaldson and Gray (2012) [37]	Systematic review of grading practice: is there evidence of grade inflation?	Systematic review	Nursing students (United States)	Grade inflation in nursing, midwifery, medicine, and allied health professions
Eva et al. (2016) [36]	Towards a program of assessment for health professionals: From training into practice	Qualitative research	Health professions students (Canada and United States)	Cast a critical lens on assessment practices
Giri and Stewart (2023) [28]	Innovations in assessment in health professions education during the COVID-19 pandemic: A scoping review	Scoping review	Undergraduate and postgraduate medical, dental, and nursing students (Not Identified)	Scoping review of literature on assessment in medical, dental, and nursing education during the COVID-19 pandemic.

Table A1. *Cont.*

Author(s) and Year	Title	Study Design	Population (Location)	Purpose
Gordon et al. (2022) [38]	Advancing the assessment of clinical reasoning across the health professions: Definitional and methodologic recommendations	Systematic review	Health professions students (United States)	To understand how clinical reasoning is assessed across the health professions.
Govaerts (2019) [45]	Managing tensions in assessment: Moving beyond either-or thinking	Systematic review	Health professions students (Netherlands)	Outline how Polarity Thinking (TM) may help assessment reform move forward by systematically leveraging assessment polarities as opportunities to drive improvement rather than as intractable problems.
Kasanda et al. (2013) [49]	Medical and pharmacy students' perceptions of the grading and assessment practices	Qualitative research	Medical and pharmacy students (Namibia)	Use of a questionnaire to evaluate assessment practice perceptions at the University of Namibia.
Kelley et al. (2019) [22]	The role of using formative assessments in problem-based learning: A health sciences education perspective	Qualitative research	Pharmacy students (United States)	Use of the problem-based learning approach in pharmacy students.
Kerr et al. (2016) [51]	An online formative assessment tool to prepare students for summative assessment in physiology	Cohort study	Health professions students (South Africa)	Bridge the gap between lecture material and application of physiological concepts to pathophysiological conditions.
Krumm et al. (2024) [54]	Digital evidence: Revisiting assumptions at the intersection of technology and assessment	Text and opinion	Health professions programs (Not Identified)	Define terms related to using data from digital sources in the evaluation of learners' knowledge and abilities.
Masava et al. (2020) [24]	A broken triangle: Students' perceptions regarding the learning of nursing administration in a low-resource setting	Sequential mixed methods study	Nursing students (Lesotho)	Describe student nurses' perceptions regarding the alignment of learning outcomes, content and assessment of a nursing administration module in a nursing education institution in a low-resource setting.
Mugimu and Mugisha (2017) [25]	Assessment of learning in health sciences education: MLT case study	Qualitative research	Medical Laboratory Technology students (Uganda)	A critical review of the issues concerning learning assessment in health sciences education and investigates whether and how they are addressed at the Medical Laboratory Technology (MLT) training at Mulago in Uganda.
Mitra et al. (2023) [47]	Artificial intelligence: Opportunities and challenges in health professions education	Text and opinion	Health professions programs (Not Identified)	Add to the understanding of AI's impact on student learning experiences, assessment, healthcare, faculty development, and health professions education research.
Nagai et al. (2024) [23]	Clinical competency of nurses trained in competency-based versus objective-based education in the Democratic Republic of the Congo: A qualitative study	Qualitative research	Nursing students (Democratic Republic of the Congo)	Qualitatively compare supervisors' perceptions of competency-based educated and objective-based educated nurses.
Ng et al. (2024) [33]	The nature of students' learning outcomes during and following participation in a simulation remediation program	Mixed methods	Occupational therapy, physiotherapy, and speech pathology students (Australia)	Evaluate students' ability to meet placement criteria after participating in a simulation remediation program.

Table A1. *Cont.*

Author(s) and Year	Title	Study Design	Population (Location)	Purpose
Oermann et al. (2009)[27]	Assessment and grading practices in schools of nursing: National survey findings part I	Survey research/mixed methods with both quant and qual questions.	Nursing students (United States)	Describe assessment and evaluation strategies and grading practices used by nurse faculty in prelicensure RN programs.
Oermann et al. (2009)[41]	Clinical evaluation and grading practices in schools of nursing: National survey findings part II	Survey	Nursing students (United States)	To better understand how nurse educators evaluate and grade students' clinical performance.
Plack et al. (2019)[52]	Systems thinking and systems-based practice across the health professions: An inquiry into definitions, teaching practices, and assessment	Qualitative research	Health professions students (United States)	Evaluate the understanding of Systems-based Practice and Systems thinking in medical and healthcare professions education, and discuss challenges associated with teaching SPB.
Reimschisel et al. (2017)[21]	A systematic review of published literature on team-based learning in health professions education	Systematic review	Health professions students (United States)	Summarize the published literature on team-based learning in health professions education (HPE) using Michaelsen's conceptual framework in order to identify gaps that can guide future research on the TBL method.
Roberts et al. (2021)[42]	Exploring complexities in the reform of assessment practice: A critical realist perspective	Text and opinion	Health professions students (Australia)	Provide a critical realist exploration of changing assessment practices (programmatic assessment, argument-based validity frameworks, evidence-based assessment tasks, shared narrative).
Sims and Cilliers (2024)[29]	Clinical educators' conceptions of assessment in medical education	Qualitative research	Medical education clinical educators (South Africa and Mexico)	Explore conceptions of assessment in medical education.
Steinberg et al. (2023)[34]	Development and validation of the Workplace Learning Inventory in health sciences education: A multimethod study	Mixed methods	Undergraduate health professions students (Europe, Asia, and North America)	Develop and validate a tool that can be used to assess workplace learning.
Taylor et al. (2023)[48]	Self-directed learning assessment practices in undergraduate health professions education: A systematic review	Systematic review	Undergraduate medical, nursing, and health professions students (Global)	Systematic review of self-directed learning assessment practices.
Uijtdehaage and Schuwirth (2018)[43]	Assuring the quality of programmatic assessment: Moving beyond psychometrics	Text and opinion	Health professions students (United States)	Argue for the value of programmatic assessment.
Way et al. (2019)[53]	An evidence-based toolkit to support grading of pre-registration midwifery practice	Qualitative research	Midwife students (United Kingdom)	Development of a toolkit by midwife educators to facilitate consistent, robust, and objective grading of student practice.

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