NPS-PM-25-270

ACQUISITION RESEARCH PROGRAM
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ISO9001: 2015 and ISO21001: 2018 Certification Opportunities for Quality Education at the Naval Postgraduate School

December 2024

CPT Jeremy W. Hillberry, USA
LT Maynard J. Monaghan, USN
MAJ Tyle Tripop, USA

Thesis Advisors: Dr. Robert F. Mortlock, Professor
Bryan J. Hudgens, Senior Lecturer

Department of Defense Management

Naval Postgraduate School

Prepared for the Naval Postgraduate School, Monterey, CA 93943

ACQUISITION RESEARCH PROGRAM
DEPARTMENT OF DEFENSE MANAGEMENT
NAVAL POSTGRADUATE SCHOOL

The research presented in this report was supported by the Acquisition Research Program of the Department of Defense Management at the Naval Postgraduate School.

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Acquisition Research Program
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ABSTRACT

NPS faces the challenge of aligning its educational quality management systems with global standards to maintain and enhance educational effectiveness and student satisfaction. This thesis examines the benefits and challenges of adopting ISO 9001:2015 and ISO 21001:2018 certifications, focusing on their applicability within a DoD-governed academic institution. Through analysis of ISO standards and a review of NPS's current accreditation, the research explores whether adopting these standards could enhance NPS's ability to meet accreditation requirements and improve performance.

The primary research question investigates whether NPS should pursue ISO certification and which standard—ISO 9001:2015 or ISO 21001:2018—would be most suitable. The methodology includes root cause analysis of issues, comparative analysis of NPS's current systems versus ISO standards, and a comparison between the two ISO standards. ISO certification could streamline quality management, enhance educational outcomes, and ensure compliance with international standards, but implementation complexities, including cost and administrative challenges, require careful consideration.

The study concludes that ISO 21001:2018 can improve NPS's administrative processes, student satisfaction, and overall efficiency while aligning with global best practices. Recommendations include a one-year assessment led by the Office of Institutional Effectiveness to align institutional strategy with department objectives.

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ABOUT THE AUTHORS

CPT Jeremy Hillberry enlisted in the Virginia National Guard in 2003. He grew up in Fredericksburg, Virginia, and graduated Cum Laude from the University of Mary Washington in 2015. He obtained his Commission through the University-affiliated ROTC program at George Mason University. He completed the Signal Basic Officer Leadership Course in 2015 and Signal Captain's Career Course in 2019. His duty assignments include Signal Platoon Leader for the 504th BSC and 16th SB in Baumholder, Germany, from 2015–2018. HHD Commander for 25th SIG BN, 160th SIG BDE in Doha, Qatar from 2019–2020. S6 and G6 for 2–3 GSAB, 3rd CAB, 3rd ID at Fort Stewart, GA from 2020–2023. Before obtaining his Commission, Jeremy served in the Virginia National Guard for 11 years as a Combat Engineer and Unmanned Aircraft Systems Repairer. He completed combat tours to Iraq (2007) and Afghanistan (2011) under the 116th IBCT. Upon ascension into the U.S. Army Acquisition Corps, CPT Hillberry reported to the Naval Postgraduate School in Monterey, CA, in June 2023. Upon completing an M.S. in Defense Program Management (816) in DEC 2024, Jeremy will start his Acquisition Corps career as a Project Officer for the Mission Command Requirements Division (MCRD) at Fort Moore, GA. CPT Hillberry has received numerous awards and decorations throughout his career, including the Meritorious Service Medal, Army Commendation Medal (2OLC), Army Achievement Medal (3OLC), Afghanistan Campaign Medal with 1 Campaign Star, Iraq Campaign Medal with 1 Campaign Star, Bronze Order of Mercury, and a Superior Unit Award.

LT Maynard Monaghan enlisted into the U.S. Navy in 2012 as an Information Systems Technician before earning his Commission through Officer Candidate School (OCS) in Newport, RI, in Feb 2018. He attended the University of Guam (UOG), completing a BA in Education and Social Sciences (2012) and an M.Ed. with an emphasis in Instructional Technology (2015). Before commissioning, LT Monaghan attended IT A-School in Pensacola, FL graduating with honors before reporting to Naval Computer and Telecommunication Systems (NCTS), GU, providing information systems support to commands across the Seventh Fleet AOR to include CTF-75, EOD MOB Unit 5, Naval Operational Support Center (NOSC) Guam, and Joint Region Marianas (JRM). His 1st DIVO tour was served onboard the USS ZUMWALT (DDG-1000) as the Electronic

Material Officer (EMO) and STRIKE officer. His 2nd DIVO tour was served on board USS RAFAEL PERALTA (DDG 115) in Yokosuka, JP where he served as the ship's Anti-Terrorism Officer (ATO) and Assistant Senior Watch Officer (A-SWO). LT Monaghan reported to the Naval Postgraduate School in Monterey, CA in June 2023. Upon completion of an M.S. in Defense Program Management (816) in DEC 2024, he will report to the Surface Mine Warfare Development Center (SMWDC) in San Diego, CA, where he will attend the Warfare Tactics Instructor (WTI) course of instruction.

MAJ Tyle Tripop was born and raised in Toms River, New Jersey, and attained his Bachelor of Science in Civil Engineering from the University of Delaware. In 2010, MAJ Tripop entered reserve duty as a Cadet through the University of Delaware ROTC Simultaneous Membership Program (SMP) and was assigned to the 990th Engineer Company at Fort Dix, New Jersey. He entered active duty on July 27, 2013, and was commissioned as an Engineer Officer in the United States Army. After completion of the Engineer Basic Officer Leadership Course at Fort Leonard Wood, Missouri, MAJ Tripop was assigned to the 326th Brigade Engineer Battalion (BEB), 1stBrigade Combat Team, 101st Airborne Division (AASLT) at Fort Campbell, Kentucky. At Fort Campbell, he served as the Battalion Adjutant, 2nd Platoon Leader for Alpha Company, 326th BEB, and Executive Officer for Bravo Company, 326th BEB. In 2017, MAJ Tripop attended the Engineer Captain's Career Course and attained a Master of Science in Engineering Management at Missouri University of Science & Technology. In 2018, MAJ Tripop was assigned to Joint Base Lewis-McChord (JBLM) and served as the G3 Engineer Operations Officer for I Corps. In 2019, he transitioned to 555th Engineer Brigade, JBLM, where he served as the Brigade Assistant Plans Officer. In 2020, MAJ Tripop commanded the 570th Sapper (Combat Engineer) Company, 864th Engineer Battalion. Following command, MAJ Tripop served as a Project Engineer and Project Manager for the United States Army Corps of Engineers (USACE) Seattle District in 2021. In 2023, MAJ Tripop branch transferred to the Army Acquisition Corps and reported to the Naval Postgraduate School to receive his Master of Science in Program Management. Following MAJ, Tripop will continue his career as an Assistant Project Manager for the Missile Defense Agency. CPT Tripop is a graduate of Airborne School, Air Assault School, and Sapper Leader Course. His awards and decorations include the Army Commendation Medal, the Army

Achievement Medal (3 OLC), the National Defense Service Medal, the Global War on Terrorism Service Medal, and the Army Service Ribbon.

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ACKNOWLEDGMENTS

We want to express our gratitude to our advisor, Dr. Robert F. Mortlock, for his invaluable guidance, patience, and encouragement throughout this research. His insights and expertise were instrumental in shaping our thesis. We also deeply thank our co-advisor, Dr. Bryan J. Hudgens, and second reader, Dr. Ryan S. Sullivan, for their constructive feedback and support.

A special thanks to California State University, Monterey Bay (CSUMB), for their guidance and collaboration during this process. Their support greatly enhanced our understanding and enriched the depth of our work.

We are deeply grateful to our families and friends, whose unwavering support and understanding motivated us through long nights and challenging moments. Lastly, we thank our colleagues and the faculty at the Naval Postgraduate School for fostering an environment of learning and collaboration. This journey would not have been possible without you all.

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LIST OF ACRONYMS AND ABBREVIATIONS

AACSB	Association to Advanced Collegiate Schools of Business
ABET	Accreditation Board for Engineering and Technology
ALOHA	Aligning Learner Outcomes with Holistic Assessments
ANSI	American National Standard Institute
APR	Academic Program Review
ASAP	Art and Science of Assessment Practices
BS	British Standard
CAD	Curriculum Assessment Dashboard
CR	Curriculum Review
CFR	Criteria for Review
CPR	Capacity and Preparatory Review
DCMA	Defense Contract Management Agency
DEE	Developmental Education Effectiveness
DFARS	Defense Federal Acquisition Regulation Supplement
DoD	Department of Defense
E4S	Education for Sea power Strategy
EER	Educational Effectiveness Review
EESG	Educational Effectiveness Steering Group
EOMS	Educational Organizations–Management Systems
FAR	Federal Acquisition Regulation
ILO	Institutional Learning Objectives
ISO	International Organization of Standardization
Mil-I	Military Inspection System Requirements
Mil-Q	Military Quality Program Requirements
NGO	Nongovernmental Organization
NPS	Naval Postgraduate School
PDCA	Plan-Do-Check-Act Cycle
PET	Principles of Effective Teaching
PETAL	Promoting Excellence in Teaching to Advance Learning
PLO	Program Learning Outcome

PMI	Program Management Institute
QMS	Quality Management System
RAP	Review and Assessment Program
SOF	Student Opinion Forms
TC	Technical Committee
TPI	Technology and Pedagogy Integration
TQM	Total Quality Management
WASC	Western Association of Schools and Colleges
WSCUC	Western Senior College and University Commission

I. INTRODUCTION

Not all education is equal. The ramifications of a poor education system include unproductive societies, gender inequality, the proliferation of illegal activities, and shorter life expectancy (Allison Academy, 2024). Countries with poor education systems, such as Chad, South Sudan, and Afghanistan, have low adult literacy rates of 27%, 35%, and 37%, respectively, which promotes poor understanding of mathematics and the sciences (World Population Review, 2024). As countries continue participating in world trade and cooperating on mutually beneficial initiatives, the foundational need to uphold quality education worldwide is ever more critical.

Enhancing quality management systems has long been a global priority, prompting many industries to embrace the widely adopted ISO 9001:2015 quality management system (QMS) standard. Recently, International Organization for Standardization (ISO) 21001:2018 education standards have been developed to highlight institutional commitment to delivering quality in the field of education. The attainment of quality educational standards by private and public universities may stem from imperatives such as securing funding (federal and private), elevating performance benchmarks, instilling public confidence in their educational value, or upholding regulatory standards. As a result, the ISO 9001 and ISO 21001 standards have emerged as pivotal international frameworks facilitating quality management in academic settings. However, the scholarly discourse surrounding the assimilation of ISO requirements within the education domain has been revealed to be a polarizing debate. Critics contend that applying these QMSs warrants meticulous scrutiny due to their intricate implementation procedures and substantial time commitment. Additionally, the subject still needs to be explored within academic institutions governed by the U.S. federal government, such as those housed under the Department of Defense (DoD), like the Naval Postgraduate School (NPS). In short, the complexities of integrating ISO standards to enhance educational quality and institutional effectiveness warrant further inquiry and analysis.

NPS does not currently possess the ISO 9001:2015 or ISO 21001:2018 certification. While the institution holds accreditation and certifications from governing entities—including Western Association of Schools and Colleges (WASC) Senior College and University Commission (WSCUC), the Association to Advance Collegiate Schools of Business (AACSB), the Accreditation Board for Engineering and Technology (ABET), and the Program Management Institute (PMI)—the adoption of ISO standards could further enhance NPS's ability to fulfill existing accreditation requirements, and enhance educational effectiveness and efficiency. ISO certification ensures adherence to a QMS aligned with global standards, improving education quality, and maximizing stakeholder value for NPS within the DoD.

A. OBJECTIVE AND RESEARCH QUESTIONS

The scope will include a review of the following:

1. History and background of NPS's Education Quality Management System
2. Background, benefits, and considerations of ISO 9001:2015 and ISO 21001:2018

This thesis is limited to the impact of ISO certifications within NPS.

B. RESEARCH ROADMAP

The primary research questions this paper answers are "Should NPS become ISO certified and why?" and "Which ISO standard is most appropriate for NPS and why?" The approach used to analyze these questions is root cause analysis of the issues NPS currently faces with their education management system, comparative analysis of ISO standards to the institutions current QMS, and lastly a comparative analysis of ISO 9001 and ISO 21001 to determine the more appropriate standard for NPS to implement. Concurrently, a literature review was conducted to achieve an in-depth understanding of

1. The background of ISO 9001:2015 and ISO 21001:2018 certifications
2. Historic applications of ISO principles applied in an academic institution
3. Value ISO principles provided to an academic institution

Data for this approach is gleaned from 48 peer-reviewed journal publications on the topic of ISO certification as it applies to academic institutions globally, as well as feedback from subject matter experts. The research concludes with an executive summary

of the analysis's findings, recommendations on implementing ISO certification for NPS, and a road map for certification implementation.

C. RESEARCH METHODOLOGY

The methodology used to answer the research questions is the following:

1. Primary Research Question: Should NPS become ISO certified and why?

- **Root Cause Analysis:** Root Cause analysis is used to identify any gaps or issues with NPS's current education quality management system, build a comprehensive understanding of causal factors, and determine the root causes to be problem solved. This analysis is key in ensuring recommendations successfully address the root causes and overall enhance the institution's educational system.

2. Secondary Research Question: Which ISO standard is most appropriate for NPS and why?

- **Comparative Analysis of the ISO Standards for Quality Management Systems:** The principles of ISO are compared to NPS's current EOMS/ QMS to determine standard alignment and identify gaps to explore new opportunities or exploit current systems for improvement.
- **Comparative Analysis Between ISO Standards:** ISO 9001 and ISO 21001 are compared to determine which standard is more suitable for NPS. The comparison seeks to recommend a standard based on applicability as well as its overall benefit to the institution.

D. ORGANIZATION OF THE STUDY

The research effort is organized into five chapters and three appendices. Appendices provide a comprehensive glossary of acronyms and definitions commonly used in ISO and institutional certification. The thesis is organized in the following manner:

- **Chapter I:** presentation of the statement of the problem, an outline of the objectives and scope limitations, the primary and secondary research questions, the roadmap of the research effort, the applied methodology, and the organization of the study
- **Chapter II:** a collection of backgrounds, including ISO 9001:2015, ISO 21001:2018, and the accreditation history of NPS
- **Chapter III:** the literature review of ISO standards covering peer-reviewed journals, NPS theses, and ISO-related publications

- **Chapter IV:** methodology framework and implementation, literature review findings, root cause analysis, and comparative analysis.
- **Chapter V:** research conclusions, recommendations on implementing ISO certification for NPS, and costs of implementation.

II. BACKGROUND

Established over a century ago in Monterey, CA, NPS reflects the continued expansion of naval education in the United States and the DoD. In 1909, NPS started as a modest institution to enhance naval officers' leadership skills and education. Secretary of the Navy George Meyer and many other contributing naval leaders recognized the necessity of a specialized education institution for the U.S. Navy (Naval Postgraduate School [NPS], 2024a). Currently, with a focus on continuously improved education for its serving members and civilians, the potential adoption of ISO 9001:2015 and ISO 21001:2018 accreditation may represent a strategic approach to enhance NPS's institutional quality and effectiveness. The globally recognized standards of ISO aim to promote QMSs. ISO could benefit NPS by supporting an improved educational environment, focusing on operational efficiency, higher stakeholder satisfaction, and greater alignment with international standards (American National Standard Institute [ANSI], 2024). Implementing the ISO standards can provide the reinforcement necessary to continue driving NPS's commitment to educational accomplishments, thereby improving the performance and reputation of its graduates and the organizations they support.

A. HISTORICAL TIMELINE

The following subsections describe the years of development and growth at NPS: Early Years and Growth (1909–1940); World War II and Relocation (1941–1945); Post-War Expansion and Modernization (1946–1980); Technological Advancements and Research (1981–Present).

1. Early Years and Growth (1909–1940)

NPS originally started in Annapolis, MD, and offered limited marine and electrical engineering courses (NPS, 2024a). Despite the limited availability of educational training, the importance of leadership improvement became apparent quickly. By 1919, a formal curriculum was established and expanded further by the 1920s. Over the next 2 decades, NPS would grow into a well-established and significant leadership

foundation for the Navy, developing a reputation for producing highly skilled officers in an expanded maritime engineering, ordnance, and communications field (NPS, 2024a).

2. World War II and Relocation (1941–1945)

The start of World War II highlighted the need for technical and operational officer education. This demand accelerated NPS's expansion, requiring the support of a growing student body and faculty. In 1941, NPS was approved by the Department of the Navy to relocate to Monterey, CA (NPS, 2024a). During the war, NPS provided significant support to the success of the U.S. military by training its naval officers in critical areas of radar, sonar, and logistics (NPS, 2024a). The graduating officers served in various theaters of war, showing the effectiveness of postgraduate education for military operations (NPS, 2024a).

3. Post-War Expansion and Modernization (1946–1980)

NPS continued its rise in significance in the immediate aftermath of World War II, leading into the Cold War era, facilitating newer challenges in enemy threats and advancements in technology. The Department of the Navy took control of NPS in 1947, confirming its status as a critical institution for the U.S. Navy. NPS expanded its curriculum in the 1950s and 1960s to include additional programs in operational research, meteorology, and computer science (NPS, 2024a). Foreseeing the importance of officer education support across the DoD, NPS expanded its admission to other U.S. military branches and international students, supporting diversity and collaboration for allies across the globe.

4. Technological Advancements and Research (1981–Present)

At the conclusion of the 20th century and the start of the 21st century, NPS continued implementing technological advancements and research into its programs (NPS, 2024a). Today, NPS implements a focused approach for its faculty and students to engage in projects contributing to the increased expansion of cybersecurity, unmanned systems, and space operations. The agility and flexibility within the school allows for an evolutionary approach to adapting the curriculum to meet the needs of the Navy and the DoD. The school offers several graduate degrees, including master's and doctoral

programs in engineering, defense analysis, defense acquisition and contracting, and information sciences (NPS, 2024a).

5. Current Accreditation

NPS has a strong accreditation history, reflecting its commitment to maintaining high educational standards. According to the NPS accreditation webpage, the school is accredited by the WSCUC, ensuring it meets rigorous academic criteria (NPS, 2024b). This accreditation, reaffirmed every 10 years, demonstrates NPS's dedication to providing quality graduate education to military and civilian students (NPS, 2024b). Additionally, NPS maintains specialized accreditations for various programs, enhancing its academic credibility and the value of its degrees: ABET, AACSB, and PMI. ABET accredits NPS's engineering and technology programs, ensuring quality and relevance in these fields. The last accreditation was awarded in 2020 (NPS, 2024b). AACSB accredits NPS's Department of Defense Management, confirming excellence in business and management programs. The most recent accreditation cycle was completed in 2020 (AACSB, 2020). PMI accredits NPS's project management programs, aligning them with industry standards outlined in the Project Management Body of Knowledge (PMBOK). The accreditation was reviewed for approval in 2024. The NPS *Facts and History* webpage highlights the school's longstanding tradition of excellence in education and research since its establishment in 1909, with significant expansions and relocations culminating in its status as a premier military graduate school (NPS, 2024a).

6. Legacy and Impact

The legacy of NPS is one of continuous innovation and excellence in education. Over its long history, NPS has produced thousands of graduates who have gone on to serve with distinction in the U.S. Navy, other branches of the armed forces, and allied military organizations worldwide (NPS, 2024a). NPS remains committed to providing advanced education and supporting research to address the complex challenges of modern naval and military operations. As it moves forward, the school continues to uphold its tradition of excellence, preparing future leaders for the challenges of a rapidly evolving world.

7. NPS Accreditation Reviews

Maintaining school accreditation is required by law for NPS and is critical to preserving the school's academic standards and reputation (CRS, 2023). The process for certification requires an external and unbiased evaluation of the school's educational effectiveness to ensure its programs meet the established benchmarks of the accreditation commission (NPS, 2024b). The review from each reaccreditation results in invaluable insight, providing the feedback necessary to inform the school's leadership to refine the strategic plan and inform the decision-makers. By implementing these review recommendations, NPS strives to improve the quality of its academic programs, realigning them with the goals of the DoD and ensuring the students receive the highest quality of education, preparing them for the complex world of modern military operations. Continuous reaccreditation confirms NPS's commitment to excellence while driving the school's ongoing efforts to innovate and adapt in an ever-evolving world.

B. WSCUC 2023 HANDBOOK OF ACCREDITATION

The following is a list of defined criteria for review (CFR), listed as recommendations for improvement during any portion of the accreditation reviews for NPS from the years 1999 through 2024, as currently stated in the 2023 WSCUC *Handbook of Accreditation* (WASC Senior College and University Commission [WSCUC], 2023).

> STANDARD 1: Defining Institutional Mission and Acting with Integrity
>
> CFR 1.1 The institution's mission and other statements of purpose are appropriate for an institution of higher education and clearly define its essential values, culture, and ways the institution contributes to society and the public good (WSCUC, 2023).
>
> CFR 1.4 The institution maintains appropriate operating policies and business procedures, including timely and fair responses to complaints and grievances (WSCUC, 2023).
>
> CFR 1.5 The institution treats faculty, staff, administrators, and students equitably by adhering to its published policies and procedures (WSCUC, 2023).
>
> STANDARD 2: Achieving Educational Objectives and Student Success

CFR 2.2 Degree programs engage students in an integrated course of study of sufficient breadth and depth. These programs ensure the development of core and professional competencies relevant to the degree level (WSCUC, 2023).

CFR 2.3 The institution identifies and effectively implements student learning outcomes and expectations for achievement. These outcomes and expectations are reflected in and supported by academic programs, policies, and curricula and provide the framework for academic advising, student support programs and services, and information and technology resources (WSCUC, 2023).

CFR 2.4 The institution conducts periodic reviews of its degree programs. The program review process includes an analysis of student achievement of the program's learning outcomes (WSCUC, 2023).

CFR 2.5 The institution has faculty with the capacity and scale to design and deliver the curriculum and to evaluate, improve, and promote student learning and success (WSCUC, 2023).

CFR 2.6 The faculty exercise effective academic leadership and act consistently to ensure that the quality of academic programs and the institution's educational purposes are sustained (WSCUC, 2023).

CFR 2.7 The faculty are responsible for creating and evaluating student learning outcomes and establishing standards of student performance (WSCUC, 2023).

CFR 2.10 The institution demonstrates that students make reasonable progress toward and complete their degrees in a timely manner (WSCUC, 2023).

STANDARD 3: Assuring Resources and Organizational Structures

Faculty, Staff, and Administrators: CFR 3.1 The institution employs faculty, staff, and administrators sufficient in scale, professional qualifications, and background to achieve the institution's educational and student success objectives, to propose and oversee policy, and to ensure the integrity of its academic, student support, and co-curricular programs and services and administrative processes (WSCUC, 2023).

CFR 3.3 The institution provides professional development and evaluation for faculty, staff, and administrators (WSCUC, 2023).

Fiscal, Physical, Technology, and Information Resources: CFR 3.4 Resource planning and development include realistic budgeting, enrollment management, and diversification of revenue sources. Resource allocation is aligned with evidence-based educational and student success

objectives consistent with operational and strategic planning (WSCUC, 2023).

CFR 3.5 The institution is financially stable and has resources sufficient to ensure long-term sustainability. The institution has unqualified or unmodified independent financial audits (WSCUC, 2023).

CFR 3.6 The institution provides physical, technology, information, and other resources sufficient in scope, quality, currency, and kind to support the work of its faculty, staff, administrators, and students (WSCUC, 2023).

CFR 3.7 The institution operates with appropriate autonomy governed by an independent board or similar authority that is responsible for mission, integrity, and oversight of planning, policies, performance, and sustainability. The governing board selects and evaluates the chief executive officer (WSCUC, 2023).

CFR 3.8 The board members have a range of backgrounds, knowledge, and skills to carry out their responsibilities (WSCUC, 2023).

STANDARD 4: Creating an Institution Committed to Quality Assurance and Improvement

CFR 4.1 The institution employs comprehensive quality assurance processes in both academic and non-academic areas and uses the results to improve institutional operations (WSCUC, 2023).

CFR 4.2 The institution collects, analyzes and acts on disaggregated student outcomes data including retention and graduation rates (WSCUC, 2023).

CFR 4.3 The institution examines the extent to which its climate supports student success and acts on its findings. The institution regularly assesses the characteristics, experiences, and performance of its students and uses this evidence to improve student success (WSCUC, 2023).

CFR 4.4 The institution has institutional research capacity, scope, and coordination consistent with its purposes and characteristics (WSCUC, 2023).

CFR 4.7 The governing board engages in self-evaluation and development (WSCUC, 2023).

CFR 4.8 The institution periodically engages its stakeholders in reflection and planning processes based on the examination of evidence. Through these processes it assesses the institution's strategic position, articulates priorities, examines the alignment of its purposes, core functions, and

resources, and defines the future direction of the institution (WSCUC, 2023).

1. 1999 WASC Accreditation Review

The 1999 accreditation review by WASC established the history of a specialized approach to assessing and improving educational outcomes at NPS (NPS, 2008). Following this visit, the WASC Commission reaffirmed NPS's accreditation and provided recommendations to enhance the school's overall effectiveness. These recommendations focused on four key areas: Inclusivity and diversity, evaluation of programs and educational outcomes, technological tools and learning support, as well as strategic planning, curriculum development, and instructional quality (NPS, 2008).

2. 2006 WASC Accreditation Review

For the 2006 reaccreditation, NPS was given recommendations to collect and document student feedback. This recommendation highlighted the need for NPS to develop assessment tools and ensure these tools were effectively implemented into the school's processes. The review highlighted several CFRs, including 2.2, 2.4, 2.7, 2.10, 3.4, 4.4, and 4.7. These criteria supported the alignment of program objectives with NPS's mission, ensuring that the faculty and school leadership were involved in establishing practical quality assurance processes. The 2006 review set a precedent for establishing assessment tools and the collection of student feedback (WASC, 2006).

3. 2008 WASC Accreditation Review

Building on the 2006 review, the 2008 WASC accreditation report urged NPS to institutionalize its program review processes further (NPS, 2008). The key recommendations from this review were the need for external validation of academic quality and expanding assessment efforts across NPS.

The WASC team recommended institutionalizing the program review processes. (NPS, 2008). This involves aligning program reviews on external validation and ensuring that assessment becomes integral to the institutional culture. The recommendation for expanding assessment efforts encouraged NPS to integrate assessment results into campus planning processes and align program reviews with broader strategic goals. The

2008 recommendations were essential in pushing NPS to develop a more structured approach to program review, ensuring that assessments are performed and used effectively in decision-making processes.

4. 2010 WASC Educational Effectiveness Review

The 2010 WASC Educational Effectiveness Review was an essential milestone in NPS's goal of improving educational quality. The review highlighted the need for continuous improvement in graduate education quality and the importance of clear performance goals. The key recommendations included developing a measurement system, in which NPS was advised to establish a measurement system with clear performance goals that could be compared against its peers (WASC, 2010). This system would help NPS improve its programs and ensure they meet high standards.

The review emphasized collecting and documenting student learning evidence across all departments, which is listed as the systematic collection of student learning evidence (NPS, 2008). This evidence was essential to improve curriculum development and other strategic decisions. NPS was also urged to improve its documentation and assessment efforts to allow seamless integration into various review processes (NPS, 2008). These recommendations highlighted the importance of creating a continuous improvement and accountability culture at NPS.

5. 2011 WASC Commission Letter

The 2011 WASC Commission letter acknowledged NPS's progress since the previous reviews but also identified areas for further improvement. The letter highlighted three significant areas for special attention. First was the assessment of learning outcomes, emphasizing the need for NPS to build on its existing foundation for assessing learning outcomes (WASC, 2011). This process focused on defining the unique qualities of an NPS education and ensuring these outcomes were regularly assessed and incorporated into program evaluations and planning (WASC, 2011). The second recommendation was the broader application of learning outcomes across the institution. Although some progress had been achieved, many departments were still in the early stages of adopting and understanding these outcomes. WASC recommended that NPS

extend effective assessment practices uniformly across the university. To expand NPS's reach, the review also encouraged NPS to diversify its funding sources, engage in cooperative agreements, and strengthen its infrastructure to support distributed learning programs (WASC, 2011). The 2011 recommendations were critical in pushing NPS to ensure that assessment practices were consistently applied across all programs and that the school continued to expand its reach and impact. The listed CFRs for 2011 were 1.5, 2.2, 2.3, 2.5–2.7, 3.4–3.8, 4.1–4.4, and 4.8 (WASC, 2011).

6. 2014 WASC Interim Report

The 2014 WASC Interim Report focused on completing assessment protocols across all academic units at NPS (WASC, 2014). It acknowledged the efforts of groups such as the Educational Effectiveness Steering Group (EESG) and recommended further action. Completing assessment protocols across all departments emphasized ensuring every academic unit is engaged in systematic assessment practices (WASC, 2014).

The creation of the Associate Provost for Educational Effectiveness is a recommendation suggesting a dedicated role to oversee and support educational effectiveness efforts across the school (WASC, 2014). The recommendation for expanding best practices encouraged NPS to increase the best practices for assessment developed in departments with subject-accredited programs to all departments across campus (WASC, 2014). These recommendations were aimed at ensuring that NPS maintained a consistent and high standard of educational effectiveness across the entire institution.

a. Review and Assessment Program

The NPS Review and Assessment Program (RAP) Framework is built on systematic oversight, continuous evaluation, and improvement of academic programs (WASC, 2014). The framework begins with clearly defined roles and responsibilities for review and assessment established by NPS and its academic departments. These responsibilities are detailed in critical documents like the Faculty Handbook, and Capacity and Preparatory Review Report, which guide program oversight (WASC, 2014).

Each department within NPS assigns faculty members to specific academic oversight positions, such as associate chair instruction, academic associates, and program officers, ensuring that every program is effectively managed and monitored. The design of academic programs is closely aligned with NPS's mission and strategy, ensuring consistency with institutional standards (WASC, 2014). This alignment is reinforced through new program reviews and the academic council's involvement, which ensure that program objectives and goals are articulated and aligned with the school's mission (WASC, 2014).

Program outcomes are carefully defined, focusing on curriculum, educational skills requirements, and degree accreditation outcomes (WASC, 2014). To support these outcomes, program components are designed with a clear link to school objectives, often connected through tools like program mapping and curriculum matrices. Each course within a program is created with specific objectives that relate to the overarching program goals, documented through course journals and course mapping (WASC, 2014).

The RAP framework mandates regular program reviews at the university and departmental levels (WASC, 2014). Curricula are reviewed every 2 years, while departments conduct a comprehensive academic program review every 6 years (WASC, 2014). Additionally, departments conduct ongoing, systematic internal reviews through committees like the Department Curriculum Committee and academic associate's meetings (WASC, 2014).

Assessment is a critical component of the RAP framework. Each department maintains detailed assessment plans and systematically collects assessment information from various stakeholders, including faculty, students, alumni, and employers. This information is gathered through student surveys, sponsor visits, and alumni surveys. Faculty performance, development, and teaching effectiveness are evaluated through faculty activity reports, student opinion forms, and classroom observations (WASC, 2014).

Program and course outcomes are assessed using direct measures of student learning at multiple levels, including capstone assessments and professional examinations

(WASC, 2014). These assessments are crucial for determining the effectiveness of instructional methods and identifying areas for improvement (WASC, 2014).

The RAP framework highlights the necessity of leveraging assessment findings to foster ongoing enhancements. Each department should note modifications made to improve academic assessment, drawing on the insights obtained through review and assessment activities (WASC, 2014). This commitment to continuous enhancement is reflected in practices such as the end of year program documentation and implementing action items from curriculum and academic program reviews (WASC, 2014).

b. Promoting Excellence in Teaching to Advance Learning

NPS continued to expand its faculty development programs through the Promoting Excellence in Teaching to Advance Learning (PETAL) initiative (WASC, 2014). The PETAL initiative focuses on equipping faculty with the skills and knowledge needed for effective course design and instruction. It introduces innovative methods and technologies aimed at creating stronger links between teaching strategies, student learning, and assessment processes, ensuring a cohesive and impactful educational experience (WASC, 2014).

PETAL provides developmental and educational programs designed to enhance teaching and learning across individual faculty, departments, and schools (WASC, 2014). The initiative prioritizes course outcomes to optimize the learning experience, accomplished through various methods of assessment and instruction. By fostering skills that connect the student to instructors, PETAL aims to ensure a cohesive approach to education (WASC, 2014). Additionally, PETAL emphasizes the importance of validating student learning and evaluating program effectiveness. The end result is a leverage of methods to support student success (WASC, 2014).

PETAL offers a variety of tailored resources and professional development opportunities, such as specialized short courses, one-on-one support, course-specific consultations, focused studies, workshops, and collaborative roundtable discussions (WASC, 2014). Since 2010, several key initiatives have been launched, including the Principles of Effective Teaching (PET) program, the Technology and Pedagogy

Integration (TPI) series, the Art and Science of Assessment Practices (ASAP) capstone project, the Aligning Learner Outcomes with Holistic Assessments (ALOHA) initiative, and the Developmental Education Effectiveness (DEE) proposals (WASC, 2014). These initiatives have collectively contributed to the continuous improvement of instruction at NPS, ensuring that faculty are adequately engaged to meet the evolving needs of students and the institution (WASC, 2014).

7. 2021 WASC Accreditation Review

The commission urged NPS to address critical areas to enhance its institutional effectiveness (WASC, 2021). First, the review emphasized developing common or related metrics and standards across NPS, focusing on creating and assessing program learning outcomes and evaluating student learning outcomes. This approach ensures that NPS consistently measures and improves educational effectiveness across all programs. The aligned CFRs are 2.6, 4.1, and 4.3 (WASC, 2021).

Second, NPS was encouraged to secure the necessary resources to achieve its vision and mission effectively (WASC, 2021). This includes acquiring funding to hire specialized, diverse faculty and staff and modernize facilities (WASC, 2021). These resources are vital for maintaining the high standards of education and research that NPS is known for while ensuring that the school can adapt to future challenges. The aligned CFRs are 1.4, 3.1, and 3.5 (WASC, 2021).

Third, the review highlighted the need for NPS to continue its efforts in inclusion and diversity. By leveraging best practices and assessment data, NPS is expected to enhance its recruitment, onboarding, and retention strategies for faculty, staff, and students, ensuring that the school remains a welcoming and equitable environment. The aligned CFR is 3.1 (WASC, 2021).

Lastly, NPS was advised to publish a clear vision, mission, and strategic plan supporting the school objectives (WASC, 2021). This strategic alignment is essential for setting institutional goals and establishing measures of performance and effectiveness, which will guide resource allocation and future planning efforts. By addressing these

recommendations, NPS will strengthen its foundation for sustained excellence and innovation in the future. The aligned CFR is 1.1 (WASC, 2021).

8. 2024 WASC Accreditation Review

The most recent 2024 WASC accreditation review continued to build on the progress made in previous years, identifying critical areas for continued development (NPS, 2024b). First was the focus on an institution-wide approach to assessment, emphasizing the need for NPS to develop and sustain assessing student learning and improving educational effectiveness (WASC, 2024). This approach would require common metrics and standards to be applied across the organization. Second was faculty and staff support, which highlighted the importance of ensuring sufficient faculty and staff support to sustain assessment efforts (WASC, 2024). This included providing adequate resources and professional development opportunities. Third was the vision and strategic framework, which recommended that NPS develop strategies to evaluate the impact of its framework, ensuring that these are effectively implemented and inform institutional activities (WASC, 2024). The 2024 recommendations reflected the ongoing need for NPS to align its strategic goals with assessment practices, ensuring continuous improvement and accountability. The aligned CFRs are 1.1, 2.6, 3.1, 4.1, 4.3 (WASC, 2024).

9. NPS Responsible Positions

NPS has established a foundation of positions dedicated to reviewing and assessing academic programs and curricula, ensuring that educational standards align with institutional goals and the Navy's needs (WASC, 2024). At NPS, several key positions play a significant role in overseeing these processes. The provost, serving as the principal educational leader, oversees academic operations, ensuring that academic policies comply with accreditation criteria and align with the Navy's directives (WASC, 2024). Assisting in this role, the vice provost focuses on developing policies and frameworks that support excellent instruction in academic affairs and address curricular demands (WASC, 2024). This position also ensures that instructional evaluations are effectively conducted and oversees instructional support functions (WASC, 2024). The

Office of Institutional Research is tasked with collecting and organizing institutional data, developing research programs related to the school, and conducting student surveys, assessment projects, and special studies (WASC, 2024). Additionally, the director of programs oversees the administration of the school's curricular operations, including the evaluation of curricular programs (WASC, 2024).

Further positions within the departments are essential for managing and maintaining educational quality (WASC, 2024). Chairs oversee and manage all academic programs within their respective departments (WASC, 2024). Associate chairs for instruction coordinate and manage the delivery of educational programs within departments, ensuring that instruction aligns with departmental goals (WASC, 2024). While titles may vary, most departments have a position dedicated to this role. Academic associates and faculty members assigned to specific curricula coordinate and oversee curriculum objectives, content, assessment, and quality (WASC, 2024). They also maintain ongoing curriculum assessments and liaise with curriculum sponsors to ensure that the curriculum meets the educational requirements of the sponsors (WASC, 2024). Department leaders are responsible for managing student administrative tasks and overseeing formal curriculum reviews for assigned programs (WASC, 2024). These program officers serve as intermediaries between academic associates and program sponsors, ensuring the curriculum's quality and relevance. In contrast, program managers focus on administrative duties, student engagement, and support, particularly for distributed learning and reimbursable programs (WASC, 2024).

Lastly, course coordinators and faculty members assigned to each course monitor course content and ensure that courses remain current and relevant (WASC, 2024). This structure ensures that NPS maintains oversight and continuous improvement across all levels of its academic programs and curricula (WASC, 2024).

10. Background Conclusion

From 1999 to 2024, review feedback for NPS highlights a commitment to enhancing educational effectiveness. Each review cycle provided NPS with valuable feedback, reinforcing the institutional goals of its academic programs, assessment methods, and operational processes. These recommendations have shaped the school's

approach to continuous improvement, providing important policy and procedural changes to develop improved assessment processes that ensure accountability across all academic offerings.

A repeating theme, however, has been the need for NPS to address repeated CFR recommendations, particularly those related to program assessment, educational effectiveness, and integrating learning outcomes. The repetition of these recommendations highlighted areas where NPS needed to strengthen its processes to ensure improvements were implemented and sustained over time. In response to the reviews, NPS has repeatedly developed assessment practices tied to strategic objectives. This has involved implementing clear, measurable learning outcomes for every program and ensuring these outcomes are evaluated and integrated into the larger institutional goals.

NPS can further explore the potential adoption of ISO 9001:2015 and ISO 21001:2018 certifications to improve its commitment to quality and continuous improvement. These internationally recognized standards are designed to promote quality management across many industries, including education. Implementing ISO standards at NPS can enhance operational efficiency and stakeholder satisfaction and align the school with global educational quality benchmarks. Specifically, for NPS, ISO 21001:2018 focuses on the academic quality of its management systems, ensuring that NPS can maintain an efficient and consistent process (ISO 21001, 2018). It is explicitly tailored for educational organizations, emphasizing the alignment of educational practices with the needs and expectations of learners and other stakeholders (ISO 21001, 2018). Although adopting and integrating these ISO standards is multifaceted, it offers a strategic process to reinforce NPS's commitment to higher educational goals and improved institutional performance.

The focus on addressing repeated CFR recommendations has required NPS to adopt a more proactive approach to maintaining accreditation. Seeing each review as an opportunity to assess and enhance the school's educational practices, NPS has implemented processes for monitoring and reporting program effectiveness, ensuring that the school's response to accreditation feedback is timely and impactful.

Also, NPS has shown it can make considerable strides in expanding the use of learning outcomes, ensuring that programs are equipped with clear, measurable goals that align with the school's mission. Integrating these learning outcomes into the school's objectives is essential to foster a culture of evidence-based decision-making, where program effectiveness is evaluated and improved based on data and stakeholder feedback. NPS's responses to accreditation reviews reinforce its integrity and ensure the school remains at the forefront of graduate education, especially in fields critical to national security and defense.

The potential adoption of ISO 9001:2015 and ISO 21001:2018 certifications could further strengthen NPS's commitment to quality management and educational excellence. With current accreditations such as ABET (2014) for engineering and technology programs, AACSB (2020) for business and management education, and PMI (2024) for project management programs, NPS demonstrates its dedication to high academic standards. These recognitions position NPS as a leader in graduate-level education, equipping the Navy and the broader defense community with skilled, knowledgeable leaders to address complex global challenges. Implementing ISO standards would enhance these efforts, reinforcing NPS's reputation as a top military graduate institution responsive to stakeholder needs.

III. LITERATURE REVIEW

To understand the appeal of ISO certifications within NPS, the researchers conducted a comprehensive survey of existing literature on international quality and education standardization management. ISO is a global entity pivotal in developing and publishing international standards across various industries. ISO's history is rich in efforts to standardize practices and ensure quality, safety, and efficiency in products and services worldwide.

As shown in Table 1 and Figure 1 the total number of certifications and the number of countries issuing certifications continue to rise. However, certificate data published by ISO (2024), shows that between 2021 and 2023, there was a slight decrease in certificate holders in Germany, Japan, and France, with Germany experiencing the most significant change—a decrease of approximately 4.5% in ISO certificates issued. In contrast, from 2020 to 2023, China, India, and the United Kingdom saw substantial growth in certification numbers. China led in absolute terms, adding 227,234 new certificates (a 41.2% increase). Continued analysis of certificate data published by ISO (2024) shows that in terms of overall percentage growth, India saw the largest increase (29,417 new certificates, a 47.7% rise), followed closely by the U.K. (17,770 new certificates, a 40.6% rise). It is worth noting that when the 2022 ISO survey (a voluntary process conducted by nations with ISO representative bodies) was conducted, some countries, including China, did not participate, so official survey results were not published for those nations (ISO, 2024).

Table 1. Number of ISO certificates per country from the years 2020, 2021, and 2023. Adapted from ISO (2024).

Order	Country	2020	2021	2023
1.	China	32,4621	42,6716	551,855
2.	Italy	94,216	92,664	91,493
3.	India	36,505	32,236	61,653
4.	Germany	47,576	49,298	49,349
5.	United Kingdom	43,765	39,682	25,995
6.	Japan	38,916	40,834	32,287
7.	Spain	32,059	31,318	29,814
8.	United States	29,579	25,561	20,919
9.	France	21,880	21,918	21,880
10.	Brazil	18,705	16,268	17,503

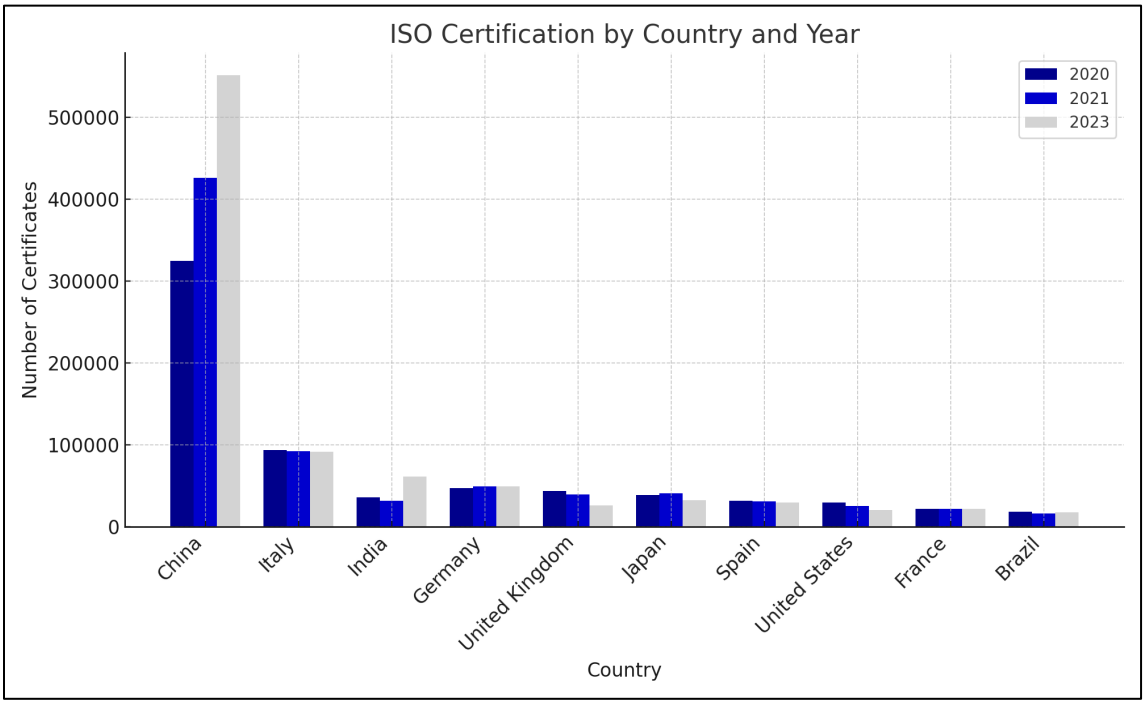

Figure 1. Number of ISO certificates per country from the years 2020, 2021, and 2023. Source: ISO (2024).

A. HISTORY OF ISO 9001

Since the ISO 9000 family of standards was introduced in 1987, its impact on product quality has been a topic of extensive discussion. Among the early influences on ISO 9000 were Mil-I-45208A (Inspection System Requirements) and Mil-Q-9858A (Quality Program Requirements), both issued by the U.S. DoD in 1963 to regulate the inspection and quality assurance of military equipment and systems (International

Organization for Standards [ISO], n.d.). Another significant predecessor to ISO 9000 was the BS 5750, introduced in 1979, which offered guidelines for QMSs and closely resembled the ISO 9000 framework currently employed (Stephens, 1994). The ISO 9000 standards have achieved widespread global acceptance and have since undergone four revisions (1994, 2000, 2008, and 2015). As of the most recent ISO survey conducted in 2022, over a million companies across 195 countries were registered to these standards (ISO, 2023).

The ISO 9000 standard has been subject to various interpretations, both accurate and inaccurate, regarding its purpose, applicability, and benefits. As Motwani et al. (1996) explain, several early misconceptions about its adoption were particularly common. For example, many believed ISO 9000 was primarily a European standard designed for industries in the United Kingdom, whereas it was developed through international collaboration, with significant contributions from the United States and other nations via ISO/Technical Committee (TC) 176 and its subcommittees. Another widespread misunderstanding, as Motwani et al. point out, was the assumption that ISO 9000 inherently mandated higher product quality. Instead, the standard requires implementing a Quality Management System (QMS) to ensure consistent processes, which indirectly supports quality but does not explicitly improve products or services. Motwani et al. also dispel the notion that ISO 9000 certification was necessary for non-European organizations to remain competitive in European markets, clarifying that certification was not a prerequisite for market access. Additionally, they address the misconception that ISO 9000 enforces a rigid certification process with stringent quality standards, explaining that the standard emphasizes adherence to an organization's documented processes and quality management practices rather than imposing external criteria. Through their analysis, Motwani et al. provide a clearer understanding of ISO 9000's intent and scope, highlighting its role in fostering consistency in quality management practices rather than dictating inflexible external standards.

B. FUNDAMENTAL PRINCIPLES AND BENEFITS OF ISO 9001

ISO 9001 is founded on several essential quality management principles, and the American National Standard Institute (ANSI) plays a key role in its implementation. As

the sole U.S. representative and a founding member of the International Organization for Standardization (ISO), ANSI is actively involved in ISO's governance and technical activities, guiding the application of standards like ISO 9001 (ANSI, 2024). ISO 9001 emphasizes critical principles such as customer focus, leadership, people engagement, a process-driven approach, continuous improvement, evidence-based decision-making, and relationship management. These principles enable organizations to adopt effective quality management practices and improve the quality of products or services rendered leading to higher customer satisfaction and continued partnership (ANSI, 2024). The standard also promotes process optimization, waste reduction, and efficiency improvements, contributing to cost savings and better resource utilization (ANSI, 2024). Furthermore, ISO 9001 encourages a culture of continual improvement, allowing organizations to adapt to changes and enhance performance over time. Ensuring compliance with relevant regulatory and statutory requirements helps reduce the risk of legal and financial penalties (ANSI, 2024). As a globally recognized certification, ISO 9001 offers a competitive edge, facilitating access to international markets and long-term organizational success (ANSI, 2024).

C. GLOBAL IMPACT AND ADOPTION OF ISO 9001

Since its inception, ISO 9001 has been adopted by organizations across a wide range of industries, including manufacturing, healthcare, aerospace, automotive, technology, and service sectors (ANSI, 2024). The standard's global adoption reflects its versatility and effectiveness in improving quality management practices. Millions of organizations in over 170 countries have achieved ISO 9001 certification, demonstrating their commitment to quality and customer satisfaction (see Figure 2; ISO, 2024).

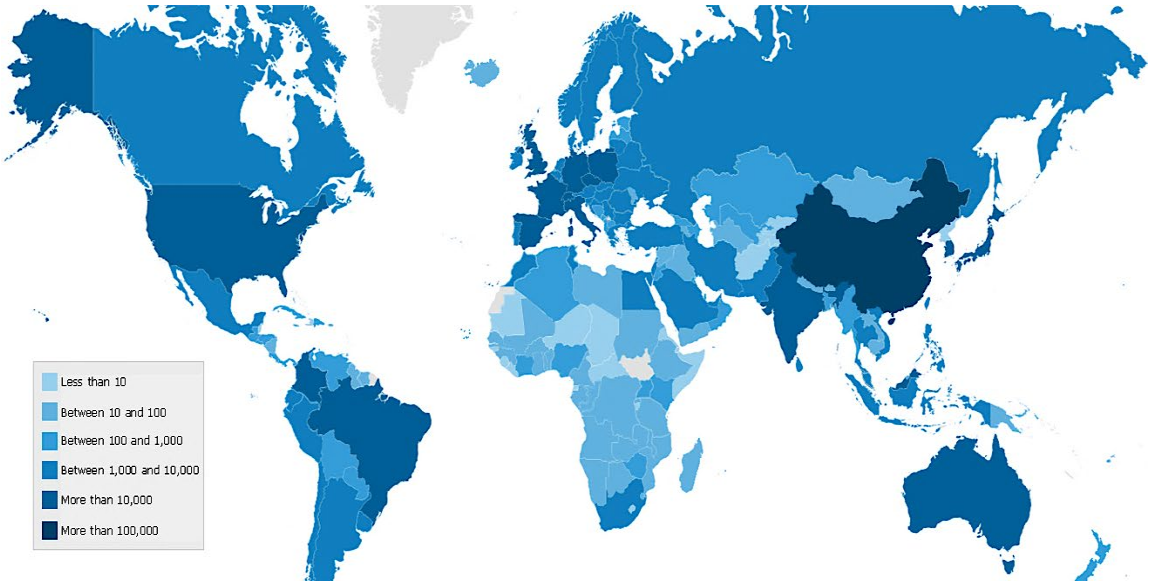

Figure 2. World distribution of ISO 9001 certificates in 2023. Source: ISO (2024).

As the business landscape evolves, ISO 9001 will undergo further revisions to address emerging trends and challenges. The ongoing focus on digital transformation, sustainability, and resilience will shape the standard's future direction. ISO will continue collaborating with industry experts, regulatory bodies, and other stakeholders to ensure that ISO 9001 remains relevant and effective in promoting quality management worldwide (ANSI, 2024).

The top 3 countries for the total number of ISO 9001 certificates issued globally in 2023 were from the countries of China, Italy, and India. The top three Sectors for ISO 9001 in 2023 were basic metal and fabricated metal products; wholesale and retail trade, and repairs of motor vehicles, motorcycles and personal and household goods; and electrical and optical equipment (ISO, 2023). These numbers are presented in Tables 2 and 3.

Table 2. Top 10 sectors for ISO 9001 certificates in 2023. Adapted from ISO (2023).

Order	Sector	Certificates
1.	Basic metal & fabricated metal products	77,233
2.	Wholesale & retail trade, repairs of motor vehicles, motorcycles & personal & household goods	57,349
3.	Electrical and optical equipment	50,450
4.	Construction	49,707
5.	Engineering services	37,385
6.	Rubber and plastic products	34,085
7.	Machinery and equipment	31,568
8.	Transport, storage and communication	30,367
9.	Chemicals, chemical products & fibres	20,329
10.	Information technology	16,523

Table 3. Top 10 countries for ISO 9001 certificates in 2023. Adapted from ISO (2023).

Order	Country	Certificates
1.	China	130,402
2.	Italy	99,419
3.	India	57,658
4.	Germany	41,760
5.	Japan	39,584
6.	Korea (Republic of)	38,041
7.	United Kingdom	34,956
8.	Spain	30,341
9.	United States of America	26,833
10.	France	19,987

ISO 9001 has established itself as a cornerstone of quality management, helping organizations worldwide enhance customer satisfaction, operational efficiency, and continual improvement. Its evolution reflects the dynamic nature of business and the ongoing commitment to fostering quality in products and services. As organizations navigate complex global markets, ISO 9001 will remain vital for achieving excellence and maintaining a competitive edge.

D. HISTORY OF ISO 21001

Education today functions within a globally competitive landscape, vying for reputation, talent, and students (particularly those organizations of higher learning, i.e., public and private universities, technical and vocational institutions, etc.). This competition in education increasingly hinges on quality (Musselin, 2018). Defining

quality in higher education is challenging due to the intricate relationships between institutions and students and the varied roles students play in the educational process. To support the increasing demand for academic institutions to enhance their QMS standards and address learners' needs, ISO introduced the ISO 21001:2018 standard titled *Educational Organizations —Management Systems for Educational Organizations — Requirements with Guidance for Use*. The ISO 21001 standard acts as a comprehensive guide for educational institutions aiming to achieve excellence and adaptability, and it influences management systems for Educational Organizations–Management Systems (EOMS) regarding quality in education and training. Similar to the impact of the ISO 9000 standards introduced in 1987, ISO 21001:2018 requires institutions to demonstrate their ability to support competence development through teaching, learning, or research with the intent to increase satisfaction for students and staff. (Kayyali & Khosla, 2021). This is accomplished through implementation of EOMS which promote organizational compliance and continuous process improvement (Kayyali & Khosla, 2021).

ISO 21001 is primarily designed for organizations that provide or support educational products and services, helping them manage processes and meet the needs of stakeholders, such as faculty and students. However, its applicability extends beyond these groups to include a wide variety of schools, colleges, and universities offering formal education; vocational training and professional development providers; corporations and companies with in-house training programs; government agencies involved in education and training; non-governmental organizations (NGOs) serving various communities; and e-learning and online education platforms (Gilbert, 2020). The standard aims to improve educational processes, enhance satisfaction among learners and other beneficiaries, and align existing QMSs with internationally recognized quality and education standards.

E. KEY COMPONENTS AND PRINCIPLES OF ISO 21001

ISO 21001 is based on principles that guide educational organizations in managing and improving their processes. These principles include ensuring that the needs and expectations of learners are met with quality education and training (Learner Focused); establishing a clear vision and direction with committed leadership at all levels

(Leadership); recognizing the essential role of people at all levels and fully engaging their abilities for the organization's benefit (Engagement of People); managing activities and resources as interconnected processes (Process Approach); continuously seeking ways to improve organizational performance (Improvement); utilizing thorough analysis and evaluation of data (Evidence-Based Decision Making); and optimizing performance by effectively managing relationships with learners, parents, staff, and the community (Relationship Management; ANSI, 2024).

F. IMPLEMENTATION AND BENEFITS OF ISO 21001

Implementing ISO 21001 involves a comprehensive review of an educational organization's processes and systems to ensure they align with the standard's requirements. This alignment brings several benefits, including enhanced educational quality, by focusing on learners' needs and providing high-quality education and training. It also increases satisfaction by meeting the expectations of learners, parents, and other stakeholders, fostering higher levels of trust. Additionally, ISO 21001 improves organizational efficiency through a process approach and continuous improvement principles that streamline operations. Finally, certification to ISO 21001 provides global recognition, demonstrating a commitment to quality education (ANSI, 2024).

G. ADOPTION AND IMPACT OF ISO 21001

According to Lopez (2021), since its introduction, ISO 21001 has been widely adopted by various educational organizations worldwide, including universities, colleges, schools, and training centers. Lopez explains that the standard has helped these organizations improve their management systems, enhance educational outcomes, and achieve strategic objectives. Additionally, Lopez highlights that ISO 21001 has fostered greater accountability and transparency within educational institutions. By adhering to a standardized management system, organizations can better demonstrate their commitment to providing quality education and meeting the needs of their learners and other stakeholders. ISO has yet to publish survey data, or a comprehensive list of universities or institutions certified under ISO 21001:2018 in 2023, but based on the limitation of public data on institutions that have adopted this standard and the fact that

ISO certification is typically granted through external auditors and certification bodies, a comprehensive global list may not always be available or up-to-date. Table 4 was created by the authors using publicly available resources to showcase institutions worldwide that have adopted ISO 21001. The data includes a variety of educational organizations, such as universities, colleges, schools, and specialized institutions, along with the corresponding countries and years of adoption. Information was sourced from official websites, institutional announcements, and other publicly accessible materials to provide a comprehensive overview of ISO 21001's global reach.

Table 4. Various academic institutions with ISO 21001:2018 certification

Institution	Country	Year
University of Havana	Cuba	2023
Dubai Police Academy	Dubai	2022
Tanta University, Faculty of Medicine	Egypt	2024
Nutan College of Engineering and Research (NCER)	India	2018
Scottish High International School, Gurugram	India	n.d.
Ciputra University	Indonesia	2023
Tishk International University	Iraq	2021
Mapúa Malayan Colleges Laguna (MCL)	Philippines	2022
University of San Agustin	Philippines	2023
International Science and Technology University (ISTU)	Poland	n.d.
Tunis Faculty of Medicine	Tunisia	2024
Selinus University Business School (Distance Learning)	USA	2023

1. ISO 21001 Prospects

ISO 21001 will ensure that educational organizations remain practical and relevant as the educational landscape evolves. The standard will continue to be refined and updated to address emerging challenges and opportunities in education, such as the increasing use of technology and the need for more personalized learning experiences (ANSI, 2024).

ISO 21001 represents a significant advancement in the management of educational organizations. By providing a structured framework for managing educational processes and ensuring quality, the standard helps institutions effectively meet the needs of learners and other beneficiaries. Implementing ISO 21001

demonstrates an organization's dedication to ongoing enhancement and educational excellence, improving students nationally and globally.

2. ISO Key Milestones and Impact

ISO's impact on global standardization must be balanced. The organization's standards have facilitated international trade, improved product quality and safety, and promoted sustainable practices. *ISO 9001 Quality Management* is adopted by organizations worldwide (ISO, 2023). It ensures that quality management principles are implemented to enhance customer satisfaction and operational efficiency. ISO 21001 is a standard developed by ISO specifically for educational organizations (Institute of Classic Entrepreneurs [ICENT], n.d.). It provides the structure to support the applicable management of academic institutions, ensuring they meet the needs of learners and other beneficiaries. ISO remains committed to addressing new challenges and opportunities as the world evolves. The organization increasingly focuses on standards supporting innovation, digital transformation, and sustainability. ISO's collaborative approach, involving experts worldwide, ensures its standards remain significant and practical.

The ISO has played an essential role in shaping the modern world by promoting international cooperation and standardization. From its inception in 1947 to its status as a global leader in standardization, ISO's contributions have facilitated global trade, improved quality, and fostered sustainable practices (ICENT, n.d.) As new challenges and opportunities arise, ISO will continue to develop standards that drive progress and ensure a better, more interconnected world.

3. Motivation for ISO Certification

Organizations seek ISO 9001 and ISO 21001 certifications for various purposes, primarily aimed at enhancing quality management and the administration of educational institutions, respectively. These certifications are pursued to achieve greater efficiency, compliance, and effectiveness within their specific operational contexts. The motivations for obtaining these certifications may include enhancing organizational effectiveness, meeting regulatory, customer, and stakeholder requirements, or gaining a competitive advantage. ISO 9001 certification is often sought to improve process efficiency, ensure

consistent product quality, and increase customer satisfaction. It provides the structure to support continuous improvement and standardization, reducing costs and increasing operational efficiency. Research highlights that implementing ISO 9001 can enhance service quality, reliability, and customer loyalty by standardizing processes and promoting an organization's quality culture (Boiral, 2012). However, ISO 21001 certification is aimed at educational organizations and focuses on improving educational processes, enhancing learner satisfaction, and achieving better academic outcomes. This certification helps educational institutions align their management systems with international standards, enhancing their credibility and effectiveness (Poksinska, 2007).

The DoD QMS policy is detailed through various federal and DoD regulations, policies, directives, and guidance. Key documents include the latest Federal Acquisition Regulation (FAR) versions, the Defense Federal Acquisition Regulation Supplement (DFARS), and the DoD Instruction 5000.02, collectively defining the U.S. DoD policy on acquisition and associated quality requirements (Inspector General, 2014). The Defense Contract Management Agency (DCMA) plays a crucial role in implementing quality management policies by providing guidance through the *DCMA Guidebook for Government Contract Property Administration* (DCMA, 2020). The Defense Contract Management Agency (DCMA) plays a crucial role in implementing quality management policies, as described in its *Guidebook for Government Contract Property Administration* (DCMA, n.d.). Kaur et.al (2021) explains that the Department of Defense (DoD) Quality Management System (QMS) policy, along with its connection to ISO 9000, originates from executive guidance documents issued during the mid-1990s. These documents marked a significant transition from military-derived specifications to commercially accepted quality standards. According to DoD guidance (1995), this shift was driven by industry concerns about military standards such as MIL-Q-9858, which required extensive documentation of quality policies, test results, manufacturing problems, and corrective actions. Kaur et al. (2021) emphasized that these requirements were seen as imposing unnecessary burdens on contractors, adding little value to manufacturing processes while consuming resources better allocated to value-adding activities. As noted by Kaur et al. (2021), both contractors and DoD personnel advocated for changes to reduce these inefficiencies. In response, many contractors adopted dual QMS systems

that complied with both MIL-Q-9858 and commercially recognized standards like ISO 9000, enabling them to meet both military and commercial requirements. This dual system approach addressed the need for flexibility while maintaining compliance with diverse quality expectations.

4. Benefits of ISO Application

Since its inception, ISO 9001 certification has garnered significant interest and prompted extensive research to explore its benefits, which can be categorized into business, financial, operational, customer satisfaction, quality-related, and cultural areas; various assessments have analyzed relationships between the reasons organizations seek ISO 9000 certification and the advantages they perceive or realize (Bravi & Murmura, 2021). The findings from these studies are diverse, but a common conclusion is that ISO 9000 certification generally enhances organizational performance. Performance metrics used to assess the benefits of implementing or certifying ISO 9000 are often divided into operational and financial/business factors. Singels et al. (2001) investigated five indicators of organizational performance, including product/service quality. Their findings suggested that ISO 9000 certification alone does not guarantee improved performance.

Instead, the underlying motivations for seeking certification are crucial in determining the outcomes. Organizations driven by internal motives, such as the desire to enhance efficiency or productivity, tend to experience better performance improvements than those motivated by external factors like expanding business opportunities or meeting customer demands. This interaction between motivation and performance outcomes has been corroborated by other studies, which also highlight the superior impact of internal motivations on achieving desired results.

While Fotopoulos and Psomas (2009) observed that ISO 9000 certification enhances an organizations administrative and operational performance, no direct correlation was identified to link ISO 9000 certification with improved metrics such as sales, profit margin, and market share. Instead, they noted that improved business performance tends to be an indirect benefit stemming from internal operational enhancements and ongoing improvement initiatives (Fotopoulos & Psoma, 2009). The

ISO 9000 results from Motwani et al. (1996) displayed several benefits. These included increased consistency in product, process, and service quality, enhanced market competitiveness, standardized operations, and greater operational discipline. Conversely, Martínez-Lorente and Martínez-Costa (2004) advised against pursuing ISO 9000 certification unless it is a customer requirement due to the substantial costs associated with achieving and maintaining the certification, which may outweigh the benefits and pass more costs through suppliers on to customers.

A study by Naveh and Marcus (2005) found benefits in ISO 9000 certification through reduced product deviations and control costs leading to positive customer feedback. Similar to the study conducted by Fotopoulos and Psomas (2009), Naveh and Marchus (2005) concluded that there was no direct correlation between ISO 9000 certification and improved performance metrics. For such business improvements to occur, companies needed to maintain diligent use of the ISO 9000-compliant QMS and engage in continuous improvement efforts. Rodríguez-Escobar et al. (2006) examined companies' benefits and satisfaction levels following ISO 9000 certification, and they found significant gains in organizational performance, operational productivity, and commercial success. However, the degree of satisfaction was closely linked to how well the results matched the expected benefits at the start of the certification process. They also observed that early adopters of ISO 9000 within a sector experienced more significant commercial benefits than those who adopted the certification later.

Kartha (2022) conducted a study to assess the relationship between ISO 9000 and quality-related factors and concluded that the certification had an overall improvement on consumer satisfaction and profitability metrics however did not influence the implementation of total quality management (TQM) principles. The study added that impediments to implementation included cultural friction and budgetary limitations (Kartha, 2022). The success of ISO 9001 certification efforts was most affected by budgetary constraints and resistance to cultural change within the company. Similarly, Rahman's (2001) study on small and medium enterprises found that organizations with ISO 9000 certification did not experience more significant benefits in TQM implementation or overall organizational performance than those without the certification. The notable exception was process control, where ISO 9000–certified

organizations showed significantly better results. Lewis et al. (2006) investigated the impact of ISO 9000 certification on the implementation of "hard" and "soft" TQM aspects. They discovered that hard aspects were more extensively implemented than soft. Since soft aspects are crucial for the success of TQM efforts, they recommended that future standard revisions should emphasize these softer elements of a QMS.

Zaramdini (2007) reported that "ISO 9000 certification contributed to improvements in a large number of quality-related measures, including: internal costs, profitability, productivity, employee motivation, customer satisfaction, and product quality" (p. 24). Additionally, Zaramdini highlighted a strong positive relationship between the reasons for pursuing ISO 9000 certification and the resulting benefits. Similarly, Santos and Escanciano (2002) explored the motivations behind seeking certification and the associated internal and external advantages. Their findings revealed that organizations pursued ISO 9000 certification for both internal and external reasons, with these motivations being relatively balanced. Internal benefits included advancements in human resource management, process efficiency, productivity, and cost savings. Although external benefits such as improved customer loyalty, higher sales, and greater market share were identified, Santos and Escanciano noted that these were perceived as less critical than the internal benefits

Rusjan and Alič (2010), in their extensive review of literature on the business performance impacts of ISO 9000 certification, emphasized that adopting an ISO 9000-compliant Quality Management System (QMS) does not inherently lead to operational improvements. They argued that the extent of these benefits is largely dependent on the motivations driving the certification and its integration with broader organizational goals. According to their findings, companies driven by internal motivations and those that align their quality policies with strategic objectives tend to experience more substantial benefits. Using a balanced scorecard (BSC) framework, Rusjan and Alič (2010) evaluated the advantages of ISO 9000 certification in roughly four areas of observation and relating to general customer satisfaction, internal processes, financial performance, and overall employee development. Their research confirmed that meaningful and validated improvements have been observed in each of these associated categories.

Nonetheless, organizations that pursued ISO 9000 certification primarily in response to customer demands tended to underappreciate the benefits in relation to the costs, in contrast to those motivated by internal objectives. Namara (2009) indicated that while businesses typically recognized the importance of maintaining their ISO 9000 certification, the predominant driving factor was external pressure from customers instead of a genuine commitment to continually enhance product or process quality. Furthermore, research conducted by Chow-Chua et al. (2003) revealed that obtaining ISO 9000 certification positively influenced overall financial performance. Their findings also highlighted that, even in the absence of financial obligations to shareholders, ISO 9000 certification resulted in improved process documentation, elevated perceptions of product and service quality, and enhanced communication among employees.

A study by Dick and Tarí (2013) questioned the cause-and-effect relationships often reported in studies linking ISO 9000 certification to enhanced business performance. They asserted that differences in performance between certified and non-certified companies could stem from pre-existing disparities before certification was pursued. Specifically, Dick and Tarí (2013) observed that companies achieving certification might already have had superior quality management systems, stronger financial standing, or operated in industries with higher growth potential. They emphasized the importance of exercising caution when interpreting comparative studies, as improved results may not solely be attributable to ISO 9000 certification. This perspective remains highly relevant for evaluating such claims today.

Srivastav (2010) explored how ISO 9000 certification influences various organizational aspects, including cultural, climatic, and behavioral dimensions, both before and after certification. The study highlighted implementing ISO 9000 fosters notable changes, such as increased collaboration, a shift in organizational climate from dysfunctional to functional traits, reduced role-related stress, and improved team-based problem-solving approaches. Expanding on organizational influences from ISO 9000 Naser et al. (2004) examined the differences in financial performance between organizations with ISO 9000 certification and those without it. Their research identified a clear positive relationship between certification and key financial metrics, particularly

return on sales (ROS) and economic value added, emphasizing the financial advantages associated without adoption of the standard.

Withers and Ebrahimpour (2001) conducted an in-depth study across various European industries to examine the requirements for achieving ISO 9000 certification, the primary challenges encountered during the process, and its effects on operational performance. Their research identified that the most resource-intensive components of implementing a Quality Management System (QMS) included internal auditing, document and data control, and process control. Additionally, Withers and Ebrahimpour (2001) highlighted several significant obstacles organizations faced when pursuing certification. These challenges included securing commitment from senior management, managing the time demands of the certification process, interpreting ISO 9000 requirements, and making substantial modifications to ensure the QMS aligned with the standard. Despite these difficulties, the study emphasized the considerable benefits of ISO 9000 certification. Chief among these were improvements in product and service quality. Moreover, Withers and Ebrahimpour reported operational gains such as enhanced internal communication, a stronger corporate image, greater efficiency, and improved competitive positioning, underscoring the strategic advantages of certification.

In summary, this in-depth literature review on ISO 9001 and ISO 21001 underscores the significance of standardized quality management systems in fostering organizational excellence across various sectors, including education. While ISO 9001 has long been established as a benchmark for quality management systems across industries, ISO 21001 extends these principles to the unique context of educational organizations, emphasizing learner-centric approaches and stakeholder engagement. The literature reveals that both standards share foundational elements, such as a focus on continual improvement and systematic management. However, ISO 21001's tailored requirements address the specific challenges of education, including diverse learner needs, pedagogical objectives, and societal responsibilities. This distinction positions ISO 21001 as a transformative tool for improving educational outcomes and promoting transparency, accountability, and inclusivity in learning environments.

Moreover, the financial implications of adopting these standards reveal nuanced impacts. While ISO 9001 demonstrates a direct correlation with operational efficiency and financial performance, the literature on ISO 21001's economic benefits remains limited, indicating an area ripe for further research. Nonetheless, the potential for ISO 21001 to enhance institutional reputation, attract stakeholders, and align with global educational goals suggests promising long-term benefits. This analysis provides a robust foundation for exploring the practical implications of these standards within specific institutions. The following chapter will examine how the adoption of ISO 9001 and ISO 21001 could benefit the Naval Postgraduate School, particularly in terms of enhancing operational efficiency, aligning with accreditation requirements, and reinforcing its commitment to excellence in education. By applying the insights from this review, the analysis aims to offer actionable recommendations that underscore the strategic value of these standards in advancing the institution's mission and global standing.

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IV. ANALYSIS

A. ROOT CAUSE ANALYSIS

NPS has faced recurring challenges in implementing and supporting assessment and documentation processes, as revealed when analyzing the multiple accreditation reviews between 2006 and 2024. The root causes of these challenges include fragmented review processes, inconsistent faculty engagement, inadequate faculty training in assessment, and a reliance on external feedback from Navy sponsors. NPS has struggled to integrate assessment practices into decision-making and strategic planning, further hindered by leadership gaps and insufficiently developed institutional learning objectives. Addressing these systemic issues is critical for NPS to achieve its educational goals and provide continuous improvement. The reviews from 2006, 2008, 2010, 2011, 2014, 2021, and 2024 each provide valuable insights into the recurring challenges in implementing and supporting university assessment and documentation. This root cause analysis has helped to determine the underlying concerns supporting NPS's goals to achieve higher education standards and continuously provide the best product available for the students and faculty.

1. 2006 Quality Assurance Challenges

Figure 3 highlights key factors contributing to the inconsistent tracking of student learning outcomes and fragmented curriculum reviews, emphasizing issues in review processes, documentation, administrative support, and faculty training.

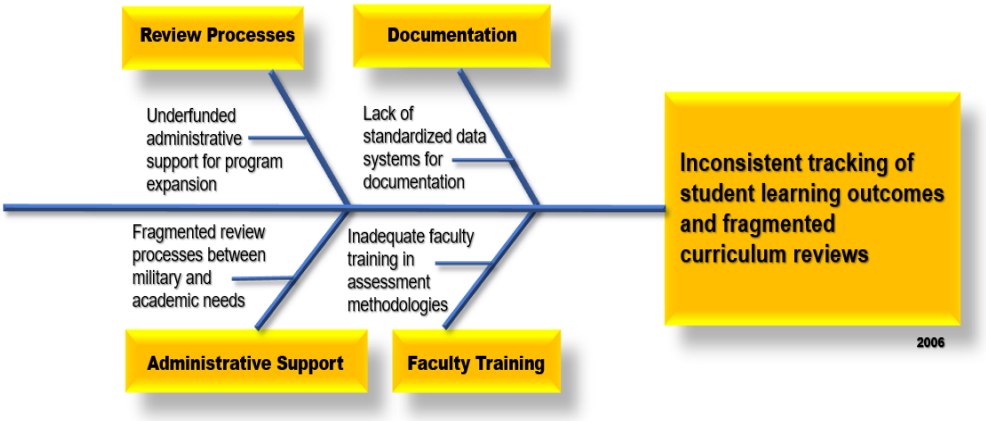

Figure 3. WASC Accreditation Review for NPS (2006).

The 2006 review by WASC highlighted critical shortcomings at NPS, including inadequate documentation of student learning outcomes, a fragmented approach to curriculum and program reviews, and a lack of standardized data systems (WASC, 2006). These issues were caused by inconsistent faculty training in assessment practices, insufficient resource allocation to support growing programs, and a reliance on outdated technology without a coordinated framework for tracking student progress. While NPS curricula include learning objectives and require culminating projects like capstones, assessments' systematic collection and documentation still need to be developed. Faculty expertise in their fields often does not extend to pedagogy and assessment methodologies, a gap worsened by the lack of formal orientation or training programs in assessment best practices. Additionally, the dual review processes of CR and APR for military and academic programs have not been integrated, leading to fragmented evaluations and incomplete documentation of student progress (WASC, 2006).

Resource limitations and inconsistent use of technology further hinder efforts to address these challenges. Inadequate administrative support has strained documentation and assessment functions, particularly for new and expanding programs. The growing adoption of distance learning programs has also created additional complexities, as inconsistent data systems across departments make tracking and analyzing student progress difficult (WASC, 2006). While some improvements have been made, the need for uniform tools and processes for documenting learning outcomes continues to limit

progress. To address these challenges, NPS must allocate sufficient resources, integrate military and academic review processes, and implement faculty training programs focused on assessment techniques to create a cohesive and effective evaluation framework.

2. 2008 Quality Assurance Challenges

Figure 4 illustrates the fragmented assessment processes and the disconnection between Curriculum Review (CR) and Academic Program Review (APR), focusing on issues in data utilization, assessment practices, faculty development, and leadership.

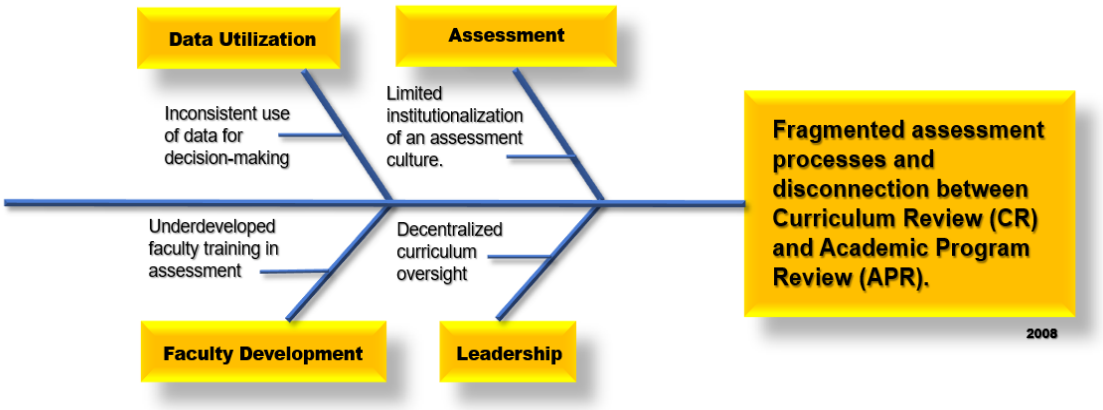

Figure 4. WASC Accreditation Review for NPS (2008).

By 2008, NPS continued to face challenges with fragmented assessment processes due to the disconnection between CR and APR. While CR focused on program relevance to defense needs and APR emphasized academic quality, these parallel processes needed to be fully integrated, complicating efforts to streamline documentation and assessment across the institution (NPS, 2008). Decentralized curriculum oversight and limited institutionalization of an assessment culture are needed to improve consistency in documenting learning outcomes. Faculty development in assessment practices needed more developed, leading to variability in how outcomes were documented. Additionally, NPS needed help integrating data into decision-making processes, weakening its ability to drive continuous improvement and apply assessment findings to campus planning (NPS, 2008).

The WASC team emphasized the need to embed assessment as a core institutional priority, but NPS had yet to achieve this cultural shift by 2008. Decentralized curricula management and varying oversight procedures led to inconsistent data collection on program effectiveness and learning outcomes (NPS, 2008). Feedback mechanisms, such as student surveys and sponsor input, were underutilized, and data from various stakeholders needed to be consistently applied to improve programs and documentation processes (NPS, 2008). While each curriculum had designated Academic Associates and Program Officers, procedures for maintaining curricula varied significantly, contributing to inconsistencies. Though subject-matter experts, faculty often needed more training in educational assessment practices, contributing to gaps in documenting and reviewing student learning outcomes. These inefficiencies in leveraging assessment data and feedback hindered efforts to improve program quality and align institutional practices with strategic goals (NPS, 2008).

3. 2010 Quality Assurance Challenges

Figure 5 identifies the variability in collecting and utilizing student learning evidence across departments, emphasizing challenges in program review processes, data integration, and faculty training.

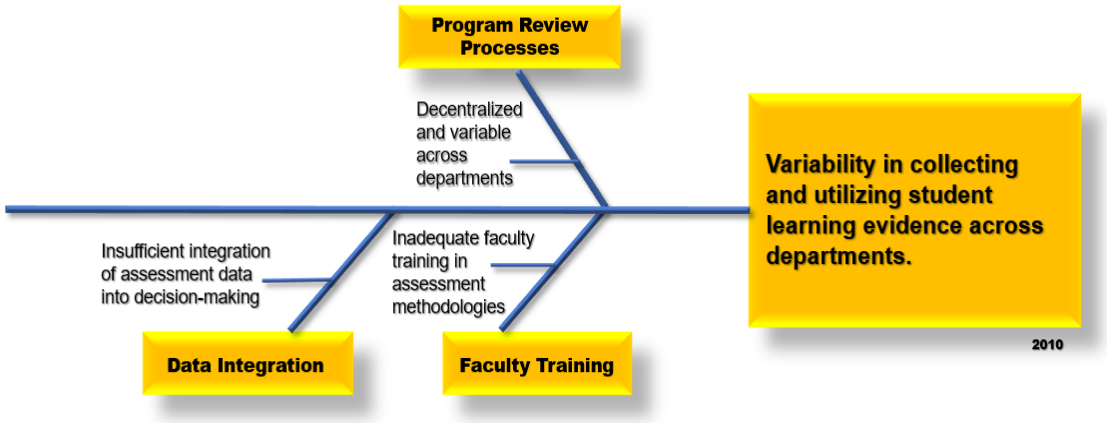

Figure 5. WASC Accreditation Review for NPS (2010).

The 2010 review identified persistent challenges in collecting and utilizing student learning evidence at NPS. Decentralized program review processes and the inconsistent implementation of assessment frameworks led to significant variability

across departments. While some departments collected data through capstone projects and other mechanisms, others were still in the process of developing such systems, resulting in gaps and incomplete data collection (WASC, 2010). The RAP framework was introduced to standardize assessment efforts and set campus-wide expectations, but its implementation needed to be revised. This decentralized approach, granting departments autonomy in developing procedures, contributed to inconsistencies in the quality of data collected and documented. Furthermore, delays in program reviews, coupled with insufficient integration of assessment data into institutional decision-making, hindered continuous improvement efforts and delayed strategic planning (WASC, 2010).

The report also highlighted limited faculty training in assessment methodologies as a critical factor in the variability of documentation quality. While evaluating student learning outcomes, faculty members often needed more standardized training or institutional support, leading to inconsistent practices across departments (WASC, 2010). Resource constraints and administrative inefficiencies further delayed program reviews and accreditation processes, limiting NPS's ability to document progress and implement improvements. While data on student learning and other metrics was being collected, it needed to be consistently integrated into decision-making processes, weakening the institution's capacity for evidence-based program enhancements. These ongoing gaps in systematized evidence collection and the disconnect between data and its application in program improvement underscore the need for more robust and centralized assessment practices (WASC, 2010).

4. 2011 Quality Assurance Challenges

Figure 6 highlights the inconsistent implementation of assessment protocols across departments, focusing on challenges in adopting best practices, assessment execution, planning integration, and engagement with learning outcomes.

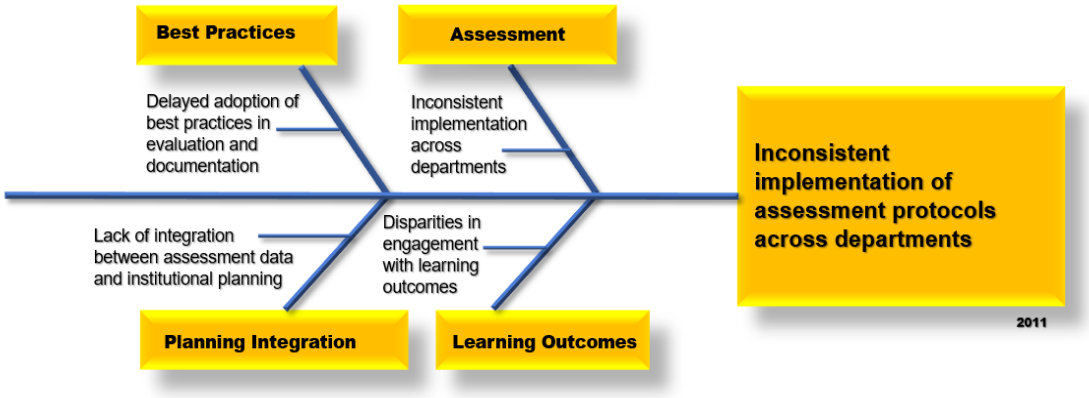

Figure 6. WASC Accreditation Review for NPS (2011).

In 2011, NPS made progress in developing protocols for assessing student learning, but inconsistent implementation across departments, notably those not subject to external accreditation, remained a significant challenge. Programs accredited by external agencies, such as ABET and AACSB, demonstrated more robust assessment practices, while non-accredited departments lagged behind (WASC, 2011). This disparity led to variability in documenting student learning outcomes and hindered efforts to standardize assessment processes institution wide. Faculty engagement with defining and measuring learning outcomes was still emerging, and limited training on assessment practices contributed to inconsistent implementation. While curriculum mapping and direct measures of student learning were introduced, their adoption across all academic units needed to be completed (WASC, 2011).

The lack of integration between assessment results and institutional planning further reduced the effectiveness of these efforts. While some progress was made in incorporating assessment data into program review and planning, the process needed to be fully embedded, particularly in non-accredited programs. There needs to be more alignment between assessment results and strategic planning to allow the institution to use data for continuous improvement (WASC, 2011). Delayed adoption of best assessment practices, especially in departments without external oversight, contributed to gaps in evaluating and documenting student learning outcomes. The WASC report emphasized the need for widespread adoption of standardized assessment practices to

ensure consistent evaluation and alignment of student learning outcomes with institutional goals (WASC, 2011).

5. 2014 Quality Assurance Challenges

Figure 7 illustrates the persistent inconsistencies in assessment practices across departments, focusing on challenges related to decentralized review processes, overreliance on external feedback, and limited faculty involvement in assessment initiatives.

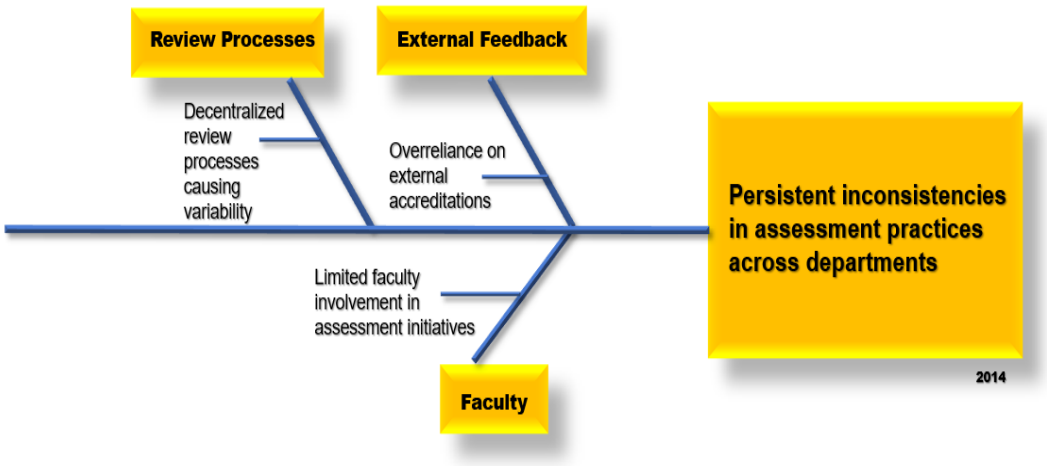

Figure 7. WASC Accreditation Review for NPS (2014).

The 2014 review revealed persistent inconsistencies in implementing assessment protocols due to a decentralized review structure and limited faculty engagement. Non-accredited departments lagged in establishing robust assessment mechanisms, relying heavily on external accreditations to drive evaluation standards (WASC, 2014). Departmental autonomy and varying engagement levels with the EESG further contributed to the uneven adoption of assessment practices. While initiatives like the EESG and roles such as the Associate Provost for Educational Effectiveness were established, gaps in institutional oversight and insufficient faculty development programs could have improved consistent engagement with assessment efforts (WASC, 2014). The decentralized nature of CR APR processes led to a lack of coordination, resulting in inconsistent application of assessment protocols and varying documentation quality across departments.

Programs with external accreditations from ABET and AACSB demonstrated more robust assessment mechanisms, but non-accredited programs struggled to establish structured evaluation processes (WASC, 2014). Although capstone assessments and other measures have been introduced, feedback from these assessments could have been more consistently used to enhance educational programs and strategic planning. Limited integration of assessment results into program improvement efforts weakened the institution's ability to drive continuous quality improvements. The report emphasized the need for systematic feedback loops and better coordination of assessment practices across departments to reduce variability and strengthen institutional oversight (WASC, 2014). Overall, while progress had been made, NPS faced challenges in fostering widespread faculty engagement and ensuring uniform implementation of assessment protocols.

6. 2021 Quality Assurance Challenges

Figure 8 illustrates the lack of standardized institution-wide metrics and alignment with strategic goals, focusing on inconsistent adoption of the assessment framework, delayed integration of assessment results into strategic planning, and insufficient resources for faculty development and infrastructure.

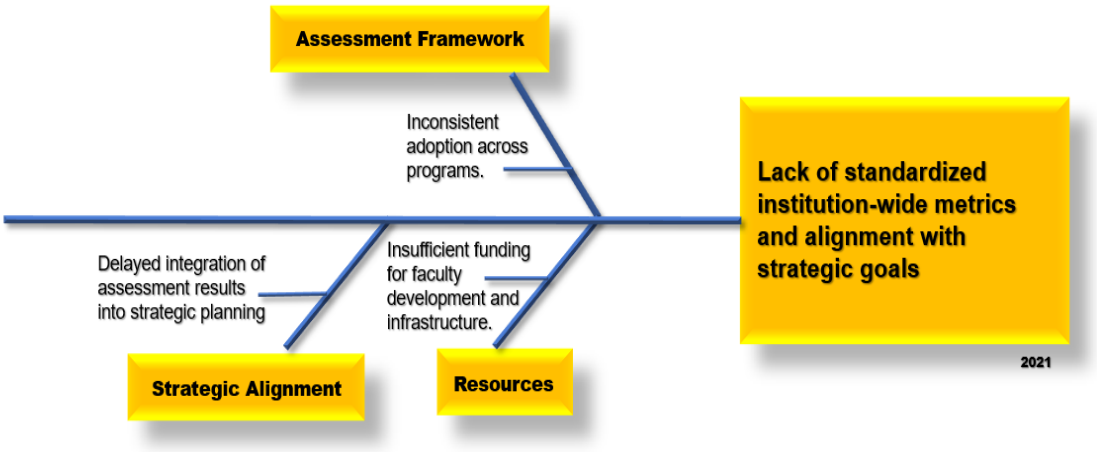

Figure 8. WASC Accreditation Review for NPS (2021).

By 2021, NPS continued to face challenges in implementing institution-wide metrics and standards for assessment. The inconsistent adoption of assessment practices across programs, coupled with insufficient resources and misalignment with strategic goals, hindered progress in improving educational effectiveness and documentation.

WASC emphasized the need for shared metrics and a cohesive system for evaluating program and student learning outcomes institution-wide, as the need for standardized approaches led to inconsistent documentation across departments (WASC, 2021). While some programs had robust assessment frameworks, others needed to catch up in adopting and implementing effective practices, resulting in a fragmented approach to documenting educational effectiveness. Resource limitations, particularly in faculty development and technological infrastructure, further compounded these issues, impeding efforts to create consistent and thorough assessment practices (WASC, 2021).

WASC recommended aligning NPS's vision, mission, and strategic plan with broader frameworks like E4S to better integrate assessment data into institutional planning and decision-making. The review stressed the importance of securing additional resources, such as hiring specialized faculty and modernizing facilities, to enhance operational effectiveness, including assessment activities (WASC, 2021). A disconnect between assessment practices and strategic planning created gaps in using data to guide resource allocation and program improvements. The delayed integration of assessment results into decision-making processes could have improved their effectiveness in driving continuous improvement. To address these challenges, WASC urged NPS to prioritize alignment between assessment efforts and institutional goals to ensure better use of data for strategic planning and documentation (WASC, 2021).

7. 2024 Quality Assurance Challenges

Figure 9 illustrates the challenges leading to the inconsistent implementation of PLOs, focusing on limited faculty engagement in assessment practices, overreliance on Navy sponsor feedback, the absence of finalized institutional learning objectives, and delays in appointing key leadership roles.

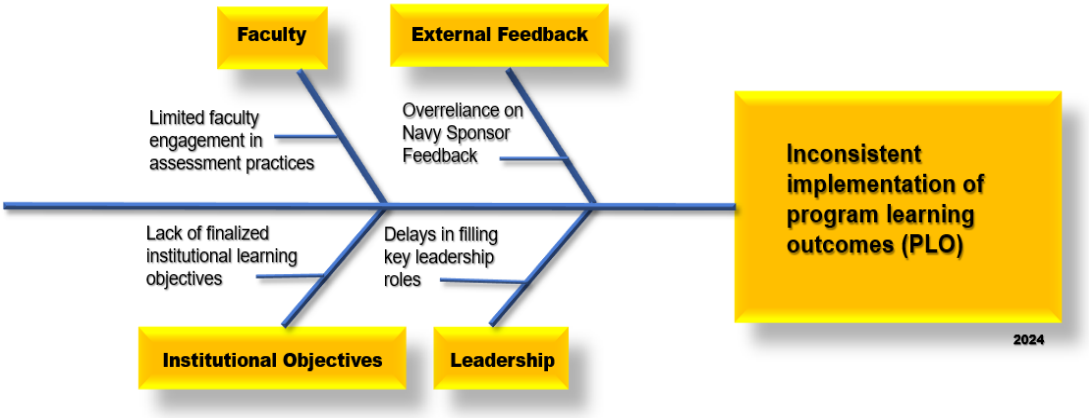

Figure 9. WASC Accreditation Review for NPS (2011).

The 2024 review highlighted delays in filling key leadership positions responsible for overseeing assessments, such as the Assessment Director, whose vacancy remained unfilled for extended periods, including after the initial appointment left in early 2024 (WASC, 2024). These delays, inconsistent implementation of PLO assessments, and an overreliance on Navy sponsor feedback hindered institutional progress in creating a comprehensive assessment program. While tools like CAD and CR were introduced, assessments remained inconsistent, with most programs evaluating only one outcome per review cycle, leading to gaps in systematic evaluations (WASC, 2024). Weak institutional oversight and limited faculty engagement further worsened these challenges, preventing meaningful improvements in documentation and program evaluations.

The absence of finalized institutional learning objectives and benchmarks three years after the 2020 reaffirmation visit continued to impede the school's ability to track progress and evaluate program effectiveness (WASC, 2024). Without alternative feedback mechanisms, overreliance on Navy sponsors for curriculum reviews further weakened the institution's internal ability to assess and document student learning outcomes. Although ABET, AACSB, and PMI-accredited programs demonstrated a strong awareness of assessment practices, other faculty and academic leadership lacked the expertise and training to implement assessments effectively. Limited faculty development in assessment methodologies contributed to inconsistent engagement and documentation practices across the institution, leaving significant gaps in the overall assessment framework (WASC, 2024).

8. Common Themes and Concerns

Figure 10 illustrates the factors contributing to inconsistent implementation and integration of assessment practices, focusing on challenges in resources, faculty engagement, review processes, strategy and integration, standardization and metrics, and leadership. Key issues include insufficient funding, inadequate faculty training, fragmented review processes, delays in aligning institutional learning objectives, lack of standardized metrics, and delays in filling key leadership roles.

Figure 10. Areas of Improvement for NPS (2006 – 2024).

The root cause analysis of NPS's assessment and documentation issues from 2006 to 2024 highlights inconsistent implementation of assessment protocols across departments. While some departments have made progress, others must catch up, resulting in variability in documenting and assessing student learning outcomes (WASC, 2024). Fragmented review processes, with APR and CR operating in silos, lead to inconsistent data collection and a lack of a unified approach to evaluating program effectiveness. Delays in appointing and maintaining leadership positions, such as the Director of Assessment, hinder progress in establishing comprehensive assessment practices. Limited faculty engagement due to insufficient training in educational assessment has also contributed to uneven participation across departments, leaving some programs disengaged from assessment efforts (WASC, 2024).

An over-reliance on external feedback from Navy program sponsors weakens NPS's internal assessment processes, as inconsistent sponsor engagement creates gaps in

program reviews (WASC, 2024). Additionally, the lack of finalized ILOs with clear benchmarks hinders the institution's ability to track progress and measure educational effectiveness. These challenges reflect deeper structural, cultural, and resource-related issues that impede NPS's implementation of consistent and effective assessment practices. Addressing these root causes, such as integrating assessment into institutional planning, fostering faculty development, and establishing standardized ILOs, will prevent ongoing issues and improve documentation and program evaluation processes (WASC, 2024).

The EOMS framework from ISO 21001, Figure 11, provides the foundational principles that can improve the process of utilizing lessons learned, evaluations, and assessments to implement continuous improvement. This process, depicted in the PDCA (Plan-Do-Check-Act) cycle shown in Figure 11, ensures that each step in the educational process informs the subsequent one, creating an iterative cycle for quality enhancement.

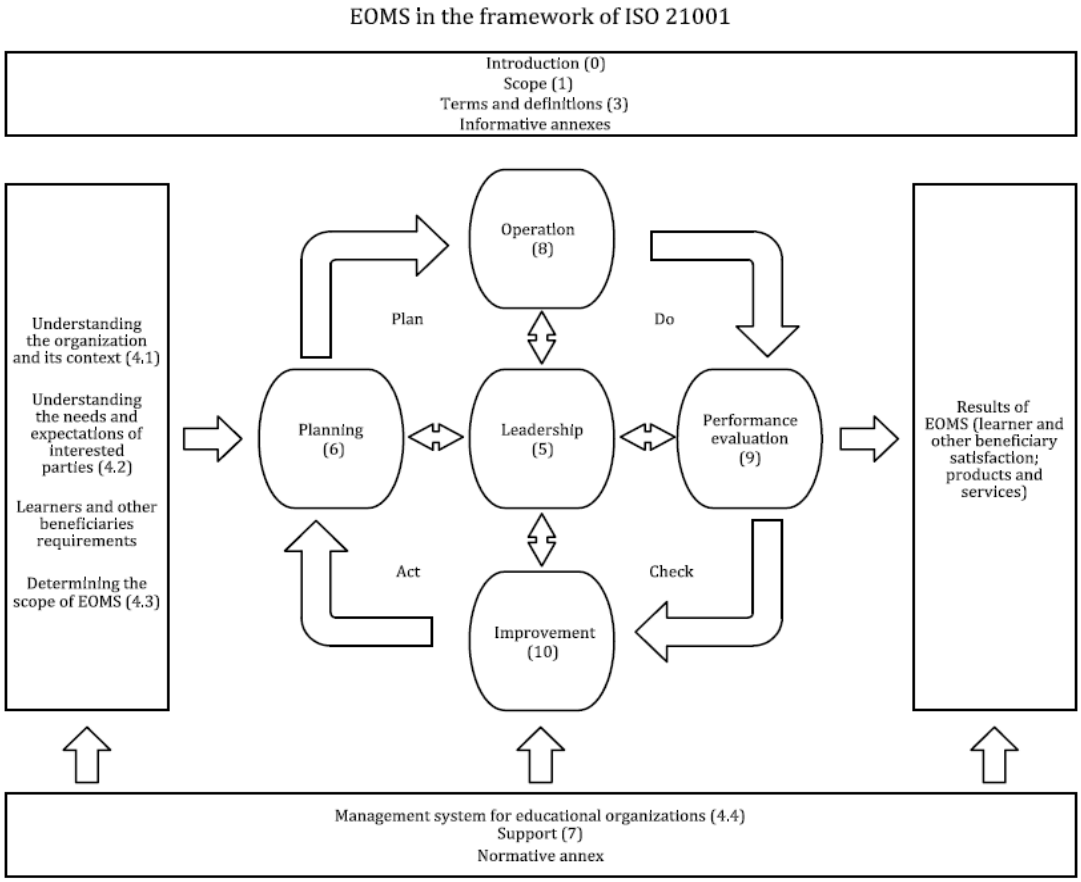

Figure 11. Plan-Do-Check-Act (PDCA) cycle. Source: ISO (2018).

For NPS, the root cause analysis underscores recurring challenges in implementing and supporting comprehensive assessment and documentation processes. Issues such as fragmented review processes, inconsistent faculty engagement, inadequate training, and overreliance on external Navy sponsor feedback have impeded effective data utilization for strategic decision-making and continuous improvement.

To truly close the loop on evaluation and assessment, NPS must focus on integrating its evaluation processes (Performance Evaluation in the EOMS framework) into institutional planning and improvement activities (Improvement phase). This involves not only assessing program effectiveness through structured evaluations but ensuring the findings are systematically fed back into the planning (Planning phase) and operational adjustments (Operation phase). Addressing identified gaps, such as faculty training in educational assessment, consistent engagement across departments, and integrating internal feedback mechanisms, would strengthen this loop.

By embedding a robust and proactive feedback loop, which includes root cause analysis and consistent documentation, NPS can ensure that lessons learned from past reviews and assessments are effectively incorporated into planning and decision-making. This strategic integration would help mitigate systemic issues and improve overall educational effectiveness, aligning with ISO 21001's framework of continuous quality improvement and fostering an institution-wide culture of assessment and enhancement.

Continuous improvement for institutional effectiveness at NPS aligns with the fundamental principles of the PDCA cycle within the EOMS framework (ISO 21001, 2018). This concept focuses on systematic and ongoing process enhancement, leveraging evaluations, assessments, and feedback to inform decision-making and strategic planning. The aim is to develop a self-sustaining system where improvements are identified, implemented, monitored, and refined in an iterative cycle.

At NPS, continuous improvement for institutional effectiveness needs to address the root causes highlighted in past accreditation and internal review cycles. Specifically, the reviews have identified issues such as fragmented review processes, inconsistent faculty engagement in assessment practices, insufficient training, and the overreliance on

external Navy sponsor feedback. These challenges hinder the ability to fully capitalize on lessons learned and integrate findings into strategic decision-making.

To achieve continuous improvement, NPS must work toward integrating assessment data seamlessly into decision-making processes. This would align with the "Check" and "Act" phases of the EOMS cycle, where performance evaluation results are reviewed and used to adjust plans and operations. By doing so, NPS can ensure that assessment data supports evidence-based decision-making, leading to measurable improvements in educational effectiveness. Addressing the inconsistencies in how assessments are conducted across various departments is essential for continuous improvement. Implementing standardized methodologies for documenting and evaluating student learning outcomes and faculty contributions ensures a more uniform approach to quality and effectiveness monitoring. Effective leadership plays a vital role in fostering a culture of continuous improvement. The historical delay in appointing leadership roles for assessment oversight at NPS has limited progress. Filling these positions promptly and ensuring strong leadership can enhance the strategic alignment of assessment practices with institutional goals. Furthermore, faculty engagement through training and development in assessment methodologies supports more consistent and effective participation. Establishing and integrating clear ILOs into the strategic plan allows for more systematic progress tracking. When ILOs are aligned with assessments and reviews, they serve as benchmarks that inform the "Plan" and "Do" phases of the PDCA cycle, setting the foundation for targeted improvements. Ensuring a strong mechanism to incorporate feedback from various assessments, whether from capstone projects, student surveys, or faculty evaluations, into planning and operational adjustments is crucial for closing the loop. This practice supports continuous quality improvement using real-time data and insights to inform future educational and strategic initiatives.

By embedding these principles into the institutional culture, NPS can drive continuous improvement, resulting in enhanced educational outcomes, better alignment with strategic goals, and more effective resource utilization. This comprehensive approach not only meets the standards of ISO 21001 but also positions NPS to maintain and elevate its institutional effectiveness and educational mission.

9. WSCUC Accreditation and ISO QMS Certification

During the 2024 WSCCUC Special Visit, the assessment team identified and recommended the following improvements for the Naval Postgraduate School:

- "Aligning vision, mission, and strategic plan with institutional goals, MOPs, and MOEs to allocate resources and guide future planning" (NPS, 2024b, p. 1).
- "Exercise effective academic leadership and act consistently to ensure that the quality of academic programs and the institution's educational purposes are sustained" (NPS, 2024b, p. 1).
- "Develop common or related metrics and standards through an institution-wide approach to assessment with the goal of developing program learning outcomes and evaluating student learning outcomes across the organization" (NPS, 2024b, p. 1).

To support solution development for these issues, the ISO 21001:2008 standard provides a comprehensive structure that compliments criteria for WSCUC accreditation. Within the ISO 21001 standards, the functions of Leadership, Planning, and Performance Evaluations can be applied to improve the stability of Naval Postgraduate School's accreditation program. This alignment provides a complimentary solution to build on the current educational structure of Naval Postgraduate School while enhancing areas requiring attention as identified by the 2024 WSCUC Special Visit.

Figures 12 and 13 illustrates the traceability between ISO 21001:2018 standards and WSCUC concerns for NPS. ISO aligns its operational and educational practices with accreditation requirements and provides a structured framework for leadership, planning, support, operations, performance evaluation, and improvement. These functions directly support WSCUC standards by addressing key concerns such as defining institutional missions (Standard 1), achieving educational objectives (Standard 2), and fostering quality assurance (Standard 4). For instance, ISO's focus on leadership, resource allocation, and data-driven planning strengthens institutional integrity and transparency while promoting continuous improvement. This alignment enables NPS to systematically meet WSCUC accreditation expectations, linking institutional processes with measurable outcomes for sustained educational excellence.

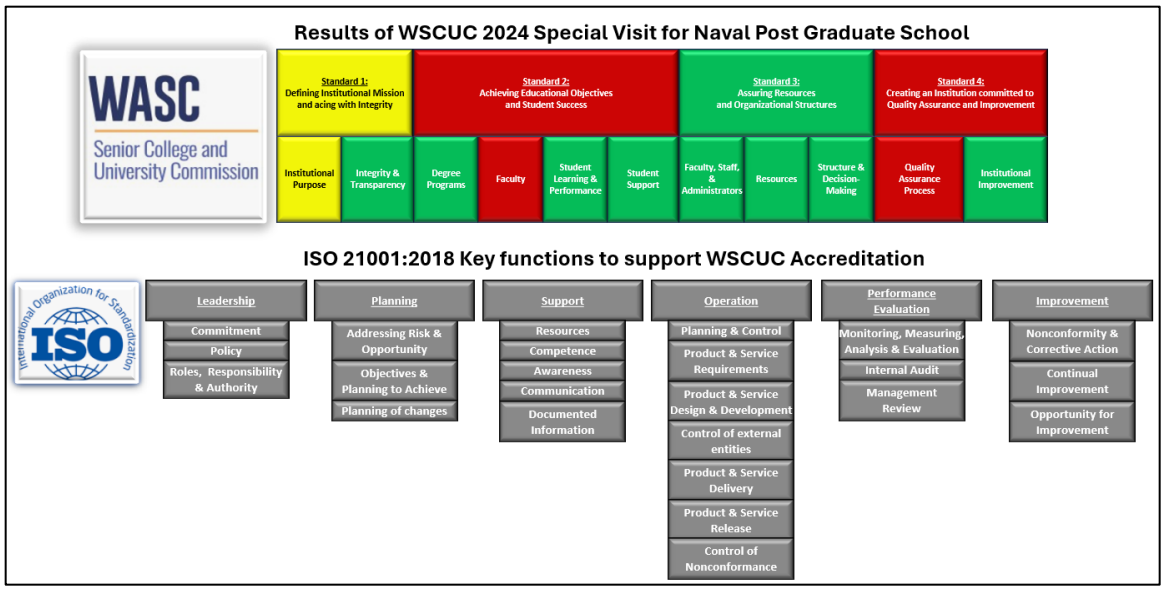

Figure 12. WSCUC Identified Accreditation Standards for NPS (2024).

WSCUC Standard/Concern	ISO 21001:2018 Key Function	Support Provided
Standard 1: Defining Institutional Mission and Acting with Integrity	Leadership	Establishes commitment, clear policies, and roles for maintaining institutional integrity and transparency.
	Planning	Addresses risks and opportunities while aligning objectives with the institutional mission.
	Support	Ensures resource availability and effective communication to uphold institutional purpose.
Standard 2: Achieving Educational Objectives and Student Success	Operation	Develops, designs, and delivers programs aligned with educational objectives to ensure student success.
	Support	Builds faculty and staff competence and enhances communication for effective teaching and learning.
	Performance Evaluation	Monitors and measures student performance to ensure alignment with educational objectives.
	Improvement	Enables continual improvement through corrective actions and opportunities for better student support.
Standard 4: Creating an Institution Committed to Quality Assurance and Improvement	Leadership	Drives organizational culture focused on quality assurance and continuous improvement.
	Performance Evaluation	Conducts audits and management reviews to identify areas for quality enhancement.
	Improvement	Implements continual improvement cycles to address nonconformities and foster institutional growth.

Figure 13. ISO and WSCUC Standards for Traceability

B. COMPARATIVE ANALYSIS OF CURRENT NPS EDUCATION QUALITY MANAGEMENT SYSTEM AND ISO CERTIFICATION

In the field of education, institutions face increasing pressure to establish credibility and ensure quality to fulfill their mission of delivering impactful learning experiences. As Harrington (2019) notes, this demand has prompted many organizations

to pursue accreditation and, more recently, ISO certification as frameworks for quality assurance. Although both accreditation and ISO certification aim to promote quality, they differ in their approaches, areas of emphasis, and recognized outcomes. Examining the alignment and divergence between accreditations such as that provided by the Western Association of Schools and Colleges (WASC) and ISO certification (notably ISO 9001 and ISO 21001) offers valuable insights. As Navarro (2022) suggests, understanding whether ISO certification addresses gaps in quality assurance not fully covered by WASC accreditation is key to developing a more robust and systematic approach to quality in education.

Both accreditation and ISO certification share a focus on ensuring quality, enhancing stakeholder satisfaction, and fostering continual improvement. Accreditation, such as the process overseen by WASC, involves a comprehensive evaluation of an institution's effectiveness in governance, program quality, and student learning outcomes to ensure compliance with recognized standards in education (WASC, 2021). In contrast, ISO certification emphasizes the implementation of quality management systems (QMS) that are industry-agnostic, with ISO 21001 specifically designed for educational organizations. As described by ISO (2018), ISO 21001 provides a management framework that helps educational institutions deliver consistent, high-quality learning experiences while meeting stakeholder expectations. By integrating these systems, institutions can potentially achieve a balance between industry-recognized management practices and education-specific quality standards.

Both systems promote the importance of continual improvement. WASC accreditation encourages institutions to engage in cycles of self-assessment, strategic planning, and action to improve educational outcomes and institutional processes (WASC, 2021). Similarly, ISO certifications, especially ISO 9001 and ISO 21001, incorporate a Plan-Do-Check-Act (PDCA) cycle that requires organizations to monitor and evaluate their quality management practices continuously (ISO, 2018). Additionally, both frameworks prioritize stakeholder satisfaction. While WASC addresses student success and community engagement, ISO standards emphasize customer (in this case, student and stakeholder) satisfaction, with structured mechanisms to ensure consistency and responsiveness to needs (Harrington, 2019).

Despite shared aims, there are fundamental differences in the scope, methodology, and focus of accreditation and ISO certification. Accreditation through WASC is primarily concerned with evaluating educational quality and institutional effectiveness. The accreditation process relies heavily on qualitative evaluation, with self-studies, peer reviews, and site visits forming a significant part of the assessment. The standards are tailored specifically for education, assessing aspects like program quality, faculty credentials, and student outcomes to ensure alignment with educational values and goals (WASC, 2021).

ISO certification, conversely, centers on quality management systems and is applicable across multiple industries. ISO 9001 and ISO 21001 emphasize operational efficiency, consistency, and risk management. The certification process relies on standardized documentation and regular audits to verify conformity with established management practices (ISO, 2018). Unlike WASC accreditation, ISO certification provides a more process-oriented approach, focusing on how institutions operate rather than evaluating the quality of educational programs themselves (Navarro, 2022). Additionally, accreditation and ISO certification differ in terms of compliance and recognition. Accreditation from WASC is often required for educational institutions to establish credibility, gain eligibility for government funding, and demonstrate adherence to educational standards (WASC, 2021). ISO certification, while beneficial, is not mandated and is typically sought by institutions looking to enhance their internal management practices, standardize procedures, and improve efficiency. ISO certifications are globally recognized, which can appeal to institutions with international aspirations, but they do not carry the same weight as accreditation in terms of educational quality assurance (Harrington, 2019).

While WASC accreditation rigorously assesses educational quality, it does not focus extensively on the operational aspects that underpin institutional efficiency, risk management, and process standardization. This gap leaves room for ISO certification to add value by introducing a structured approach to quality management that emphasizes consistency, risk-based thinking, and systematic process improvement (ISO, 2018). ISO 9001, for example, requires institutions to identify potential risks and implement mitigation strategies, a component that is not explicitly required in WASC accreditation

standards (Navarro, 2022). Risk management is especially beneficial for educational institutions as it prepares them to handle unexpected challenges, whether they relate to operations, student services, or program delivery. Additionally, ISO standards encourage institutions to standardize their processes across departments, promoting efficient workflows and reducing variability, which can enhance operational resilience and scalability (Harrington, 2019). ISO certification also strengthens stakeholder satisfaction in a way that complements WASC's focus on educational outcomes. The ISO 21001 standard for educational organizations is explicitly designed to improve the management of educational delivery and enhance stakeholder satisfaction, thereby aligning internal processes with the needs and expectations of students, faculty, and other community members (ISO, 2018).

Through systematic feedback loops and regular assessments, ISO certification enables institutions to gauge satisfaction more effectively, using data to inform improvements. This focus on data-driven decision-making and feedback mechanisms can bolster WASC's commitment to continual improvement and accountability in educational quality (Navarro, 2022). Many institutions have successfully integrated both WASC accreditation and ISO certification to enhance their quality framework, benefiting from the complementary strengths of each. For example, an educational organization that holds both WASC accreditation and ISO 21001 certification may demonstrate not only a commitment to high educational standards but also a robust management system that improves operational efficiency and risk management. Such institutions report enhanced clarity in processes, reduced redundancies, and improved accountability across departments (Harrington, 2019).

While WASC accreditation and ISO certification serve distinct purposes, they offer complementary pathways to quality assurance in education. WASC accreditation remains essential for evaluating educational quality, governance, and student success, while ISO certification adds value by addressing operational efficiency, risk management, and process standardization. Together, these frameworks create a comprehensive quality assurance model that enhances both educational effectiveness and institutional management (WASC, 2021). Institutions that pursue both WASC accreditation and ISO certification can benefit from a dual approach that not only meets

educational standards but also promotes internal consistency, stakeholder satisfaction, and international recognition. By integrating the strengths of accreditation and ISO certification, educational organizations can foster a culture of excellence that supports continual improvement, accountability, and resilience in an increasingly competitive and dynamic educational landscape (ISO, 2018; Navarro, 2022).

C. COMPARATIVE ANALYSIS OF ISO 9001 AND ISO 21001

1. Fundamental Principles

ISO 9001 is a globally recognized quality management system (QMS) standard that has shown success across many industries and sectors. ISO 21001 was introduced to address the specific needs of educational institutions and adopts and adapts ISO 9001 principles to the education sector. Figure 14 illustrates how ISO 21001:2018 builds upon the fundamental principles established by ISO 9001:2015 while expanding to address sector-specific needs in education. ISO 9001's principles, such as leadership, process approach, improvement, and evidence-based decision-making, serve as the foundational framework for ISO 21001. However, ISO 21001 introduces additional principles—social responsibility, accessibility and equity, ethical conduct in education, and data security and protection—which are critical for addressing the unique challenges and objectives of educational organizations. These additions are summarized below and reflect the distinct mission of educational institutions and how ISO 21001 addresses these gaps.

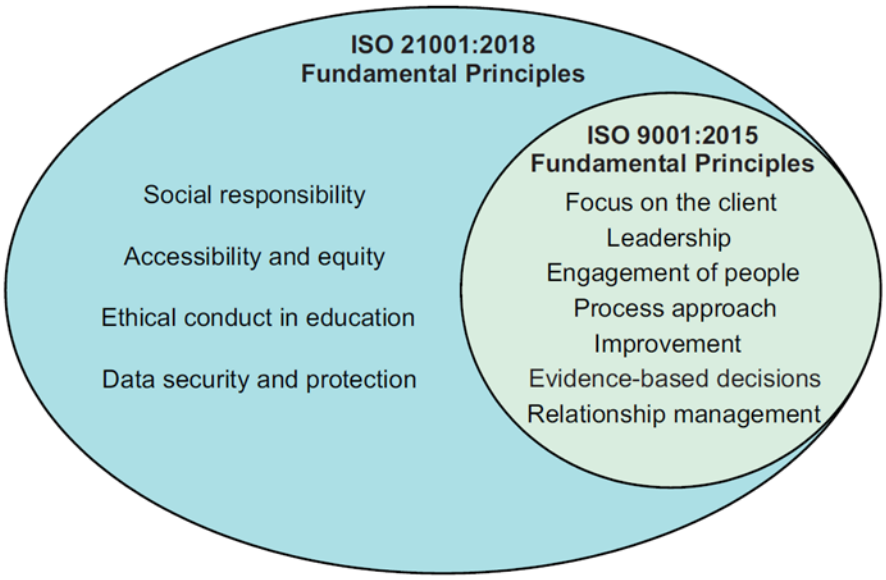

Figure 14. ISO 21001:2018 and ISO 9001:2015 Fundamental Principles. Source: Kovalenko et al. (2020).

a. Social Responsibility

Social responsibility is a fundamental principle of ISO 21001, reflecting the standard's emphasis on the ethical and sustainable impact of educational organizations. Drawing from the framework of ISO 26000, ISO 21001 defines social responsibility as the organization's obligation to address its societal, economic, and environmental impacts transparently and ethically. This includes fostering sustainable development through initiatives such as ensuring equitable access to quality education, prioritizing health and safety, and promoting societal welfare. Additionally, ISO 21001 emphasizes compliance with legal and international norms, while integrating these responsibilities into organizational practices and stakeholder relationships. The benefits of adopting social responsibility are far-reaching, including enhanced reputation, stronger relationships with stakeholders, cost savings from efficient resource use, improved risk management, and greater staff satisfaction. By embedding social and environmental considerations into their operations, educational institutions can align with broader societal goals and ensure long-term success (ISO, 2018).

b. Accessibility and Equity

Accessibility and equity are central to ISO 21001, emphasizing the need for educational organizations to be inclusive, flexible, transparent, and accountable. The standard highlights the importance of addressing the diverse needs, abilities, and backgrounds of learners, including those with special requirements. To achieve this, organizations must ensure broad access to their educational products and services while promoting equitable opportunities for all learners to benefit. According to ISO 21001, these practices not only widen the pool of potential learners but also increase satisfaction among those with special needs and enhance the organization's ability to meet the requirements of various stakeholders. Furthermore, fostering a diverse learner population contributes to innovation and enriched learning through the exchange of diverse perspectives. These principles underscore the commitment to providing inclusive and equitable education, which is essential for meeting both organizational and societal goals (ISO, 2018).

c. Ethical Conduct

Ethical conduct in education is a fundamental principle of ISO 21001, emphasizing the importance of fostering a professional and equitable environment within educational organizations. The standard underscores the need for organizations to avoid conflicts of interest, treat all stakeholders fairly, and ensure that their activities benefit society as a whole. Ethical practices not only project an image of integrity—defined by honesty and fairness—but also uphold the highest standards of professionalism among staff. ISO 21001 highlights several key benefits of ethical conduct, including reduced losses from corrupt activities, an enhanced organizational reputation, improved staff morale and motivation, stronger relationships with stakeholders, and the preservation of integrity in the research process and outcomes. These practices contribute to sustained success and the fulfillment of societal and educational missions (ISO, 2018).

d. Data Security and Protection

Data security and protection are essential principles of ISO 21001, ensuring that all stakeholders can engage with educational organizations with confidence in the care

and confidentiality of their data. The standard emphasizes the importance of maintaining data confidentiality, integrity, and availability by identifying threats and vulnerabilities and implementing controls to mitigate risks. According to ISO 21001, robust data management systems provide several key benefits, including protecting information from unauthorized access or deletion, preventing data loss and the associated costs of recovery, and fostering trust through clear and transparent data disclosure policies. Additionally, secure and reliable data supports evidence-based decision-making, improves emergency response capabilities, and facilitates the efficient retrieval of information. These practices not only enhance organizational trust and performance but also align with the broader goal of fostering a secure and accountable educational environment (ISO, 2018).

2. Key Aspect Differences

We use analogical reasoning to explore the similarities and differences between ISO 9001 and ISO 21001, focusing on how the latter adapts the principles of the former to meet the unique challenges of the educational sector. By systematically comparing key aspects, we can assess whether the documented benefits of ISO 9001 offer valuable insights for the application of ISO 21001 in educational contexts. Table 5 show the major comparative differences between the two ISO standards, highlighting how ISO 21001 modifies the general principles of ISO 9001 to address educational priorities, such as learner outcomes, while still emphasizing quality management and continual improvement. The comparison is structured into five sections: core similarities, key differences, causal mechanisms, challenges in direct comparisons, and the potential for cross-sector insights. These sections highlight the shared principles between the two standards and the necessary sector-specific adaptations, offering a framework to understand how ISO 21001 can benefit educational organizations.

Table 5. Comparison Table: ISO 9001 vs. ISO 21001.

Aspect	ISO 9001 (Quality Management)	ISO 21001 (Educational Organizations)	Major Difference
Scope	Applies to all organizations regardless of type or size.	Specific to educational organizations and related sectors.	ISO 21001 is sector-specific, whereas ISO 9001 is generic.
Objective	Ensure consistent quality of products/ services.	Improve educational outcomes and learner satisfaction.	ISO 21001 focuses on learners' needs and satisfaction.
Focus	Customer satisfaction and continual improvement.	Learner satisfaction and alignment with educational goals.	ISO 21001 emphasizes education-specific stakeholders.
Structure	10 clauses in a high-level structure.	11 clauses adapted for education.	Additional clause in ISO 21001 focuses on education-specific issues.
Key Stakeholders	Customers, suppliers, regulators, employees.	Learners, educators, regulatory bodies, and community.	ISO 21001 recognizes learners as a primary stakeholder.
Performance Metrics	Focus on measurable quality objectives for products/services.	Focus on educational goals and learning outcomes.	ISO 21001 aligns metrics with educational effectiveness.
Continuous Improvement	Plan-Do-Check-Act (PDCA) cycle.	Plan-Do-Check-Act (PDCA) cycle tailored to education.	ISO 21001 adapts PDCA to educational processes.
Risk Management	Emphasizes risk-based thinking across processes.	Focuses on risks related to education quality and accessibility.	Risk management is tailored to education in ISO 21001.
Leadership Role	Top management ensures quality objectives and resource allocation.	Leadership ensures alignment with educational mission and goals.	Educational mission central to ISO 21001 leadership.
Customization	Can be applied to any industry; no sector-specific requirements.	Contains education-specific clauses, such as accessibility.	ISO 21001 customizes principles for educational needs.
Stakeholder Feedback	Collects customer feedback for improvement.	Collects learner, parent, and community feedback.	Stakeholder feedback is broader in ISO 21001.
Accreditation	Demonstrates capability to consistently provide quality services.	Demonstrates alignment with educational objectives and values.	Accreditation aligns with sector goals in ISO 21001.

a. Foundational Principles

Aspects Referenced: Scope, Objective, Focus, Continuous Improvement, Leadership Role

ISO 9001 and ISO 21001 share foundational principles aimed at enhancing process efficiency, stakeholder satisfaction, and organizational performance. Heras-Saizarbitoria et al. (2011) highlight that ISO 9001 emphasizes process standardization and continual improvement, enabling organizations to reduce operational variability and improve outcomes. Similarly, ISO 21001 applies these principles to educational institutions by promoting consistency in teaching, curriculum delivery, and administrative processes and practices (ISO, 2018). Both standards also adopt the Plan-Do-Check-Act (PDCA) cycle, a proven framework for continual improvement, with ISO 21001 tailoring the approach to reflect the nuances of educational processes (Natarajan et al., 2017). Both ISO 9001 and ISO 21001 place a strong emphasis on stakeholder satisfaction, though their specific applications differ. As noted by Becket and Brookes (2006), ISO 9001 is designed to meet customer expectations, fostering trust and loyalty in business contexts. This focus aligns closely with ISO 21001's dedication to satisfying the needs of learners, parents, and other educational stakeholders. By addressing these groups effectively, educational institutions can enhance their reputation and build stakeholder trust, much as businesses achieve customer loyalty through ISO 9001. Additionally, both standards underscore the importance of leadership commitment and data-driven decision-making. Natarajan et al. (2017) emphasize that these elements are crucial for ensuring that organizational practices align with strategic objectives and for driving continual improvement, whether in business or educational environments. Together, these shared priorities highlight the standards' mutual goal of improving outcomes through trust-building and strategic alignment.

b. Sector-Specific Adjustments

Aspects Referenced: Scope, Objective, Performance Metrics, Stakeholder Feedback, Customization

Although ISO 9001 and ISO 21001 share foundational principles, their sector-specific applications introduce notable differences. ISO 9001 is designed for diverse industrial contexts, where measurable outcomes often include reduced defect rates, cost savings, or market share growth. Santos et al. (2011) emphasize that these metrics align with business priorities such as operational efficiency and profitability. In contrast, educational institutions prioritize outcomes like learner achievement, satisfaction, and equity, which require qualitative metrics and a broader focus on societal impact (Owlia & Aspinwall, 1997).

The financial models underpinning the standards also differ significantly. As noted by Terziovski et al. (2003), ISO 9001 aligns well with industries that rely on revenue generated through sales or production efficiency. By comparison, educational organizations often operate on funding sources such as tuition fees, public subsidies, and philanthropic contributions. ISO 21001 reflects these realities by emphasizing accessibility, inclusivity, and the alignment of education with societal needs (ISO, 2018). These distinctions shape the pathways to measurable benefits, with educational organizations focusing on improved student retention, higher enrollment, or enhanced stakeholder relationships rather than immediate cost reductions (Owlia & Aspinwall, 1997). Together, these sector-specific adjustments underline the importance of tailoring expectations and measurement criteria to the unique goals and operational realities of educational institutions under ISO 21001. This contrasts with the more universally applicable business outcomes targeted by ISO 9001.

c. Driving Benefits

Aspects Referenced: Focus, Continuous Improvement, Risk Management, Leadership Role, Stakeholder Feedback

Despite their sector-specific differences, the causal mechanisms that underpin the success of ISO 9001 also offer valuable insights into the potential benefits of ISO 21001 when appropriately adapted. Heras-Saizarbitoria et al. (2011) argue that ISO 9001 drives success through operational efficiencies, including waste reduction, streamlined workflows, and consistent processes. These mechanisms not only enhance productivity but also improve resource utilization. Similarly, ISO 21001 leverages these principles by

streamlining administrative and instructional processes, which can enhance the quality, reliability, and efficiency of educational delivery (ISO, 2018).

Stakeholder satisfaction represents another critical mechanism shared by both standards. Corbett et al. (2005) highlight how customer satisfaction in ISO 9001 fosters loyalty, repeat business, and improved organizational reputation. In the context of ISO 21001, Becket and Brookes (2006) suggest that learner satisfaction plays an analogous role, contributing to institutional reputation, stabilizing enrollment rates, and attracting external funding. This reputational enhancement under both standards not only strengthens stakeholder relationships but also draws attention from external audiences, such as donors or prospective students, further bolstering organizational success.

Leadership also plays a pivotal role in aligning organizational goals with strategic objectives in both standards. However, ISO 21001 places a greater emphasis on the educational mission as a central guiding framework, ensuring that leadership decisions prioritize the unique goals of educational institutions (ISO, 2018). By adapting these proven mechanisms from ISO 9001, ISO 21001 enables educational organizations to achieve operational efficiencies and stakeholder satisfaction while aligning their practices with their mission-driven objectives.

d. Challenges in Direct Comparisons

Aspects Referenced: Performance Metrics, Stakeholder Feedback, Accreditation

While analogical reasoning underscores shared principles and causal mechanisms between ISO 9001 and ISO 21001, the distinct contexts of industry and education introduce significant challenges to direct comparisons. Heras-Saizarbitoria and Boiral (2013) observe that ISO 9001's success is often quantified through operational metrics such as defect reduction, cost savings, and market share growth. In contrast, ISO 21001's impact can be more challenging to measure due to the qualitative nature of educational outcomes. Metrics such as student satisfaction, equity in access, and long-term societal contributions often resist the straightforward measurement methods used in industry (Owlia & Aspinwall, 1997). This disparity complicates the evaluation of ISO 21001's effectiveness and necessitates a more nuanced, context-sensitive approach.

Shared principles between the two standards—such as a focus on continuous improvement, stakeholder engagement, and leadership commitment—highlight the potential for transferable benefits across sectors. Heras-Saizarbitoria and Boiral (2013) emphasize that consistent adherence to quality management principles enhances organizational performance in diverse settings, suggesting that the foundational strategies of ISO 9001 may inform and benefit ISO 21001 implementation. However, as Santos et al. (2011) point out, the application of such principles must align with the unique goals of the educational sector, which often extend beyond operational efficiency to include broader societal impacts.

The funding structures and success metrics in education further distinguish ISO 21001 from ISO 9001. While ISO 9001 typically supports organizations driven by financial performance, ISO 21001 operates within educational institutions that rely on public funding, tuition fees, and philanthropic contributions (ISO, 2018). This divergence necessitates tailoring quality management systems to meet the expectations of diverse stakeholders, including learners, parents, and communities. As Owlia and Aspinwall (1997) note, educational organizations prioritize outcomes such as improved teaching quality, equity, and accessibility—goals that require specific evaluation frameworks not traditionally addressed by ISO 9001.

These differences underscore the need for adaptable approaches when implementing and comparing these standards. While the principles of ISO 9001 can inspire the development of ISO 21001, success in the educational sector requires a framework that accommodates its qualitative metrics, mission-driven objectives, and societal responsibilities. This tailored approach ensures that ISO 21001 not only aligns with its unique context but also achieves meaningful and measurable improvements in educational outcomes.

e. Potential for Cross-Sector Insights

Aspects Referenced: Focus, Customization, Stakeholder Feedback, Leadership Role

The application of ISO 9001 principles to educational institutions through ISO 21001 demonstrates the adaptability of quality management system (QMS) frameworks

to diverse sectors. ISO 9001, widely implemented across industries, provides a robust foundation for understanding the benefits of quality management, as it consistently drives improvements in operational performance and stakeholder trust (Heras-Saizarbitoria et al., 2011). However, ISO 21001 requires tailored approaches to address the unique goals and challenges inherent to the education sector. Educational institutions, for instance, must navigate distinct performance metrics, such as learner satisfaction and educational outcomes, which differ significantly from the financial and production metrics often prioritized in commercial settings (Owlia & Aspinwall, 1997).

By leveraging the shared emphasis on process improvement, stakeholder satisfaction, and leadership engagement—principles central to both standards—educational institutions can adapt ISO 21001 to enhance organizational success. For example, ISO 9001's focus on stakeholder feedback as a driver of continuous improvement is mirrored in ISO 21001's broader emphasis on engaging learners, parents, and community members (Becket & Brookes, 2006). This approach ensures that institutional goals align with the evolving needs of stakeholders, fostering accountability and responsiveness that can significantly improve institutional reputation and stability.

Analogical reasoning further aids in understanding the cross-sector applicability of QMS principles by identifying parallels between ISO 9001 and ISO 21001 while also accounting for their contextual differences. While ISO 9001 provides a strong precedent for the effectiveness of standardized quality management practices, educational institutions must adapt these practices to fit their specific operational environments. For instance, ISO 21001's emphasis on inclusivity and accessibility represents a unique opportunity for educational organizations to create social value alongside operational improvements. These features distinguish ISO 21001 from its predecessor and reflect the sector's broader ethical and social responsibilities (ISO, 2018).

Adopting ISO 9001-inspired practices such as leveraging leadership roles to drive quality initiatives can help educational organizations using ISO 21001 to enhance their operational efficiency and attract external support. As ISO 9001 has shown across various industries, consistent adherence to quality management principles can build stakeholder trust and support broader organizational goals (Heras-Saizarbitoria & Boiral,

2013). Similarly, ISO 21001's focus on creating an inclusive and accessible learning environment aligns well with the needs of modern educational institutions, positioning them to secure partnerships, funding, and enhanced community engagement (ISO, 2018).

3. Discussion

ISO 9001 is a well-established QMS standard and has demonstrated positive impacts on performance across different regions, countries, industries, and sectors as evidenced in this literature review. In contrast, ISO 21001, a relatively new QMS tailored specifically for educational institutions, lacks extensive peer reviewed research to directly support its impact on performance and related benefits within its target sector. By applying analogical reasoning, this explores whether the documented advantages of ISO 9001 may offer insights into ISO 21001's capability to generate benefits within education-based organizations like NPS.

Both ISO 9001 and ISO 21001 are built on foundational principles designed to enhance process efficiency and stakeholder satisfaction, which are closely linked. Central to ISO 9001's structure are process standardization and consistency, which help organizations reduce operational variability, improve quality, and achieve cost efficiencies (Heras-Saizarbitoria et al., 2011). ISO 21001 incorporates similar principles but adapts them to the unique structure of educational institutions, focusing on consistency in educational delivery and process improvements in administrative and instructional practices (ISO, 2018). Additionally, both standards emphasize continual improvement, with documented cases showing that the ongoing refinement of practices under ISO 9001 has led to improved operational outcomes and reduced costs (Corbett et al., 2005). In parallel, ISO 21001's framework also emphasizes student and stakeholder satisfaction, akin to ISO 9001's focus on customer satisfaction. For educational institutions, satisfying student needs and expectations can be analogous to maintaining high customer satisfaction in business, as both are linked to reputation and retention (Becket & Brookes, 2006). Finally, both standards require strong leadership engagement and data driven decision making, which are critical elements in aligning operations with strategic goals and optimizing resource allocation (Natarajan et al., 2017; Heras-Saizarbitoria & Boiral, 2013).

While there are substantial overlaps between ISO 9001 and ISO 21001, significant sector-specific differences may affect the transferability of ISO 9001's impact to educational institutions adopting ISO 21001. ISO 9001 is primarily designed for broad industry applications, where improvements often result directly from cost reductions, revenue growth, and expanded market share (Santos et al., 2011). Educational institutions, however, typically operate under different models and performance metrics. Unlike commercial enterprises, many educational institutions rely on public funding, tuition fees, and donations rather than direct sales or production, making their financial metrics less directly tied to operational efficiencies (Owlia & Aspinwall, 1997).

Moreover, ISO 9001 often demonstrates its impact through quality improvements and reductions in defect rates, which are central to industries like manufacturing (Terziovski et al., 2003). However, in education quality improvements under ISO 21001 might be reflected in educational outcomes and student satisfaction rather than defect rates, thereby making benefits less direct and more challenging to quantify (Becket & Brookes, 2006). These differences imply that the pathway to benefits may be more indirect in educational institutions, with the benefits of ISO 21001 potentially linked more to reputational and enrollment factors than immediate cost savings.

Despite these differences, the causal mechanisms that underlie the impacts of ISO 9001 may still operate within the context of ISO 21001, albeit with adjustments to fit educational settings. One of the primary ways ISO 9001 enhances organizational processes is by improving operational efficiency, which reduces waste, streamline workflows, and minimizes unnecessary costs (Heras-Saizarbitoria et al., 2011). Similarly, ISO 21001 could contribute to cost savings in education through enhanced process consistency in administrative and teaching functions, reducing redundant processes and inefficiencies that drive up costs (ISO, 2018). Stakeholder satisfaction is another relevant mechanism. In ISO 9001, high customer satisfaction is linked to loyalty and repeat business, enhancing financial stability (Corbett et al., 2005). For ISO 21001, student and stakeholder satisfaction may analogously support financial performance through improved student retention, enrollment stability, and potentially enhanced funding opportunities (Becket & Brookes, 2006). Additionally, the reputational benefits

associated with ISO certification in both standards may attract positive attention from external stakeholders, donors, and even prospective students.

Quantifying the degree of similarity between ISO 9001 and ISO 21001 can help in assessing how strongly benefits might translate across sectors. Metrics such as operational overlap, stakeholder satisfaction, and management engagement could be used to approximate the potential effectiveness of ISO 21001. Studies show that consistent adherence to quality standards improves operational performance across diverse sectors, making it reasonable to expect that similar gains might also be achievable in education (Heras-Saizarbitoria & Boiral, 2013). However, the unique funding models and goals of educational institutions require a cautious approach, as quality metrics in education are more complex and often have broader societal implications (Owlia & Aspinwall, 1997).

D. ISO CERTIFICATION PROCESS

The ISO certification process is governed by a multi-tiered system involving four key groups: the first being the organization or company seeking certification, followed by the certification bodies (comprised of auditors), the accreditation bodies, and the standard setters (ISO, 2023). As discussed by ISO, participating organizations begin by conducting a gap analysis to pinpoint differences between their current practices and the requirements of the ISO standard being pursued, after which the firm will then take steps to align their current practices with the standard to meet compliance (2023). As Pivka (2004) explains, after implementing necessary adjustments, firms select an accredited certification body to conduct a non-financial audit assessing compliance. Upon successfully passing this audit, the certification body grants the organization a certificate of compliance. Over time, accreditation bodies oversee and evaluate these certification bodies to ensure their capacity to conduct reliable audits, as emphasized by Pivka (2004). Additionally, standard-setting organizations like ISO are tasked with developing and maintaining the associated standards, as well as independently managing future updates and revisions to these standards (ISO, 2023).

Achieving ISO certification (i.e., ISO 9001, 21001), which are globally recognized quality standards, can be a powerful differentiator for organizations across industries (ISO, 2023). However, this certification comes with various costs, which can

be categorized as direct, indirect, and long-term expenses which may include consulting fees, formal employee training, documentation of supporting evidence, certification audits, and internal organizational adjustments to align processes with ISO standards (American Society for Quality [ASQ], n.d.). For companies, the pursuit of ISO certification not only requires financial investment but could also require a significant commitment of time and resources as each step of the certification process demands careful planning and thorough execution, which impacts day-to-day operations and resource allocation (Prajogo & Sohal, 2019). Table 6 below outlines the ISO certification process flow as adapted from Castka et al. (2015). It provides a step-by-step overview of the key stages involved in achieving ISO certification including the identification of gaps between current practices and standard requirements, the process of aligning practices, selecting an accredited certification body, as well as illustrating the timing of different audits.

Table 6. ISO Certification Process Flow. Adapted from Castka et.al (2015).

Perform gap analysis & identify differences between current practices and the standard(s) →	Align practices with standard(s) and address non-complying requirements →	Choose an accredited certification body to perform non-financial audit →	Conduct non-financial compliance audit →	Certification body awards compliance certificate →	Accreditation bodies monitor certification bodies →	Standard setters create and update standards

1. Determining the Cost of ISO Certification

According to ISO (2024), certification involves a separate party reviewer providing written confirmation, typically in the form of a certificate, that a particular characteristic complies with specific standards. ISO clarifies that it does not directly issue certifications; instead, organizations seeking certification must work with third-party entities accredited by recognized accreditation bodies. Furthermore, ISO (2024) explains that accreditation refers to the formal acknowledgment reviewed by an outside source,

often referred to as an accreditation body, verifying that a certification organization operates in alignment with international standards.

As Zaramdini (2007) outlines, the costs associated with ISO certification involve three main components: establishing a QMS, hiring external consultants for guidance, and covering the audit and certification fees. These elements represent significant investments, particularly for organizations new to quality management systems, as they require both financial resources and dedicated effort to achieve certification. These expenses can vary widely depending on several factors that include but are not limited to a company's size, the number and type of products and services under management, the existing state of their QMS, the industry or sector, and the level of employee proficiency with ISO certification (Stevenson and Barnes, 2002). For organizations without an established QMS, building processes according to ISO 9001 standards are likely to require significant investment in time and resources, as the review of literature has shown that ISO 9001 certification costs have fluctuated over time and can vary greatly across location. Analysis by Namar (2009) indicates that for small-to-medium enterprises (SMEs), internal preparation costs range from $15,000 to $25,000, depending on the organization's size and complexity of operations, with larger firms having to invest substantially more in this phase. According to the *Quality Systems Update* report, ISO 9001 certification can cost around $245,200 (Weston, 1995). A study performed by Zuckerman (1994) found that large organizations may spend over $1 million dollars, while smaller companies with annual sales of around $25 million typically incur costs of approximately $250,000, with annual maintenance costs exceeding $70,000. In Iceland, Gunnlaugsdóttir (2002) found that achieving certification required an average of 5,000 labor hours, with total costs of around $133,000—allocated as 53.8% for internal expenses, 38.5% for consultants, and 7.7% for registration fees. Pursuing third-party certification often requires a significant investment from organizations, accompanied by various challenges throughout the certification process (Darnall et al., 2009). For instance, businesses must bear the costs associated with certification, allocate additional resources, and develop the capabilities necessary to implement new practices. They may also need to modify production and operational processes to comply with certification standards (Balzarova & Castka, 2008). Furthermore, selecting a third-party certification

body is a critical step, requiring firms to assess factors such as the certifier's expertise, pricing, and service quality to ensure an optimal choice (Jamal & Sunder, 2011).

2. Consulting and Training

Organizations who are unfamiliar with ISO standards will likely require external guidance to understand and implement the framework. A significant portion of ISO certification costs lies in the hiring of consultants and training of employees to support these processes. Employee training costs can fluctuate dramatically between organizations with single or multiple sites, with estimates for a one-day introductory session priced at approximately $500 per participant (Stevenson and Barnes, 2002). The *American Society for Quality* (ASQ) estimates employee training costs to fluctuate based on the number of employees and the level of expertise required; small companies may spend around $500 to $5,000, while larger organizations could see costs exceeding $20,000 (2024). A study by Kuzmin & Bazhanov suggest SMEs spend $10,000–$50,000 on consulting services, while larger firms often exceed $100,000 (2021).

3. Documentation and Process Alignment

ISO certification requires comprehensive documentation of policies, procedures, and quality management processes, which can lead to substantial expenses. As Smithers (2022) explains, preparing the necessary documentation for ISO certification may require hiring technical writers or purchasing specialized software. Smithers (2022) also states that companies typically invest between $500 and $5,000 on documentation, depending on their existing documentation framework and specific needs. Furthermore, aligning internal processes with ISO standards often requires revising workflows, quality control systems, and other operational aspects, which can increase operational expenses. As Balzarova and Castka (2008) note, the extent of these adjustments depends on the organization's existing quality controls. Organizations with well-established quality systems may need only minor changes, while those with limited or no prior systems may face significantly higher costs to achieve compliance with ISO standards.

4. Certification and Audit Fees

Certification and audits are another major cost consideration for organizations pursuing ISO 9001 and ISO 21001 certification. The certification audit is conducted by an accredited third-party body chosen by the organization after careful consideration of key attributes such as competency, quality of service, and price (Jamal and Sunder, 2011). Average initial certification costs are approximately $10,000 for SMEs, with larger organizations potentially spending up to $50,000 or more (Stevenson & Barnes, 2002). Annual surveillance audits to maintain certification also add $3,000–$10,000 annually (Namara, 2009; ISO, 2015). The audit process itself is often expensive, laborious, and time consuming, but is a quintessential part of confirming that an organization does in fact meet the required standard (Darnall and Edwards, 2006). The cost of these audits can vary significantly based on numerous organizational factors such as size (i.e., number of employees), number of operational sites, and overall complexity of their activities and operations. Based on rough order estimates of cost derived from private third-party auditors like the American Society for Quality (ASQ), small companies generally spend between $3,000 and $10,000 on these audits, while larger firms may encounter costs between $20,000 and $50,000 or higher (2023).

Non-financial audits, as Power and Terziovski (2007) point out, extend beyond routine procedural checks, involving a thorough evaluation of an organization's operational effectiveness rather than simply confirming compliance with documented processes. According to these authors, the auditors must come from a non-financial source, possess a diverse skill set, demonstrate extensive knowledge, and bring substantial experience in both the industry and auditing practices to effectively perform their duties. In ISO standards, particularly ISO 9000, the principle of "continuous improvement" underscores the audit process, meaning that auditors are expected to assess both adherence to practices and the effectiveness of those practices over time (Hoyle, 2002). Unlike financial auditors, external non-financial auditors can make informed judgments about what is working effectively and where improvements might be necessary, often bridging the gap between that of an auditor and as well as advisor who offers constructive insights (Chan et al., 1993).

5. Long-Term Expense

While initial certification costs can be significant, maintaining ISO compliance is an ongoing expense. Companies often dedicate significant employee hours to certification preparation and maintenance. Gunnlaugsdóttir (2002) noted an average of 5,000 man-hours was needed to achieve certification. While this varies by organization, more recent findings indicate SMEs typically allocate 500–1,500 hours annually to maintain compliance (Namara, 2009). Annual recertification audits also add to long-term costs, as organizations typically allocate resources for continuous improvement, documentation updates, and internal audits. Furthermore, most ISO certifications, such as ISO 9001, require annual surveillance audits to verify ongoing compliance, adding a recurring expense often estimated at 50% of the original audit cost (Prajogo, 2019). A study conducted in Catalonia by Casadesús and Karapetrovic (2005) estimated that companies need a minimum of €8,500 (approx. $14,500) annually to maintain the quality system. While other researchers estimated surveillance over a three-year period to cost approximately $3,000 to $4,000 (Stevenson and Barnes, 2002). Table 7 below provides a summary of estimated costs associated with obtaining and maintaining ISO 9001 certification, categorized by organizational size. It highlights the financial commitment required for initial certification as well as ongoing maintenance. Costs vary significantly, with smaller organizations typically incurring lower expenses compared to medium and large organizations.

Table 7. Summary of ISO 9001 cost estimates.

Organizational Size	Initial Certification Cost	Maintenance Cost
Small	$15,000 – $50,000	$5,000 – $10,000
Medium	$50,000 – $150,000	$10,000 – $20,000
Large	Up to $500,000	$50,000 or more

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V. CONCLUSION AND RECOMMENDATION

Given the identified similarities and distinctions, it is reasonable to infer that ISO 21001 may produce benefits in education comparable to those of ISO 9001, with adjustments for the educational sector's specific context. ISO 21001 is likely to deliver operational efficiencies, like the effects of ISO 9001, though these may manifest through more efficient administration and standardized teaching practices rather than direct financial measure of performance or production-related savings. The standard emphasis on stakeholder satisfaction suggests that institutions might also benefit indirectly from improved reputation, enrollment stability, and reduced student attrition—outcomes which align with findings on ISO 9001's impact on customer loyalty and market competitiveness (Terziovski et al., 2003). Performance gains from ISO 21001 may be less immediately measurable than those from ISO 9001 but could still be substantial, particularly as educational institutions face increasing demands for accountability and operational efficiency (Natarajan et al., 2017). Additional research, particularly case studies and sector-specific data collection, would be valuable in further testing these conclusions and refining the analogy between ISO 9001 and ISO 21001.

Analogical reasoning allows us to deduce that ISO 21001 might yield benefits for educational institutions like those demonstrated by ISO 9001 across various industries. While ISO 9001's budgetary impact is well-documented through direct savings and revenue growth, ISO 21001's benefits in education may be more indirect, stemming from improvements in operational efficiency, stakeholder satisfaction, and institutional reputation. As ISO 21001 adoption grows, more empirical data will help solidify or refine these initial projections, contributing valuable insights into the broader impact of quality management systems within the education sector. Determining the economic value of implementing a quality QMS such as ISO 9001 or ISO 21001 can justify the investment, but it often misses the broader value of these systems. A QMS may not always deliver a strict financial return, but it can offer significant benefits regarding improved educational outcomes, operational efficiencies, and overall institutional effectiveness. The value provided by a QMS through enhanced processes, reduced inefficiencies, and risk

mitigation becomes evident after implementation, particularly as the organization gains a deeper understanding of its operations and workflows (Fonseca & Domingues, 2017).

A. LIMITATIONS

We acknowledge several limitations in this study. First, the study is constrained by the limited body of knowledge surrounding ISO 21001 implementation compared to ISO 9001, which has undergone multiple iterations over the past few decades. This disparity reflects the early adoption stage of ISO 21001, resulting in less empirical data and analysis for comparison. Additionally, the cross-sectional nature of most existing ISO 21001 studies restricts the ability to examine its longitudinal impacts, particularly on financial performance. Changes in certification strategies or implementation approaches over time may significantly influence outcomes. This limitation underscores the need for further longitudinal research to explore the evolving nature of ISO 21001's impact.

B. RECOMMENDATIONS FOR FURTHER STUDY

Future research should address several areas to advance the understanding of ISO 21001 and ISO 9001 certifications. Expanding the scope of research by incorporating broader search terms and exploring QMS implementations across diverse industrial sectors beyond education would provide a more comprehensive perspective. Additionally, collecting detailed data on organizational characteristics—such as firm size, age, and pre-certification QMS status—would help clarify factors influencing certification outcomes. To capture the full impact of certification, future studies should use diverse data sources, including surveys, financial reports, and interviews, while also considering external variables such as market conditions, regulatory changes, and product launches. Longitudinal studies are particularly important for understanding the long-term effects of ISO 21001, as they can provide insights into how firms and institutions adjust certification strategies over time. Cross-country comparisons would further enhance knowledge by determining whether observed benefits are context-specific or globally applicable. To improve the assessment of financial performance, researchers should develop robust ROI analysis frameworks that integrate both tangible and intangible metrics. Finally, expanding research to analyze global adoption trends, dynamic changes

in certified organizations, and broader financial performance metrics would strengthen the foundation for evaluating the long-term implications and benefits of ISO certifications.

Several recommendations are proposed to enhance NPS's assessment and documentation processes to address the key challenges identified in previous reviews. NPS needs to standardize and centralize its assessment processes. Implementing a school-wide, unified framework for assessing program learning outcomes will help overcome inconsistencies across departments. Tools such as CAD, APR, and CR should be standardized across all departments to ensure consistency in documenting and assessing outcomes. NPS's assessments and documentation can align with ISO 21001 by enhancing educational processes, ensuring alignment between learning objectives and institutional goals, and promoting continuous improvement in teaching practices. They also align with ISO 9001 by fostering a quality management culture through systematic assessment, feedback mechanisms, and faculty development. Together, these initiatives support the goals of both ISO standards by contributing to a more efficient, effective, and learner-centered educational environment. By adopting ISO 21001, NPS can further streamline its assessment procedures, set clear education management system standards, and establish common metrics for tracking student performance. The PETAL and ALOHA programs are excellent examples of ways NPS can continue enhancing faculty development and aligning course objectives with institutional goals. The core advantage of PETAL lies in its ability to foster continuous improvement by aligning instructional methods, technology, and pedagogy to better integrate assessment practices into teaching. This program enhances faculty engagement and supports student-centered learning outcomes by providing customized workshops, short courses, and faculty consultations. Encouraging broader participation in programs, particularly integrating technology into pedagogy, will allow faculty to refine their instructional methods continuously in response to student learning assessments. This strategy should be further supported by structured feedback loops that link program initiatives with measurable student outcomes to validate the effectiveness of instructional changes. By requiring faculty participants to develop detailed course analyses and learning-centered syllabi, programs that enhance faculty assessment goals help to ensure that learner outcomes are vertically and

horizontally integrated throughout the curriculum. These processes help to ensure that students can acquire, apply, and integrate knowledge across diverse contexts. Assessment programs should be expanded to involve more faculty, especially in departments where assessment methods are underdeveloped. Furthermore, embedding direct assessments into more courses would allow for continuous measurement of student achievement against institutional learning objectives. Programs such as PETAL and ALOHA support a centralized administrative framework that tracks progress and integrates findings into institutional decision-making. This strategy would ensure that the initiatives are successful at the individual course level and contribute to a cohesive, school-wide strategy for educational effectiveness. Such an approach would standardize learning assessments and ensure consistency across all academic programs, enhancing the overall education quality. By integrating assessment programs such as PETAL and ALOHA more fully into the institution's educational strategies, NPS will advance its commitment to continuous improvement, aligning faculty development with student learning outcomes to enhance instructional quality and assessment effectiveness.

Strengthening leadership in assessment is another priority. Consistently filling and maintaining key positions, such as the Director of Assessment, is crucial to avoid delays in program reviews and ensure that assessment remains a priority within the institution. These leadership roles must have clearly defined responsibilities that focus on overseeing assessment practices. ISO 9001, which emphasizes leadership's role in driving quality management, can help NPS create a robust leadership framework dedicated to continuous improvement in assessment processes. Faculty development and engagement must also be a central focus. Many faculty members, while subject-matter experts, may lack training in educational assessment methods. NPS should implement a structured training program that equips faculty with the tools to assess student learning outcomes effectively. This strategy will foster greater faculty engagement in the assessment process, leading to more consistent documentation across departments and a stronger culture of continuous improvement. ISO 21001 emphasizes the importance of leadership in quality management, with clearly outlined leadership responsibilities and authority to prioritize systematic assessment integration across departments, ensuring continuous improvement. The leadership must address the ongoing issue of draft ILOs, as seen in the 2024 review,

by aligning them with ISO 21001 standards. These ILOs should be measurable and linked to institutional strategic goals, allowing effective tracking of student learning and program outcomes. Formalizing and implementing ILOs is essential to create a cohesive system for measuring educational effectiveness. NPS must finalize its ILOs and align them with strategic goals and accreditation standards. The absence of clear benchmarks has hindered the institution's ability to track progress and evaluate program effectiveness.

Establishing measurable objectives will enable NPS to link student outcomes to broader institutional goals, improving overall educational quality and documentation. Reducing reliance on external sponsor feedback is another critical recommendation. While Navy sponsors provide valuable input for program reviews, NPS must develop stronger internal feedback mechanisms to ensure continuous and proactive assessments. Over-reliance on external feedback has contributed to inconsistent reviews and delayed improvements. By establishing regular internal review cycles involving faculty, administration, and students, NPS can maintain a more responsive approach to program development and improvement. Incorporating assessment data into strategic planning and decision-making is also vital for maximizing the value of assessments. Assessment results should inform resource allocation, curriculum development, and long-term institutional planning. By embedding assessment into decision-making processes, NPS can align its educational outcomes with its strategic vision and ensure that programs evolve to meet student and institutional needs.

To enhance NPS's assessment and documentation processes, supported by ISO 21001 for improving the PDCA (Plan-Do-Check-Act) cycle, it is recommended that NPS adopt a school-wide EOMS based on ISO 21001 to standardize assessment processes across departments. This will ensure consistent documentation, streamline data collection, and integrate practices into strategic planning, as highlighted by past review cycles. NPS should implement uniform standards across all educational departments for CAD, APR, and CR for a fully standardized and accepted data management and assessment process. The lack of integrated systems noted in previous reviews can be addressed by this standardization, promoting consistent documentation and assessment. NPS needs to develop training programs aligned with ISO 21001 to equip faculty with comprehensive knowledge of assessment methodologies. Past reviews emphasized the

need for consistent faculty training. This program should include workshops, short courses, and customized consultations requiring faculty participation, enhancing engagement and continuous improvement by aligning teaching methods with data-driven assessment results with programs already utilized like PETAL and ALOHA.

To ensure systematic performance evaluation, NPS must establish institution-wide benchmarks and metrics for consistent progress evaluation, aligning with the "Check" phase of the PDCA cycle. After evaluation, the feedback integration and closing of the evaluation loop must move beyond reliance on external sponsor feedback by instituting regular, internal program review cycles. This change will create a proactive feedback loop that feeds assessment findings into the "Act" phase for operational adjustments. NPS must continuously implement real-time data collection mechanisms to inform planning and adjustments, fulfilling the iterative quality improvement emphasized by ISO 21001. Resources must be aligned with NPS's strategic objectives to address resource limitations noted in reviews by securing financial and staffing support for a fully operational Office of Institutional Effectiveness. This office should oversee assessments and support continuous improvement efforts. NPS must invest in unified technological data collection and analysis systems to facilitate consistent assessment and feedback. The assessment and feedback process should ensure that assessment data is integrated into institutional planning processes to align with ISO 21001's emphasis on improvement and decision-making. The process must provide a systematic feedback channel to incorporate assessment, review, and student performance findings into strategic decisions. This practice supports the continuous "Check" and "Act" phases, promoting a culture of quality and responsiveness.

Implementing ISO 21001 and ISO 9001 can help formalize these processes, ensuring a continuous feedback loop between assessment and institutional development. Support for a culture of continuous improvement is essential for sustaining progress in educational quality and documentation. Both ISO 21001 and ISO 9001 emphasize the need for ongoing monitoring and refinement of processes to address gaps and inefficiencies. By creating an environment that values feedback and adapts based on data-driven insights, NPS can enhance its ability to provide high-quality education and meet accreditation standards consistently. These recommendations aim to create a more

unified, transparent, and effective system for managing educational quality and ensuring continuous improvement at NPS. The critical recommendation is for NPS to undergo a leader-driven holistic transformation period to assess, develop, and implement a foundational educational system aligned with the standards of ISO 21001. For a detailed overview of the proposed implementation framework, refer to Figure 15 below, which outlines the key stages and components of this alignment in processes.

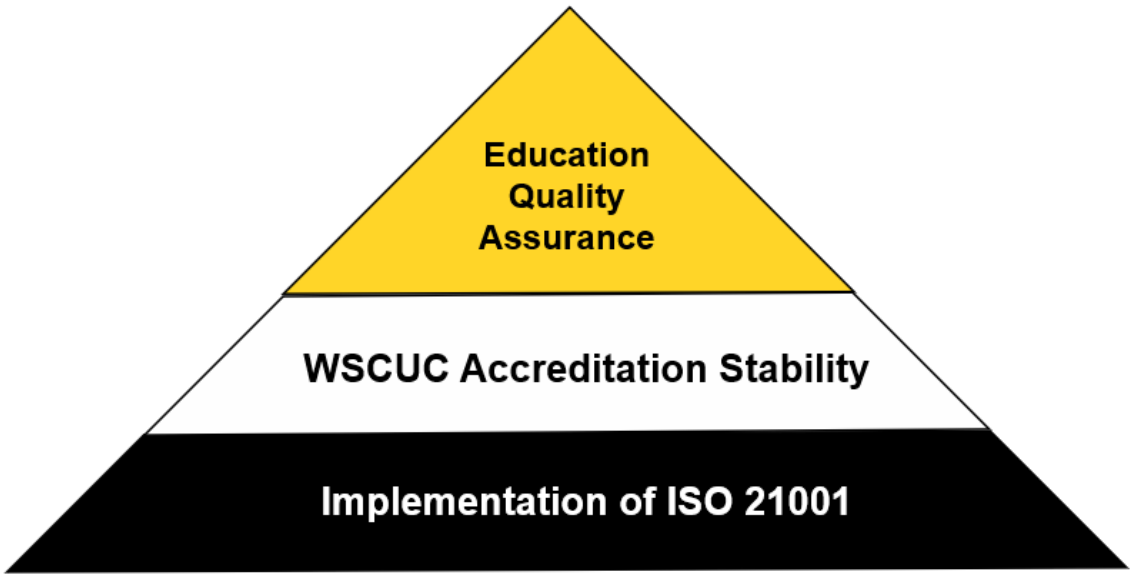

Figure 15. Conceptual Alignment of ISO 21001 to ensure Education Quality Assurance.

To develop a comprehensive and complete strategy for implementing ISO 21001, it is recommended that a one-year assessment be conducted by the Office of Institutional Research with participation from an associate chair from each department. This assessment aims to re-evaluate the mission of NPS, evaluate and compare current and potential educational management systems for institutional and department alignment, and define roles and responsibilities for implementing and maintaining ISO 21001 certification. After a thorough assessment of the implementation roadmap, it is recommended to establish and fully staff an Office of Institutional Assessment and Research to ensure the highest likelihood of integration, educational quality assurance, and future institutional improvement. This recommendation aligns with the institution's existential objective to remain accredited by WASC and, therefore, synchronizes a way forward to achieve results before the 2030 WCUC Accreditation visit. This alignment

provides the greatest opportunity to meet the standards set forth by ISO 21001 and WASC while maximizing new and current resources to ensure the institution's legitimacy.

APPENDIX A. CRITERIA FOR REVIEW

STANDARDS OF ACCREDITATION

Standard 1: Defining Institutional Mission and Acting with Integrity	Standard 2: Achieving Educational Objectives and Student Success
Standard 3: Assuring Resources and Organizational Structures	Standard 4: Creating an Institution Committed to Quality Assurance and Improvement

STANDARD 1: DEFINING INSTITUTIONAL MISSION AND ACTING WITH INTEGRITY

The institution defines its mission and establishes educational and student success objectives aligned with that mission. The institution has a clear sense of its essential values, culture, and distinctive elements, and its contributions to society and the public good. It promotes the success of all students and makes explicit its commitment to diversity, equity, and inclusion. The institution functions with integrity and transparency.

CRITERIA FOR REVIEW

Institutional Purposes

CFR 1.1 The institution's mission and other statements of purpose are appropriate for an institution of higher education and clearly define its essential values, culture, and ways the institution contributes to society and the public good.

CFR 1.2 Consistent with its purposes and character, the institution defines and acts with intention to advance diversity, equity, and inclusion in all its activities, including its goal setting, policies, practices, and use of resources across academic, student support, and co-curricular programs and services.

Integrity and Transparency

CFR 1.3 The institution operates with integrity and transparency in its operations, and truthfully and clearly represents its academic goals, programs, requirements, services, and costs.

CFR 1.4 The institution maintains appropriate operating policies and business procedures, including timely and fair responses to complaints and grievances.

CFR 1.5 The institution treats faculty, staff, administrators, and students equitably by adhering to its published policies and procedures.

CFR 1.6 The institution maintains, publishes, and adheres to policies on academic freedom.

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APPENDIX B. PETAL ALOHA PROGRAM

toundtable Book Seminar	Foundations for Teaching and Learning (FTL)
becoming a Critically Reflective Teacher, Stephen D. Brookfield, ossey- Bass, 1995.	November 2, 9, 16, 30, 2012 (0900-1130); DKL 151
October 5,12,19, & 26, 2012 1230-1430); DKL 151	

ctive Teaching:	Roundtable Book Seminar	ALOHA Part 2
ation Practicum	***Flow: The Psychology of Optimal Experience.*** Mihaly Csikszentmihalyi, Harper Perennial Modern Classics (1991, 2008).	March 5, 12,19, 26, 2013; (1500-1630); DKL 151
0900-1130; DKL 25; February 1 & 8,		
500-1700); IN 224; March 5 & 12, 2013	March 1,8, & 15, 2013 (1230-1430); DKL 151	

tices	Round Table Book Seminar
DKL 151;	***The Courage To Teach,*** Parker Palmer John Wiley & Sons, 1998, 2007. April 5, 12, 19, 26, 2013 (1230-1430); DKL 151

Round Table Seminar	DEEP
Readers Choice: title TBD; August 23 & 30; September 6 & 13, 2013 (1230-1430); DKL 151	Call for Proposals—Developmental Educational Effectiveness Projects; AUGUST 2013

rofessional development, or to register for programs, contact t. arodgers@nps.edu

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APPENDIX C. REVIEW ASSESSMENT PROGRAM FRAMEWORK

NPS REVIEW AND ASSESSMENT PROGRAM FRAMEWORK			
AREAS	ELEMENTS	EXPECTATIONS	EXAMPLES Practices / Evidence
Program Oversight	Review and Assessment Responsibility	• NPS & Academic Departments define RAP roles and responsibilities	• EESG • Faculty Handbook • CPR Report
	Faculty Positions	• All departments assign faculty to NPS academic program oversight positions	• Associate Chair Instruction • Academic Associates • Program Officers
Program Design	Program context: NPS Mission and Strategy	• Academic programs, and their objectives, are consistent with NPS' mission and strategy, and NPS academic standards	• New Program Review • Academic Council
	Program Objectives / Goals	• Objectives/goals are stated for all degree and/or curricular programs	• Curriculum objectives or purpose stated in the NPS catalog
	Program Outcomes	• Curriculum Educational Skills Requirements	• Degree Accreditation Outcomes
	Program Components	• Program components are designed to support and satisfy stated program objectives and outcomes	• Program/Curriculum Mapping • Curriculum Matrix
	Program Courses	• All program courses have stated objectives, related to program objectives	• Course Journals • Course Mapping
Program Review	Program Review - University	• CR occurs for curricula on two-year cycle • APR occurs for Departments on six-year cycle	• Curriculum Review • Academic Program Review
	Program Review - Department	• Ongoing, systematic program review occurs internal to the department • Department has standing positions and processes to perform this	• Department Curriculum Committee • Academic Associates meetings
Program Assessment	Assessment Plans	• Review and assessment plans are kept for all departments	• Dept RAP Sheets
	Program Assessment Information	• At the department and/or curriculum level, programs systematically collect and utilize program assessment information from four stakeholder groups: Faculty, Students, Alumni, Program Sponsors or Employers	• Student Surveys • Sponsor Visits • Section Leaders • Sponsor Chairs • Alumni Survey • Faculty Survey
	Faculty Assessment	• All departments have systematic processes for evaluating faculty performance, development and advancement	• Faculty Activity Reports (FARs) • Faculty Annual Review • Faculty Reappointment Review
	Teaching Assessment	• All departments systematically evaluate faculty in their teaching role	• Student Opinion Forms (SOF) • Classroom observation • Course Journals
	Program Learning Outcomes Assessment	• At the department, degree, and/or curriculum level, programs employ direct measures of student learning outcomes	• Capstone Assessment • Professional Examinations • Embedded Assessments • Employer Assessments • Assessment Maps
	Course Outcomes Assessme	• Accomplishment of Course Learning Outcomes assessed at the course level	• Course/Faculty specific • PETAL Initiative
Program Improvement	Results from Review and Assessment Practices	• All departments document and report changes & improvements to their academic programs resulting from their review and assessment process	• Annual Record of Program Changes/Improvement. • CR and APR Action Items

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Acquisition Research Program
Naval Postgraduate School
555 Dyer Road, Ingersoll Hall
Monterey, CA 93943

www.acquisitionresearch.net