

Advancing Forensics Pedagogy: A Pathway to Quality Matters Course Certification

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Abstract: This study represents a multiyear investigation into the development and evolution of Walsh University's first forensic science course, Introduction to Forensic Science (NS 114). From the initial planning and first offering in 2007 to its current form, the course has undergone significant transformations to enhance student engagement, critical thinking, and application of forensic science concepts to real-world situations. Initially offered as a face-to-face course, NS 114 transitioned to an online format in 2014 to accommodate a wide range of student schedules and incorporated emerging technologies. This transition involved restructuring assessments, implementing problem-based learning through forensic reflections, and aligning content to Quality Matters (QM) standards for course design. Key innovations include the development of the new pedagogical models: 10 Print Card of Fingerprints of Student Success and Student Reflection Formulator. Collectively, these models were designed to guide instructors in creating effective learning experiences and aligning course content with learning outcomes. These initiatives have led to significant improvements in student engagement and achievement of learning outcomes, as evidenced by assessment of student performance. The study highlights the importance of continuous improvement in course design, the effectiveness of problem-based learning in forensic science education, and the value of aligning course content with national standards for quality assurance. Strategies and tools developed through this process have potential applications across various disciplines and educational settings, thereby offering pedagogical approaches for enhancing student success in the online forensic science courses and beyond.

Keywords: forensics pedagogy, Quality Matters, assessment, student success, course design

Introduction

With a vision to enhance forensic science education at Walsh University, a mid-sized private institution located in North Canton Ohio, one faculty member set out on a personal mission. She explored and implemented new teaching strategies that led to significant improvement in pedagogical approaches as evidenced through Quality Matters (QM) certification and student success. The vision came from a time of evolving landscape within higher education. In recent years, through the increased demand for online courses, forensic science courses and its related programs faced challenges in preparing students for real-life applications. Capon and Hung emphasized the importance of interactive course elements and features, such as problem-based learning, and these ideas connect to the implementation of forensic reflections and case studies for this course (1, 2). This article shares a comprehensive, multiyear investigation into the development and refinement of Walsh University's first forensic science course, Introduction to Forensic Science (NS 114). Through a series of strategic initiatives and continuous improvement efforts, one chemistry faculty member created the "Student Reflection Formulator" and uncovered the "Fingerprints of Student

Success", key elements that contribute to effective learning experiences in forensic science education. These steps to instructional design and continuous improvement are similar to those found previously by Wiggins (3).

This journey, from 2007 to 2024, highlighted the power of small and methodical improvements and innovative pedagogical approaches in creating a fun and effective learning experience having both social presence and alignment to national QM standards. There are eight General Standards (GS) that break down to 42 Specific Review Standards (SRS) that are used to evaluate the design of online or hybrid courses (4). Moreover, this course earned its place in the General Education curriculum as a foundations course (FD). With an FD designation, NS 114 attracted learners from all majors and any level, freshman through senior. Moving forward in this unique journey for student success brought new experiences, successes, and challenges. These will be shared along with direct implementation strategies for any forensic science educator. Although the lens of this paper describes the online setting at a private institution, practical strategies and tools that can be adapted to a forensic science course in any modality (face-to-face, online, or hybrid) as well as at any type of institution.

Methods

Creating the first forensic science course on campus

The journey began in 2007 with the creation of Introduction to Forensic Science that was designed to meet the growing interest in forensic science and demand for science courses for students from various majors, including Psychology, Sociology, and Criminal Justice. The initial face-to-face offering in 2008, having 15 students, marked the beginning of an ongoing process of evaluation and improvement.

The course centered around factual information, career resources, drawings, and crime scene photographs found in *Forensic Science: The Basics* by Mirakovits and Seigel (5). This book received positive feedback from learners due to its layout, organization, tables, figures, photos, and illustrations. Over the years, students expressed that their favorite chapters from the course were crime scene investigation, fingerprints and tool marks, and fires and explosions. This trend continued from the most recent course offering in Fall 2024. Adoption of the eBook format in recent years proved to be beneficial for students as they could engage with the readings in new ways including making flashcards, writing annotations, highlighting sections, and gaining quick access within the course shell.

Early successes and challenges

Early assessments revealed several positive outcomes: 1) Exams and quizzes effectively aided students in achieving course learning outcomes (CLOs) 2) Students demonstrated success in critical thinking and application to real-life cases 3) Group activities proved to be effective learning tools and 4) Guest speakers, particularly from the FBI, were well-received by students. However, there were also areas in need of improvement such as: 1) Some exam questions were deemed too detailed for an introductory course without prerequisites 2) There was a need for more real-life applications, especially given the absence of a laboratory component and 3) The need to explore more ways that student voice and choice could be implemented into the curriculum. These initial findings revealed a new path in pedagogy to concentrate on small and frequent improvements that would shape the course over the next decade and beyond. The efforts toward continuous improvement correlate to best practices in forensic science education by strengthening students' foundation and skills (6-7).

Evolving pedagogical approaches to course design: 2007-2012

During the first five years from 2007 to 2012, the faculty member implemented several new aspects and learning experiences to enhance the course such as expanding the guest speaker program, exploring case studies and related student activities, and addressing a scheduling challenge for student athletes. First, in order to widen the network of collaboration, the faculty member sought out new opportunities which all started with an email invitation. Marshall University hosted an open house and tour for their MS program in forensic science. The faculty member attended the event at Marshall, established new connections that led to future collaboration, and acquired new insights into the student experience through the tour of the facility and crime scene house. Back at Walsh University, she shared her experience with students and continued to emphasize the importance of guest speakers. Then, in two consecutive academic years, one forensic chemist from Marshall presented his research and real-life cases to Walsh students, faculty, and administrators. This presentation generated excitement in the forensic sciences in a new way unlike any other done before. This pedagogical approach empowered students with real-world insights and tightened the connection between academic learning and professional experience. In the early years, close consultations with Marshall faculty served to enhance the course and ensure it included current and compelling topics in forensic science. Second, by creating case study exploration as a learning activity, students gained new insights into forensics. Students explored forensic cases from popular TV shows and documentaries that, in turn, increased engagement in real-life applications, one essential course learning outcome. Student voice and choice was realized through questions that asked if they thought this case should be included in the course the following year. Overall, this strategy not only increased student interest, but also enhanced their ability to apply theoretical knowledge to practical and realistic scenarios. Moreover, these strategic decisions helped to support student success in the learning outcomes that aligned with these areas. Lastly, there was a new need that arose after the first few offerings. With a continued increase in popularity that warranted the expansion of two sections per semester, one challenge still interfered with student enrollment. That challenge was a scheduling conflict for students actively engaging in athletic events or necessary travel to those events. Recognizing the difficulties that student athletes faced in attending all classes, the faculty member began exploring alternative delivery methods and new flexible options for learners. This consideration was well-received by the chair of the division and eventually led to a significant transformation of the course.

Transition to online learning

In order to meet the students where they were in their academic pursuits, an idea came to fruition. If the course was designed as an online experience, then no students would be left out of this popular and well-received learning experience. In 2012, new adventures were obvious as this professor embarked on a significant transformation of the course by transitioning the content and learning activities to an online format. This decision was driven by the need to accommodate a wide variety of student schedules and to leverage new and emerging educational technologies. Jones employed a similar approach for the transition to online modalities including innovative assessment strategies (8).

In 2012, the chemistry professor completed a 9-week professional development series focusing on best practices for online delivery, online tools and technologies, and strategies for viewing the learning management system (Sakai) from both the student viewpoint and through the eyes of an administrator. Then, it came time to begin transitioning the course to a fully online asynchronous course. Introduction of Forensic Science was redesigned and developed throughout 2013. The first online offering was launched in Spring 2014. There were several findings reported. First, assessment restructuring included weekly quizzes that replaced longer hourly exams, and the online three-part final report replaced the traditional face-to-face final exam. This aligned well with best practices in steps to assess student achievement beyond traditional exams (9). Second, the final report structure was divided into three parts, each worth 25 points: Part 1: Critical thinking about course design (Service-Learning Course), Part 2: Critical analysis of educational technology use in forensic science, Part 3: Exploration of forensic topics beyond the course curriculum. Lastly, enhanced student engagement was evidenced by unique opinion-based discussion forums. These were incorporated to provide essential social presence in the course as well as increase learner-learner interactions. Additionally, weekly discussions were utilized to gauge student interest in various forensic topics and allowed for practice in written communication.

Overall, assessment data showed that students exceeded or met the standard for critical thinking in this new online format. Students' answers showed creativity through the sharing of ideas, particularly emphasizing student voice and choice in service-learning ideas that could be implemented into NS 114. The restructured assessments, new assessment strategies, and increased engagement opportunities contributed to the overall student success during this time.

In the spirit of continuous improvement and the need to explore new strategies in quality assurance and academic innovation for Walsh University, the faculty member acquired professional development in national

standard as given by QM. This is an organization consisting of academic leaders across the globe who strive for excellence in course design for online and hybrid modalities (4). From 2020-2021, the professor completed several courses and earned many certifications. These included Applying the QM Rubric (APPQMR), Peer Reviewer Certification (PRC) for HE and K-12, Master Reviewer (MRC) for HE and K-12, as well as the 7-course series, Teaching Online Certificate (TOC). This training and experience as a team chair for course reviews, provided her with a strong foundation for preparing NS 114 for course certification.

The QM Specific Review Standards (SRS) served as a framework for course design and evaluation. Therefore, having the standards at the forefront of course innovation was a logical reason to ensure that this online forensic science course met rigorous requirements given by these quality assurance standards and provided an optimal learning experience for all learners, particularly aware of the needs of diverse learners.

Implementing QM standards: A new pedagogical approach to forensic science course design

In Summer 2021, the professor began by looking at the course from the student's point of view. Then, she started making improvements in pedagogical practices for NS 114 with a focus on the institution's new online course shell. Strengthening the alignment of course content to QM standards took the most time. This was the first forensic-related course at Walsh University to undergo such a detailed evaluation. Therefore, top priorities were identified in the preparation for the QM course review. First, enhanced multimedia content included the addition of more videos to engage learners and deliver diverse learning materials. This approach aided in the success of students having different learning styles and increased student engagement with the course material. Second, accessibility of content was given special attention by looking closely at QM GS 8: Accessibility, particularly SRS 8.3. This standard focuses on providing alternative text for images and other visual elements (4). Efforts here ensured that all students, regardless of their abilities, could fully access course content and engage in the learning process. Quality assurance, such as that described here, is vital for students in the online format (10-12). Third, a high priority was based on the alignment of learning outcomes. So, the professor evaluated the forensics content, created a plan for positive change, and then took measures to ensure that Course Learning Outcomes (CLOs) were measurable (SRS 2.1), Module Learning Outcomes (MLOs) were measurable and aligned with CLOs (SRS 2.2) (4). Diving deeper into institutional goals, the CLOs aligned with Program Student Learning Outcomes (PSLOs) for General Education. This alignment process ensured a

direct connection between course content, assessments, and broader educational goals (13). Lastly, there was significant emphasis placed on ensuring that this course was both relevant and relatable through current forensic events and scientific content. Consequently, the professor explored new and interesting ways to include new technologies and emerging trends into forensic science education. She explored current topics with peer-reviewed sources and content that aligned with professional standards. Then, after exploring many pathways in the literature, the textbook, and peer faculty mentors, she selected readings and video content to embed in the course shell. Overall, these efforts helped to strengthen the professor’s subject matter expertise as well as provide a course that was both realistic, relatable, and current (5). These efforts ensured a commitment to providing learners with an effective learning experience which is crucial in the rapidly evolving field of forensic science and forensic-related careers (6-7).

Results

Learning outcomes for NS 114 are stated in **TABLE 1**. Each outcome starts with an action word described by Bloom’s taxonomy (13). These were also tailored to the appropriate level for students taking this course that has no prerequisites.

TABLE 1 Lesson 1 MLOs for NS 114.

Lesson 1 Module-level Outcomes
1. Recognize the main scopes of forensic science
2. Identify the duties and responsibilities of key individuals working at the scene of a crime
3. Recognize the steps involved in a successful crime scene investigation
4. Distinguish between different types of evidence and the proper collection and handling
5. Relate the principles of forensic science to realistic scenarios
6. Describe how the information in this lesson provided you with new insights into forensic science

The next step was to plan how the content in the course shell would connect directly to these learning outcomes. This was done by creating a course map for NS 114 with careful attention to the level of learner and overall scope of the course that satisfies 3 credits for Walsh’s General Education curriculum (Foundations course). To show one example of alignment as found on the course map, **TABLE 2** shows the connection between Lesson 1 activities, instructional content, and assessments to the MLOs.

TABLE 2 The alignment of Lesson 1 activities, instructional materials, and assessments to module-level objectives (QM SRS 3.1, 2.4, 4.1, 5.1) (4).

Lesson 1: Learner Activities	Instructional Materials and Assessments	Module-level Objective
Watching	instructor-created video	1-5
Reading	Textbook	1-4
Reading	class notes including images and/or tables	1-5
Watching	content video	2, 3, 5
Explaining	discussion*	1, 4
Identifying	Quiz	1-5
Applying	reflection*	6

*=denotes assessment with written feedback.

Looking a bit deeper into the assessments, **TABLE 3** provides a breakdown in assessment design for Lesson 1 as well as the connection to the MLOs. This was essential to meet QM SRS 2.4 and 3.1 (4).

TABLE 3 Breakdown of Lesson 1 assessments and their alignment to module-level objectives. (QM SRS 2.4, 3.1) (4).

Lesson 1: Assessments	Module-level Objective	Assessments per Lesson	Total Point Value per Assessment
Discussions	1, 4	2	20
Quizzes	1-5	2	20
forensic reflection	6	1	6

The next initiative was to align the content to QM GS and QM SRS. **TABLE 4** shows examples of some of the unique additions to the course and how each aligns to QM GS and QM SRS. The updates contributed to student achievement of the stated learning outcomes.

TABLE 4 *New course elements to improve learner achievement and alignment with QM General Standards (GS) and Specific Review Standards (SRS)(4).*

Unique Course Element	Alignment with QM GS	Alignment with QM SRS
Course tour	GS 1: Course Overview and Introduction	SRS 1.1, 1.2
Course map and improved CLOs and MLOs that are clearly stated in the course shell	GS 2: Learning Objectives	SRS 2.1, 2.2, 2.3, 2.4, 2.5
Accessible periodic table	GS 4: Instructional Materials & GS 8: Accessibility and Usability	SRS 4.1, 4.5, 8.3
Forensic reflections	GS 3: Assessment and Measurement	SRS 3.1, 3.4
Instructor-created discussion post followed by 1-2 responses per week addressing the entire class	GS 1: Course Overview and Introduction & GS 6: Course Technology	SRS 1.8, 5.1, 6.1, 6.2
New video content of a crime lab, mobile unit, instrumentation, lab procedures, and professional interviews	GS 4: Instructional Materials & GS 8: Accessibility and Usability	SRS 4.4, 4.5, 8.5, 8.6
Case study activities where students discover, evaluate, and critique a forensic science case	GS 3: Assessment and Measurement	SRS 3.1, 3.4
Improved rubrics for the discussion forum, case studies, and forensic reflection	GS 3: Assessment and Measurement & GS 8: Accessibility and Usability	SRS 3.3, 8.3

Then, the professor continued to look at the course through the eyes of a learner. Upon reflection, questions arose related to ways to increase student success in the course through the transformation of the instructional materials. From this point, new assessments were designed and implemented into the course shell. Selected examples are showcased in **TABLE 5** and were incorporated into the asynchronous online format. Some examples shown below are reflections questions, discussion inquiries, and types of videos, both instructor-created and those found online.

TABLE 5 —*Examples of newly designed instructional materials and assessments to increase student success. In the asynchronous online format.*

NS 114 Lesson	Selected Examples of Instructional Materials or Assessments
L1: Introduction to Forensic Science and Crime Scene Investigation	Reflection 1: Please write 2-3 sentences for each question below: 1. a) How did the information in Lesson 1 provide you with new insights into forensic cases? b) What was your favorite video from this lesson and why was it your favorite?
L3: Finger-prints and Firearms	Discussion 3: Please write 2-3 sentences for each question below: 1. a) Give one example how a false positive test result could impact a criminal investigation. b) Refer to Table 3.1. Which evidence listed do you feel is found most frequently at crime scenes? (Choose any individual or class evidence) c) Which evidence listed do you feel is not found as frequently?
L5: Forensic Entomology and Case Study 1	Lesson 5 Preview* [3 min] Fatal Attraction: The Carrion Beetle [3 min] Why Entomology? [5 min]
L6: Illicit Drugs and Case Study 2	Lesson 6 Preview* [2 min] Opioids and its effect on the brain [4 min] Joy's story [4 min] Guided Tour of a Hidden Meth Lab [7min]

New initiatives to support student success

As part of her commitment to continuous improvement, the professor implemented several new initiatives designed to enhance the learning experience and promote student success (3). Some highlights included a course tour, Conversations tool, and problem-based learning (PBL) through forensic reflections. First, the course tour served as a comprehensive look into the course and its necessary navigation. The course tour helped students move through the online learning environment more effectively. This tour familiarizes students with the course structure, resources, and expectations, guiding them to success from the first day of class. Having a course tour directly connects learners through a student-centered approach (14). Second, in collaboration with Duke University, she helped develop and implement a beta version of the Conversations tool within Sakai. This tool facilitates more dynamic and engaging discussions among students and instructors, fostering a sense of community in the online environment. Additionally, it had a social media look and feel that was predicted to resonate well with college students. Moreover, the first introduction in the course proved to be visually stimulating and a fun interaction as students were asked to share something positive in life. Some participants posted their favorite vacation spots, funny

animal or pet, or encouraging quotes for peers. With a combination of both personal uplifting messages and pictures, Conversations added value to the social presence of the course as well as learner-learner interaction. Next, the professor introduced a PBL approach through forensic reflections and aligns with successes previously reported by Mello and researchers (15). This initiative aimed to enhance students' critical thinking skills, improve self-expression, and provide a deeper understanding of forensic science concepts in a creative way. Furthermore, these align with the vision of Technical Working Group on Education and Training in Forensic Science (TWGED) and purpose for the Forensic Science Education Programs Accreditation Commission (FEPAC) including the fact that forensic science education should highlight problem-solving skills through real-life applications correlated to forensic science principles (6-7). For example, Lesson 8 focuses on fires and explosions including arson cases (5). The reflection questions were "How did gaining new information about fires and explosions increase your awareness to new aspects of forensic science? b) What was your favorite video from this lesson and why was it your favorite?" This learning assessment can be used to assess critical thinking skills through written communication and also the application of the lesson content to real-life situations. Both of which are key course-level outcomes.

Diving deeper, another question arose: How could the creative elements in this course help those teaching other disciplines outside of forensic science? The professor set out to create two processes to address this question: 1) The 10 Print Card of Fingerprints of Student Success Strategy and 2) Student Reflection Formulator. First, the 10 Print Card of Fingerprints of Student Success Strategy was created to help other educators implement similar success strategies. This model served to guide novel approaches to course organization to increase student success. The cornerstone of this innovative tool is to help instructors identify and implement essential aspects of creating effective online learning experiences. The model involves a process having these steps: 1) Considering the spaces on a 10-print fingerprint card as areas for improvement 2) Identifying unique strategies that make the course relatable and meaningful and 3) Using the completed card as a "forensic roadmap" for course enhancement. Some examples that can be envisioned in the boxes on the card include forensic reflections, short and engaging videos (6 minutes or less), career-focused content (e.g., crime lab tours), quizzes concentrating on real-life applications, implementation of Sakai's Conversations tool, course tour, alignment with QM standards, collecting student opinions, and adding additional resources for future career paths and graduate programs. Overall, this model provides a visual and methodical way for instructors to conceptualize and implement improvements in their courses, drawing on the

forensic science theme to make the process both engaging and relevant. This model was introduced as an "experiment" for colleagues at a professional conference. This creative model was positively received by both faculty and instructional designers in the audience. Some comments revealed that it was a fun and effective way to organize a class.

Next, the next initiative was more focused at the assessment level. Another new model, called the Student Reflection Formulator, contributed to academic innovation by utilizing a process to create a new type of lesson assessment, specifically reflections, that consisted of short answer questions to evaluate learner achievement in the application of course content. Therefore, the model was designed to include a view of lesson content yet provide flexibility. Considering its versatility for any discipline, the formulator can be implemented for any learning track that includes any major and any level of learner. Therefore, it can support all students, not just those in science.

The main drive in creating the Student Reflection Formulator was to enhance the effectiveness of the PBL approach and to align with those highlighted in previous projects (15). This stepwise model guides educators in the creation of effective reflection questions that directly connect with CLOs and MLOs. The main goal is to consider the essential steps in creating an effective reflection question. Then, on a sheet of paper or notes app, educators can work their way through this thought-provoking process that essentially streamlines the task and increases educators' efficiency. The Student Reflection Formulator involves several important steps as shown in **TABLE 6**.

TABLE 6 *Essential steps for the Student Reflection Formulator.*

Stepwise Process of the Student Reflection Formulator

Step 1. Designate the center of a page as a blank space. The question will be written last.

Step 2. Identify content areas in the module that make a broad impact in the students' future as well as aiding in the achievement of the given MLOs. Then, write down these content areas on a separate sheet of paper, sort them, and make a final arrangement around the center of the draft sheet.

Step 3. Link the MLO to the concentrated content areas.

Step 4. Connect the MLO to the CLO. This is a crucial step to consider because it follows the requirements of QM SRS 3.1, "The assessments measure the achievement of the stated learning outcomes or competencies" (4).

Step 5. Create the reflection question (RQ). This reflection question is key for initiating student-led correlations of the material to real-life situations.

One example, as shown in **FIGURE 1**, illustrates how the Student Reflection Formulator was applied to Lesson 8: Fires and Explosions as given in the eBook (5). This figure shows how topics, such as origin of fire, explosives, and arson, helped to craft a reflection question (RQ): “How did gaining new information about fires and explosions increase your awareness to new aspects of forensic science?” The RQ allows students to apply lesson content and analyze it through their own perspectives. Essentially, this helps students apply course concepts to real-life situations.

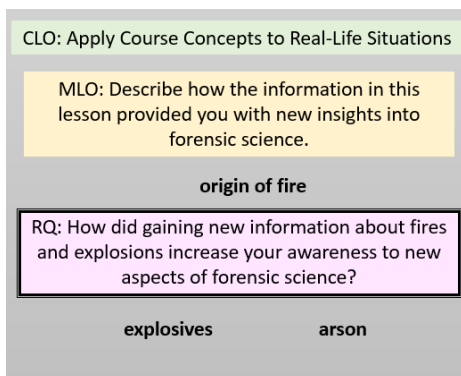


FIGURE 1 Using the principles of the Student Reflection Formulator for Lesson 8 (5).

This formulator ensured that reflection questions are not only aligned with course objectives but also encouraged students to make meaningful connections between course content and real-life applications in forensic science.

Discussion

The implementation of these initiatives led to significant improvements in student engagement and learning outcomes similar to those given by Dixson (16). Our General Education assessment strategy included the evaluation of student achievement using these reflections to evaluate written communication skills. Additionally, each reflection consists of short-answer questions designed to generate independent perspectives, encourage application of course content to future careers, increase awareness with professional expectations and necessary skills, and support continuous improvement efforts in the program (6-7).

Moreover, these strategies showed strong alignment with institutional goals. These initiatives in student success supported 1) annual program assessment 2) alignment with criteria for accreditation and 3) transparency in sharing information about student learning.

Data analysis helped to drive actionable items for upcoming years. The faculty regularly analyze assessment

data and create ways to improve student achievement within these courses. More specifically, the professor used assessment results to identify trends, discover areas in need of pedagogical improvements, and report on the effectiveness of these initiatives. This data-driven approach allowed her to make informed decisions about course modifications and new strategies. This was particularly important as the course format transitioned from face-to-face modality to online modality. Overall, these aspects of this project contributed to Walsh’s spirit of continuous improvement.

Regarding the risk of misuse of generative AI, a new policy was created for this course. Students were encouraged to use AI, but in a responsible way that included ethical considerations. The AI policy, as given on the syllabus, states, “Students may use AI tools for specific purposes such as grammar checking, language translation, and initial brainstorming of ideas. However, the final content must be the student’s own work and written in their own words.” During the grading process, the professor evaluated submitted work for any violations of this policy. Further development of the AI policy or changes to the policy may be necessary as AI evolves.

The success of the forensic science course initiatives had a university-wide impact, truly a broader impact to benefit others. First, these strategies have been adapted to support the General Education curriculum, particularly in the Foundations Pillar, which emphasizes critical thinking skills. Second, the reflection activities developed for forensic science courses have been successfully implemented in other disciplines such as freshman chemistry, upper-division chemistry, and clinical biochemistry. This supports the true versatility of this pedagogical innovation in forensic science. Next, there was a positive impact on institutional effectiveness. The novel strategies in teaching and learning contribute to Walsh University’s overall institutional effectiveness by supporting program assessment, accreditation efforts, and national research-based best practices as described through QM standards (4). Lastly, these efforts support professional development and leadership in online education within our institution and beyond. These actions toward quality assurance have led to opportunities for mentoring colleagues and sharing best practices at regional and national levels.

Looking ahead, some future goals and upcoming initiatives can be realized such as a research project to further investigate this QM certified learning experience and its multiyear impact on student achievement of learning outcomes and learner engagement and interaction. Campus-wide implementation of QM standards across other courses and programs would be the next step in promoting a culture of continuous improvement in online education including the possibilities for a laboratory course to accompany the current course. The laboratory design should align with

national standards and promote hands-on learning experiences for students to build practical skills (7). In an effort to build a strong community connection, student internships in crime scene investigation can be explored through partnerships with local crime laboratories (7). This strategy could reveal new directions in research possibilities. Coordinated research projects between the laboratory and course curriculum can pave the way for novel projects, both for traditional students and those in the Walsh Honor's program. In addition, by the professor's active involvement with QM National and the QM Ohio Consortium, she can stay at the forefront of online education best practices.

Conclusion

This multiyear investigation has shown the power of incremental improvements in pedagogical approaches to forensic science education. By implementing targeted initiatives, embracing online learning technologies, implementing QM standards, designing with diverse learners in mind, and continuously refining the approach based on student feedback and assessment data, this forensic science educator significantly enhanced the learning experience for a wide range of students. Essentially, these strategies have empowered all students to achieve the learning outcomes. Never underestimate the power of small changes year after year because it can lead to academic innovation.

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