

**RECOMMENDATIONS TO IMPROVE ACTIVE LEARNING IMPLEMENTATION AT  
THE NATIONAL SECURITY SPACE INSTITUTE IN COLORADO SPRINGS,  
COLORADO**

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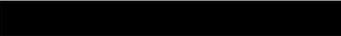
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**Author Note**

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I have no known conflict of interest to disclose.

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**ABSTRACT**

The purpose of this research study was to provide recommendations to university leaders to improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado. The problem is that 80% of the faculty at the National Security Space Institute faced a forced transition into active learning with no pre-evaluation, coordination, or effective training with the faculty. (NSSI, n.d.). A study conducted to identify and provide recommendations will help improve active learning implementation at the National Security Space Institute. This is an applied research study using both quantitative and qualitative approaches. This research study addresses the central question of “How can this research study improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado?” There were three forms of data collection: interviews, a focus group, and a survey. The first approach to data collection was qualitative semi-structured interviews with faculty department heads. A focus group with civilian administrators and active-duty leadership was the second data collection approach. The third data collection approach, which was quantitative, involved a survey administered to the faculty. The qualitative data were analyzed using coding, pattern, and theme categorization. The quantitative data was analyzed using excel for descriptive statistics such as frequencies, averages, and percentages.

*Keywords:* active learning, problem-based learning, project-based learning, constructivism, scaffolding, facilitation

### **ROLE OF THE RESEARCHER**

Mark Mitchell is the Director of Digital Learning and Strategy at the National Security Space Institute, Colorado Springs, Colorado. He has been an educator and leader within the Department of Defense for over 20 years. His education includes a bachelor's degree from the University of Phoenix and a Master's of Science in Management from Troy University. He is pursuing a Doctor of Education degree in Educational Leadership from Liberty University. Previously, Mark taught at the United States' Air Force Academy in the Behavioral Sciences department, focusing on leadership and development curriculum. Since 2016, Mark's role at the institute focused on incorporating innovative digital learning strategies in the classroom environment, standing up, expanding strategies, and sustaining growth in the online learning college. Mark also manages the institute's state-of-the-art educational technology innovation laboratory designed to evaluate new educational hardware and software tools aimed at improving the teaching and learning experience at the institute.

## **PERMISSION TO CONDUCT THE RESEARCH**

### **Permission**

Written permission was obtained from the National Security Space Institute's Vice Commandant. See the letter attached in Appendix A.

### **Ethical Considerations**

All efforts were made to ensure that all members of this research study were kept anonymous and safe. The format of this study ensured that the participants experienced minimum risk. During the study, all data collection processes were protected from participant identifiers. Participants were department heads, administrators, faculty members, and military leadership from the National Security Space Institute. Pseudonyms were used to identify participants in the qualitative data collection, and coding was used in the quantitative data collection. The data collection was stored securely, and only the researcher had access to the records. The researcher used a password-protected computer and a password-protected external Dropbox file folder. The password-protected Dropbox file folder was only accessed by the researcher. The data will be retained for a period of five years after the completion of this research study.

## CHAPTER ONE: INTRODUCTION

### Overview

The purpose of this research study was to provide recommendations to university leaders to improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado. The problem is that 80% of the faculty at the National Security Space Institute faced a forced transition into active learning with no pre-evaluation, coordination, or effective training with the faculty. (NSSI, n.d.). Classrooms in transition will undergo a physical and technical conversion designed to support active learning. Currently, nearly all the faculty required to transition are unfamiliar with the effective foundations of active learning and the pedagogical practices associated with active learning. The current faculty development program is ineffective at preparing the faculty for this transition to active learning.

This applied research study uses both quantitative and qualitative approaches. This research study addresses the central question of “How can this research study improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado?” There were three forms of data collection: interviews, a focus group, and a survey. Qualitative was the first approach to data collection. Semi-structured interviews with faculty department heads was the first data collection approach. A focus group with civilian administrators and active-duty leadership was part of the second data collection approach. The third data collection approach, which was quantitative, involved a survey administered to the faculty. The qualitative data was analyzed using coding, pattern, and theme categorization. The quantitative data was analyzed using excel for descriptive statistics such as frequencies, averages, and percentages. This chapter addresses the organizational profile, an introduction to the problem, the significance of the research, and the purpose statement.

### **Organizational Profile**

The educational site for this study is the NSSI. The NSSI is a Federal Department of Defense organization of the U.S. Space Force serving as the focal point for space continuing education, which complements space education at the U.S. Air Force's Air University and Air Force Institute of Technology and the Naval Postgraduate School. The institute's mission is to provide the responsive and relevant professional continuing education component of DoD space professional development (NSSI, n.d.). The NSSI is at Peterson Space Force Base in Colorado Springs, Colorado. The NSSI comprises 13 active-duty Space Force personnel serving in school leadership positions (Commandant, Provost, Deans) and 84 contractor personnel serving in faculty, support, and faculty leadership positions. There are 45 faculty contractor positions and 15 support military/contractor leadership positions that impact active learning at the NSSI. The NSSI has two colleges. The College of Professional Development comprises seven different courses, and the College of Space Warfare comprises nine courses. Both colleges offer courses in both a classroom and an online learning format.

### **Introduction to the Problem**

The problem is that 80% of the faculty at the National Security Space Institute faced a forced transition into active learning with no pre-evaluation, coordination, or effective training with the faculty. (NSSI, n.d.). The NSSI leadership began converting classroom space physically and technologically into classrooms designed for active learning. 75% of classrooms will be converted by 2023. Active learning is a pedagogy tied to the constructionist theory of learning established by the work of Piaget and Vygotsky, which has a foundation based on social interaction between students (Brassler & Dettmers, 2017). These new classroom configurations involved extensive technical integrations, changes to traditional classroom layout, and a focus on

problem or project-based learning to transition away from more traditional lecture-based classroom models (Arruda & Silva, 2021).

80% of the faculty must transition to active learning by 2023 (NSSI, n.d.). Currently, nearly all the faculty required to transition are unfamiliar with the foundations of active learning and the pedagogical practices associated with active learning. While the problem of forced faculty transitions is not uncommon at the NSSI, the use of active learning is uncommon. The NSSI did not schedule any specific training on the effective use of active learning prior to classroom transition, which was a common frustration seen during other forced faculty transitions. The NSSI strives to improve its educational practices and student learning experiences but often makes such decisions without including the faculty and hastily implements faculty development far too late in the implementation process.

Sound evidence shows that active learning practices bring strong learning outcomes in science-based classrooms. However, that data is bolstered when faculty show effective active learning facilitation and the use of key active learning pedagogies (Park et al., 2021). Active learning strategies require a clear faculty understanding of the benefits and limitations they pose to the student. Therefore, faculty must be able to compare traditional lecture-based learning outcomes against active learning-based learning outcomes to determine if implementing active learning is effective (Berlinski & Busso, 2017). Without improving the faculty development program related to active learning strategies, it is improbable that the NSSI will achieve the desired student learning outcomes.

### **Significance of the Research**

Active Learning implementation is important to study because it has a negative impact on faculty professional growth, job satisfaction, confidence, and morale. It also negatively affects

student engagement, morale, and, ultimately, learning outcomes. The benefits of improving the faculty development program on active learning included improved technology use through proper physical layout plans geared toward higher student outcomes (Nicol et al., 2022), which may lead to lower technology expenditures and improved faculty/student technology adoption. Faculty will see skills improvements through expanding active learning pedagogies as they transition efficiently from lecture-based (faculty-focused) learning to facilitate (student-focused) learning (Kim et al., 2018). Applying different pedagogies improves students' critical thinking skills, knowledge-creation processes, and creativity (Barajas & Frossard, 2018). The expanded use of pedagogies will improve the faculty's ability to leverage the right teaching strategy at the right moment. Students will see other benefits, which include improvements in learning success and motivation through learned experiences and social interactions (Nardo et al., 2022). Finally, the NSSI will benefit by improving the overall faculty development program for future faculty training initiatives by improving implementation strategies and staff function improvements (Hursen, 2020). Improving the faculty development program strengthens the NSSI's future educational growth and faculty training requirements.

### **Purpose Statement**

The purpose of this research study was to provide recommendations to university leaders to improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado. This is an applied research study using a mixed-method approach (quantitative and qualitative). The qualitative data was analyzed using codes, patterns, and themes with Microsoft Excel for basic descriptive statistics, such as frequencies, percentages, and averages. The first data collection approach was semi-structured interviews with faculty Department Heads at the National Security Space Institute. A focus group with civilian

administrators and active-duty leadership at the National Security Space Institute was part of the second data collection approach. The third data collection approach was a quantitative survey administered to the faculty at the National Security Space Institute.

### **Research Question**

How can this research study improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado?

### **Definitions**

1. *Learning Facilitation* - “includes the preparation of students to conduct activities and tasks required besides activities related to the facilitator guiding the learning process of the students. It also involves providing students with regular opportunities for formative feedback from the lecturer” (Arruda & Silva, 2021, para. 3.1.3).
2. *Project Based Learning* - “a pedagogy that entails two components that are a question or problem that serves to organize and drive activities; and these activities result in a series of artifacts or products, that culminate in a final product that addresses the driving question” (Brassler & Dettmers, 2017, p. 2).
3. *Problem-Based Learning* - “Problem-based learning is an experiential and student-centered learning method to practice important skills like querying, critical thinking, and collaboration through pair and group work” (Luke et al., 2021, p. 1).
4. *Constructivism* - “is the idea that knowledge can be created or constructed in the learner’s mind, rather than existing as unified, constrained, and intact entities that are flawlessly transferred from the teacher’s mind to that of the learner” (Holec & Marynowski, 2020, p.141).

5. *Didactic* - “the lecturer transmits information to the students, and the students passively listen and take notes” (Kim et al., 2018, p. 29).
6. *Scaffolding* - “refers to how the learning goals, activities, feedback, and assessment are structured differently for students across incoming levels of preparation” (Nardo et al., 2022, p. 1692).

### **Summary**

The purpose of this research study was to provide recommendations to university leaders to improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado. The problem is that 80% of the faculty at the National Security Space Institute faced a forced transition into active learning with no pre-evaluation, coordination, or effective training with the faculty. (NSSI, n.d.). This chapter covered the organizational profile, introduction to the problem, significance of the research, purpose statement, central research question, and applicable definitions.

## CHAPTER TWO: LITERATURE REVIEW

### Overview

The purpose of this research study was to provide recommendations to university leaders to improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado. The problem is that 80% of the faculty at the National Security Space Institute faced a forced transition into active learning with no pre-evaluation, coordination, or effective training with the faculty. (NSSI, n.d.). The NSSI leadership began converting classroom space physically and technologically into classrooms designed for active learning. 75% of classrooms will be converted by 2023. Unfortunately, nearly all the faculty required to transition are unfamiliar with the theoretical framework behind active learning and the pedagogical practices associated with successful active learning.

The chapter introduces the literature review on active learning in two subsections: (a) Narrative Review and (b) Theoretical Framework. A narrative review is an analysis of the current knowledge of active learning. The traditional theoretical framework subsection follows it. The narrative review discussion is organized around the following themes: 1) Understanding active learning, 2) Active learning strategies, 3) Faculty preparation, 4) Faculty motivation, 5) Student impacts, 6) Student motivation, 7) Classroom configurations, and 8) Instructional resources. The theoretical framework subsection discusses the theory used to frame this research: the constructivist theory from Jean Piaget and Lev Vygotsky. This chapter concludes with a summary of the associated literature. The literature review presents the related literature and a summary of the research.

## **Narrative Review**

This literature review aims to provide an overall synthesis of current research related to active learning, the theoretical framework behind active learning, and how understanding active learning affects classroom configuration, student learning, and teacher preparation is vital to successfully implementing active learning within an organization (Arruda & Silva, 2021). The narrative review discussion is organized around the following themes: 1) Understanding active learning, 2) Active learning strategies, 3) Faculty preparation, 4) Faculty motivation, 5) Student impacts, 6) Student motivation, 7) Classroom configurations, and 8) Instructional resources.

### **Understanding Active Learning**

#### ***Active Learning***

Active learning is a pedagogy tied to the constructionist theory of learning established by the work of Piaget and Vygotsky (Brassler & Dettmers, 2017). Active learning involves social interaction between students, significant technical integrations, physical layout changes to a classroom, problem-based learning situations, and a stark transition away from traditional lecture-based learning models (Arruda & Silva, 2021). Research shows no codified format exists regarding how educational institutions should employ a specific active learning strategy. Instead, active learning involves several approaches to achieve the desired increased learning outcomes desired with active learning strategies. While a full technology transformation may work in some classrooms and simple social problem-solving initiatives may work in another, the key is understanding the foundations to active learning and employing what is practical and most effective at any institution (Dewsbury et al., 2022). The key is to ensure student engagement is at the forefront of whatever active learning strategy is used. Placing too much emphasis on the

classroom configuration or technology implemented becomes moot if practical approaches to learning do not involve approaches that integrate the key component of maintaining student engagement during active learning (Grijpma et al., 2022). Research shows that while many institutions associate active learning environments strongly with technology, this is only one portion of the key benefits students gain through an active learning model. It is critical to understand the learning format and how it drives the students to actively participate in their learning. Problem and project-based learning are often two forms used in the Active learning model.

### ***Problem-Based Learning***

Problem-based learning is active learning, which requires students to rely on and develop their requisite educational and critical social skills. Problem-based learning encourages critical thinking by challenging students to evaluate topics and challenge their preconceived notions on a particular topic. Students work independently and in learning groups to find vital solutions to education problems. The student's baseline understanding of technology, current educational standards, and social confidence are all expounded as they work through solutions to target academic problems (Marshel et al., 2021).

For decades, institutions have used the problem-based learning model to drive improved learning outcomes. Research shows that when used effectively, students develop a strong ability to challenge the validity of solutions to complex problems through the validation of current problem-solving models or use sound approaches to critical thinking and research methods to develop new models deemed effective for a new problem (Zotou et al., 2020) making it vital that educators capture student learning models and process during all subsequent iterations of proposed problem-based learning methods. Problem-based learning approaches can involve

individual or social learning components associated with active learning and are very similar to project-based learning.

### ***Project-Based Learning***

Project-based learning is narrowly similar to active learning and problem-based learning. The most common attribute of project-based learning is the increased reliance on social interaction and group-based learning support. Research shows that project-based learning requires students to rely on and develop their cognitive abilities. Students must challenge the status quo, express their concerns to others and seek validation of their concerns, engage with others who need to do the same, and actively listen and provide critical feedback to others. Through this vital collaborative learning experience, students apply what they learned from their critical thinking and through an effective analysis of the feedback received from their peers (Dewi & Sari, 2022). As Santamaría-Cárdaba, (2020) reinforces, students who serve as a protagonist in their learning and engage in the evaluation, reinforcement, and validation of their learning process will see increased, long-term learning outcomes vital to their academic success.

### ***Active Learning Strategies***

Successful implementation of active learning involves a deliberate transition from traditional lecture-based learning. The instructor is the primary means for student learning (Kim et al., 2018). However, active learning places the instructor in a facilitator role, guiding the student through collaborative learning activities, encouraging reflective feedback from students, and enabling the student to apply evaluation tools to improve the learning process (Shoufan, 2020). This vital instructor transition can be challenging to implement successfully and requires the dedication of faculty development teams to facilitate a long-term strategy.

Successful active learning strategies focus on the physical and technical configuration of the classroom, configure lessons to include collaboration, and recognize the importance of proper faculty training as effective facilitators using active learning strategies (Eickholt et al., 2021). If academic leaders cannot recognize and implement these active learning components, it could likely result in active learning classrooms quickly functioning as traditional lecture-based classrooms. Therefore, educational leaders must recognize the common barriers to successful active learning implementation.

### ***Barriers***

Poor instructor preparation is one of the most common barriers to successful implementation of active learning. Often, organizations see the value of improved learning outcomes with active learning and apply the implementation of active learning through a lens focused on student outcomes. This approach often results in oversights in effective faculty implementation strategies. Faculty rarely receive adequate training on active learning, as seen at the NSSI, or how to make learning active in many situations (Rhodes, 2021). This issue can confuse faculty on the approach and create a sense of confusion in both the faculty and students. This confusion often leads the student to distrust or develop a negative perception of the benefit of active learning approaches.

Research shows that ineffective faculty training programs have the most significant impact on effective active learning program integrations. Poor faculty training programs limit faculty preparedness. Poorly trained faculty lack the skills to develop adequate active learning course materials or cannot comprehend how to manage class time effectively. Poorly trained faculty cannot adequately recognize how to use the technology often required in active learning classrooms or apply the resources necessary for quality active learning instruction (Fixen &

Wald, 2021). Poorly trained faculty can lose confidence in their ability to manage control of active learning classrooms, which shows their lack of confidence to the students and further erodes the students' confidence in the value and purpose of active learning strategies.

## **Faculty Preparation**

### ***Faculty Development***

As crucial as student considerations for success are, teacher training and involvement components are just as vital for successful active learning programs. Effective teachers in active learning must know how to foster student engagement, allow students to learn through scientific strategies and learned mistakes, cultivate student relationships, and balance group work with some direct lectures (Nardo et al., 2022). In order to achieve teacher success in the active learning classroom, it is vital to incorporate training regarding active learning strategies in new teacher training programs and existing faculty development programs today (Hursen, 2020).

Traditionally, faculty often show comfort in engaging in lecture-based activities as a part of their learned pedagogy. Therefore, faculty development programs must begin incorporating active learning approaches early in their faculty development (Macaluso et al., 2020). When development programs employ active learning strategies, the faculty will recognize key success strategies when participating in such training and will be more likely to implement successful active learning strategies within their classrooms when required (Sota & Marzocchi, 2021).

### ***Educational Programs***

The literature on active learning specific to successful teacher attributes shows that faculty in non-tenured tracks or those working toward tenure are more likely to employ the teaching strategies associated with active learning compared to tenured research-focused faculty (Denaro et al., 2022). The more exposure faculty has to active learning as part of their teaching

development programs, the higher the likelihood of those faculty members using strategies vital within an active learning classroom. To breed effective faculty that can employ active learning strategies in their classrooms, faculty must learn the value of student-centered teaching approaches, the value of problem, project, and evidence-based learning methods while avoiding comfort with traditional lecture-based instruction during their faculty development training (Sreyasi et al., 2022)

### ***Challenges***

One of the most significant challenges to faculty development in active learning is the time it exposes a faculty member to active learning strategies. When faculty has traditional training as a lecturer with a heavy research emphasis or little relevant teaching experience, the transition toward active learning can be significantly more challenging (Garcia et al., 2022). This data is essential for organizations like the NSSI, which leverage faculty with high subject expertise but often lack extensive, relevant teaching experience. Nevertheless, simply including active learning strategies in faculty development programs is only the beginning. Detailed programs that identify specific strategies in the active learning classroom, including examples of successful lessons using active learning, help faculty avoid implementation challenges and better understand active learning (Ito & Takeuchi, 2022). Solid faculty development programs mitigate challenges by identifying proven successes prevalent in the research.

### ***Successes***

Achieving success in faculty development focused on active learning means the program should reinforce teaching strategies that enable continuous student engagement, allow for student synthesis, and enable continuous evaluation of learned concepts. Instructors must work in active learning classrooms incorporating technology, supporting these teaching strategies (Copridge et

al., 2021). The research shows that the best way to achieve these development successes is to create active learning faculty training that incorporates these strategies and calls on the faculty to use them routinely. Secondary to reinforcing effective active learning strategies, an ideal faculty development program can show how traditional lecture-based teaching strategies can affect student learning when used in an active learning setting (Borda et al., 2020). When faculty practice lecture and active learning teaching strategies in the proper classroom format, it reinforces the importance of each strategy and its application. Understanding the value of these programs' success can help drive faculty motivation.

### **Faculty Motivation**

#### ***Techniques***

Research shows that teachers exposed early and often to techniques unique to active learning are more likely to show motivation toward developing lesson materials that encompass the required elements necessary for successful active learning execution. Motivated faculty using effective teaching materials customized for active learning, elicit ideas and engagement for their learners. They also encourage learners to seek new ways of thinking, challenge current ways of thinking, and develop current ways of employing current ideas (Gerard et al., 2022). However, to sustain adequate faculty motivation toward active learning organizations must give faculty multiple opportunities to increase their foundational teaching knowledge by exposing them to multiple teaching modalities while also allowing them to apply the skills in a classroom environment (Handlos et al., 2022).

#### ***Pitfalls***

It is dangerously easy to demotivate a teacher on the value of active learning if not approached adequately through diligent and deliberate training programs that take the time to

develop a bottom-to-top approach to faculty development and avoid hasty, just-in-time initiatives. Faculty development programs must avoid overly aggressive or half-hearted training initiatives related to active learning. Research shows that these approaches can often cause disillusionment, frustration, confusion, and job dissatisfaction (Jez, 2022). Instead, the ideal way to avoid common faculty development pitfalls involves ongoing, routine scheduling training and understanding the value to students and faculty. Successful faculty development training needs to be both flexible and consistent. Trying to avoid ambiguity of when, where, and what, the training should include the faculty or designated representatives in the development and execution of their training. This approach allows training that is specific, practical, supportive, authentic, and appropriately challenging (Hertz et al., 2022).

### **Student Impacts**

#### *Successes*

In order to achieve student success with active learning, we motivate the students to drive their learning by seeking the answer to each problem they face. However, this is unsuccessful in the absence of the faculty member. The faculty must ensure student success through active learning strategies by ensuring they fulfill a sound role as facilitators. As facilitators they ensure the student seeks viable solutions to problems via sound methods rather than simply using technology to look up answers. Effective facilitation ensures the students show a solid understanding by driving them to fully explain the rationale for their developed solutions (Isa et al., 2022). Effective facilitators must foster a learning environment that positively influences the learner's experience. Learners have a much higher chance of learning success when their active learning faculty facilitator increases their academic confidence by appropriately balancing

learner engagement and facilitation (Jian-Peng et al., 2022), ultimately increasing student motivation, engagement, and knowledge retention.

### ***Challenges***

Active learning strategies require a deliberate understanding of the benefits and limitations they can pose to the learner. Therefore, evaluating traditional lecture-based learning outcomes against active learning-based learning outcomes on the same subject will be vital to determine if implementing active learning is effective (Berlinski & Busso, 2017). Current research shows that effectively formatted active learning classrooms involving technology and collaboration improve student learning outcomes (Smith et al., 2018). However, it is essential to remember that individual motivational factors can dissuade students from fully engaging in active learning, resulting in poor performance, which requires needed facilitation from the instructor to keep students engaged (Carrasco et al., 2018). It is just as important to incorporate technological developments regarding learning strategies and ensure that they incorporate these changing and beneficial technological attributes to ensure poor faculty understanding of technology integration does not challenge student learning (Vodovozov et al., 2021).

### **Student Motivations**

#### ***Techniques***

Student motivation toward active learning is just as important as faculty motivation. When active learning programs cannot address this vital aspect, they increase the risk of failing with their active learning lessons. Students learn best when the learning environment is challenging and appealing to the learner. Practical exposure to technology in a classroom configured toward active learning ensures the student shows a positive motivation toward the active learning process (Fong et al., 2022). When students experience active learning through

faculty that embrace technology's challenges and benefits in creative, humorous, and engaging ways, students will have an increased learning outcome overall (Tam 2022). While it is often easy to employ the techniques students need to feel motivation in the classroom, the pitfalls require the most attention to avoid overlooking them.

### *Pitfalls*

When programs overlook or poorly implement effective active learning classrooms, it can easily affect student motivation. One often overlooked area is the learning environment. As Cayubit 2022 points out, the learning environment affects everything within the educational setting. This setting, therefore, affects learning psychology, cultural experience, and technical aptitude. Therefore, educators must create a learning environment that positively impacts each of these areas. When educational environments cannot provide a balanced, growth-rich, and supportive learning experience, it is easy for learners to feel frustrated, confused, and indifferent toward their learning environment.

Often, programs that hope to implement new pedagogies like active learning do so without fully understanding the research or weighing the pros and cons of leveraging such a new teaching strategy. Active learning classrooms are similar in approach to flipped classrooms. A flipped classroom places the learning preparation and responsibility on the student, requiring the student to take an active and social role in the development of their learning (Meyliana et al., 2022). Educators are trying transitions to flipped classroom strategies with excellent outcomes but are also finding poor outcomes when hasty execution of flipped classrooms takes place. The same holds for active learning implementation strategies. Students are unlikely to achieve total learning outcomes in active learning programs that do not take adequate steps during program development evaluation, research, and implementation steps.

## **Classroom Configuration**

### ***Technology***

Successful active learning classrooms should not simply throw technology into the classroom and expect a perfect transition. Instead, implementing active learning technology requires deliberate action to ensure the integrated technology supports self-education and requires appropriate technology competency while supporting teamwork and problem-solving (Kossybayeva et al., 2022). Technology integration should support active, constructive, authentic, and cooperative learning to provide a thriving learning environment for faculty and students. (Hafizah & Hassan, 2022). Faculty development programs should not view active learning classrooms as traditional classroom options. Another essential factor to consider, along with the application of technology in active learning classrooms, is the ability to leverage distance learning technologies to expand active learning strategies beyond the classroom (Aguirre-Aguilar, 2020). The NSSI has an extensive online learning program and will benefit from the solutions presented in this research.

### ***Layout***

When academic institutions configure classrooms appropriately for active learning, they often encounter higher student learning outcomes (Nicol et al., 2022). One configuration consideration is the physical layout. While no layout is a perfect solution in every situation, research shows that student and instructor feedback leans toward classroom configurations that encourage group collaboration. Data shows that students prefer a smaller group format of four to six students (Kepez & Ust, 2020). Successful technology layouts should integrate technology that supports student's visual comprehension of vital topics while supporting collaborative efforts (Peng et al., 2022). The research also shows that, while collaboration and technology are

vital in active learning, instructor lectures when used appropriately, will also enable student learning (Lee et al., 2018). However, agreement at the administration level supporting an effective physical layout transition is a must. Without supportive agreement, classroom layout can fall short of necessary technology integration and physical flow and function (Bennett 2022). Without administrative support, faculty will be less likely to embrace layout changes within the organization and potentially revert to traditional lecture-based teaching models in the new active learning classroom. Understanding motivators, affects, and classroom configurations to implement active learning classrooms is vital. The NSSI must equally rely on various instructional resources to ensure successful development, implementation, and sustainment of active learning classroom strategies.

### **Instructional Resources**

#### ***Successful executions***

To ensure a successful active learning program, the NSSI must look to the relevant research regarding examples of other successful active learning training programs. The research data can serve as a beacon of positive actions necessary for the NSSI program's success. One challenge organizations must overcome is balancing the emphasis of faculty research against the development of their teaching skills. When institutions value research more than teaching strategies and skills, teaching ability will suffer in active learning classrooms. Successful active learning programs must embrace the importance of research and the value of quality teaching skills. Programs that include the student in the research process rely on the student's critical thinking and social learning development processes (Zhan et al., 2022). Administrators must focus on removing faculty barriers to achieve successful programs. Successful programs recognize and develop poor faculty modes of instruction and implement student-centered lessons

that emphasize evidence-based learning concepts (Sreyasi et al., 2022). While recognizing and implementing successful strategies is key, identifying and avoiding barriers to the adoption of active learning strategies is just as critical and will cause improved learning outcomes for those students while enhancing the teaching skills of the faculty.

### ***Barriers to adoption***

Barriers to adoption can be subtle but significant and require diligence in recognizing their value toward negatively affecting active learning programs. One major barrier to faculty and student adoption of active learning is a failure to capture and present learning analytics. Learning analytics show the effective and ineffective ways institutions implement active learning in the classroom (Amida et al., 2022). Learning analytics provide vital statistical data on how students are performing in class. Effective programs should incorporate this data often to help drive a faculty member's choice in how they continue or alter an active learning approach in a lesson. When that data is not readily available, faculty members and students can quickly and incorrectly assume they are successful or failing in key course learning objectives.

A second significant barrier to active learning implementation involves a failure to rollout and adequately scale the evolution and integration of their programs. Just as the NSSI has hastily implemented active learning recently, research shows this is a failed approach. Instead, successful programs can avoid this barrier through a strategic approach that starts with knowledge and training of faculty, developing a sound implementation and grown strategy, routinely evaluating faculty and student success, and establishing and maintaining strong institutional support (Beaudry, 2022). Ideally, organizations accomplish this by recognizing and improving the various lessons learned experienced during the implementation and sustainment strategy.

### ***Lessons Learned***

The research shows that solving the problem at the NSSI will come down to a three-part process. First, classroom configuration must incorporate applicable learning technologies and formats that support collaboration and drive social learning (Kepez & Ust, 2020). The NSSI must create and execute a faculty development program that prepares the staff to function as effective facilitators of active learning and create practical lessons that use active learning strategies (Hursen, 2020). Last, the NSSI must evaluate its implementation strategy and student learning outcomes using an established and detailed process to identify areas of success and improvement and then take action based on the results (Arruda & Silva, 2021). Those resulting actions should ensure that the NSSI strengthens its active learning strategies appropriately.

## **Theoretical Framework**

### **Constructivist Theory**

The theoretical framework used in this research is the constructivist theory from Jean Piaget and Lev Vygotsky. Constructivist theory considers social experiences' impact on learners and their ability to construct learning processes through various social exchanges (Clark, 2018). The constructivist theory is the foundation of active learning pedagogy, which, like constructivism, represents more of a theory of learning than a theory of teaching (Bachtold, 2013). Because the research solves the problem of low faculty adoption of active learning, constructivist theory is vital to guide the research and faculty learning outcomes to ensure the greatest success at solving the problem.

### **Purpose**

Constructivism emphasizes how learning builds student knowledge through experiences and strengthens their learning construction through current and future social interactions and

experiences. It is not a theory that relies on the more commonly used and accepted form of knowledge transmission, where learners expand their knowledge only through instructor lectures (Applefield, 2001). Most faculty members at the National Security Space Institute have extensive experience in instructor-led lectures and little to no experience in active forms of learning. In order to solve the problem, the research needs to find the critical gaps in the faculty's knowledge regarding constructivist theory and active learning.

### **Application**

Problem solutions must include faculty training programs that help the teachers understand that they must facilitate the learner's thinking and learning process rather than serve as the sole feeder of knowledge (Liu & Chen, 2010). Constructivist theory is the foundation for how faculty interact with new active learning classrooms. The institute's classrooms leverage technology and non-traditional lecture configurations to encourage students to interact socially with fellow learners by overcoming obstacles through various problem-solving techniques. These techniques guide the learner's knowledge construction (Karagiorgi & Symeou, 2005).

### **Implications**

If faculty cannot understand the constructivist theory of learning, they will continue to fail at implementing active learning at the institute. The theory is the foundation behind active learning, and faculty members must apply both a foundational knowledge of constructivist theory concepts and apply those concepts within an active learning classroom setting (Bachtold, 2013). Faculty members who can adopt both constructivist theory and active learning application may provide their students with the best possible learning outcomes.

### **Summary**

The purpose of this research study was to provide recommendations to university leaders to improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado. The problem is that 80% of the faculty at the National Security Space Institute faced a forced transition into active learning with no pre-evaluation, coordination, or effective training with the faculty. (NSSI, n.d.). This chapter covered the narrative review and theoretical framework.

## **CHAPTER THREE: PROCEDURES**

### **Overview**

The purpose of this research study was to provide recommendations to university leaders to improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado. The problem was that 80% of the faculty at the NSSI faced a forced transition into active learning with no pre-evaluation, coordination, or effective training with the faculty (NSSI, n.d.). This section describes the interview, survey, and focus group procedures.

### **Interview Procedures**

The first data collection approach was semi-structured interviews with faculty Department Heads at the National Security Space Institute. Interview questions were written based on the scholarly literature designed to provide recommendations for the problem that 80% of the faculty at the National Security Space Institute faced a forced transition into active learning with no pre-evaluation, coordination, or effective training with the faculty. Topics were investigated as part of the applied research using open-ended questions. Interviews were conducted using a purposeful sampling of the department heads (eight to 10) drawn from government contractors serving as department heads at the NSSI. The selected department head members have the greatest impact on the success of the active learning program at the NSSI and can provide the most relevant feedback on their development experience.

Interview questions focused on the department head's understanding of active learning. The interviews provided data on their development experience, baseline knowledge of active learning, any applicable implementation strategies they should employ, and changes department heads must make to their curriculum development process to support active learning. When faculty adapt swiftly to changing learner needs and technology use, improved learning outcomes,

learner engagement, and execution costs are all often improved (Phelps, 2020). All interviews were conducted on-site at the NSSI library or via Zoom, scheduled for a one-on-one interview with each participant over two weeks. Each interview was allotted one hour for completion. Notes were taken during the interview on observed behaviors, expressions, and actions during the interview. The interview was recorded using an audio recorder and transcribed at the interview session's conclusion for data analysis. Once the transcripts were complete, they were reviewed for common themes present. These themes were categorized and coded, and then the data was analyzed and organized in groups applicable to research-specific topics related to providing recommendations for the problem.

### **Interview Questions**

#### 1. What is Active Learning?

This question aims to determine if NSSI faculty have a foundational understanding of active learning and if they could apply any active learning strategies. To successfully implement active learning in the classroom, the faculty must know that active learning encompasses affording students the ability to take control of their learning through personal cognitive analysis, the opportunity for self-assessment, and personal reflection. In addition, NSSI faculty must know that active learning centers on the student, not the faculty, and that the faculty must encourage students' direct inquiry into lesson topics (Lombardi & Shipley, 2021). By asking this question, the researcher can gauge faculty preparedness.

#### 2. How do you plan to implement use of active learning in the classroom?

This question evaluates the faculty's understanding of active learning and assesses the faculty's approach to using active learning in the classroom. It seeks to identify if faculty show attributes for effective active learning. Faculty should take actions that transition from the

traditional didactic lecture format toward an approach that reassures students to take an active role in problem-solving, group participation in problem-solving, and whole-class discussions to expand knowledge retention. The faculty's approach to active learning implementation expresses an understanding of how large class sizes and traditional fixed-seat classrooms negatively affect active learning strategies (Apkarian et al., 2021). The researcher can assess effective and ineffective strategies for active learning implementation by asking this question.

3. What changes have you made to your curriculum to allow you to employ active learning effectively in the classroom?

This question seeks to understand the steps faculty members take to ensure the effective delivery of active learning in the classroom. Effective strategies include approaches that drive student critical thinking and encourage open discussion, including case studies, class activities that drive problem-solving, peer learning activities, electronic learning evaluation tools, and increased integration of student research methods (Styers et al., 2018). By asking this question, the researcher can determine faculty curriculum development processes and how they support the effective use of active learning.

4. What training did you receive on Active Learning?

This question seeks to evaluate the level of faculty development focused on using and implementing active learning and the teaching strategies essential to successful active learning outcomes. Evidence shows that facilitation strategies used in active learning classrooms, combined with the effective use of technology and student-group interaction, bring improved learning outcomes compared to more traditional lecture-based learning situations (Mutambuki et al., 2018).

5. How many faculty development sessions have you attended in the last 24 months and what did they cover?

This question evaluates the consistency and focus of the NSSI's faculty development program. When schools establish training programs that guide and support faculty with training applicable to strategies required in the classroom, there is a notable success in sustaining a mature development program. A mature program ensures responsive data on positive and negative trends in the classroom and can adapt faster when necessary (Arruda & Silva, 2021).

6. Why does the NSSI wish to use active learning in the classroom?

This question seeks to determine the faculty's awareness of the benefits of active learning strategies for both the faculty and the learner. There is value in recognizing the value students achieve through collaborative, technology-enhanced, and instructor-facilitated learning environments (Mutambuki et al., 2018). When instructors align with the school's vision and employ the applicable teaching strategies for active learning, the student's acceptance and engagement increase (Park et al., 2021).

7. What technology is effective in an active learning classroom?

This question evaluates the faculty's knowledge of applicable learning technologies suited for active learning classrooms. Key technology often seen in active learning classrooms comprises portable computers, cameras, broadcasting tools, interactive monitors and whiteboards, smart-device connected technology, and wireless internet service, all designed to support collaboration between learners (Li et al., 2019).

8. What attributes apply to an effective teacher?

This question seeks to evaluate the faculty's awareness of their teaching traits and whether those traits will improve their teaching ability in an active learning classroom.

Successful active learning teachers recognize the importance of guiding their students to construct new learning processes and experiences through individual and collaborative processes with their peers. Faculty enable this process through less direct lectures and more guided facilitation (Roll et al., 2018).

9. How do your school administrators support your faculty development efforts?

This question evaluates the faculty's perception of their leadership support and how that support guides their professional growth and job satisfaction. Data advocates that a larger percentage of faculty within an organization are concerned with their performance as a teacher and do not feel they possess the skills necessary to succeed in every teaching situation (Jeremiah et al., 2021). When leadership recognizes this fundamental concern, they can adapt their faculty development programs to meet the needs of their faculty members.

10. What attributes apply to an effective learner in an active learning classroom?

This question evaluates the faculty's awareness of crucial learner attributes associated with student success in active learning classrooms. When students show high engagement in course activities, group collaboration, and develop a study and review process that accounts for follow-up of course topics beyond the conclusion of the course, students achieve higher learning outcomes more effectively (Moosa, 2019).

### **Focus Group Procedures**

The second data collection approach was a focus group with civilian administrators and active-duty leadership at the National Security Space Institute. Questions for this focus group were pre-set and presented synchronously. Focus group questions were written based on the scholarly literature on topics investigated as part of the applied research. The participants comprised six participants pulled equally from the government contractors serving in administration positions (two) and active military leaders (two) filling academic leadership positions. All participants have direct decision-making and interaction with active learning strategies, faculty development matters, and student learning outcomes, which made these participants the correct choice to include in the focus group.

The questions focus on the faculty's awareness of the effects of active learning on improving student learning, classroom learning environment, and faculty development. The focus group was conducted on-site using the faculty development center with only the participants and researcher present. The focus group was scheduled for 90 minutes. Notes were taken during the focus group on observed behaviors, expressions, and actions during the focus group. The focus group was audio recorded and transcribed after the focus group session for data analysis. Once the transcripts were completed, they were reviewed for common themes present. These themes were categorized and coded, and then the data was analyzed and organized in groups applicable to research-specific topics which related to providing recommendations for the problem of 80% of the faculty at the NSSI faced a forced transition into active learning with no pre-evaluation, coordination, or effective training with the faculty. The coding data was formatted into visual tables and charts and included as an attachment for reader validation.

### **Focus Group Questions**

1. How can active learning impact student learning in the classroom?

This question identifies faculty awareness of the benefits active learning brings to the student. Teachers achieve student learning and engagement improvements through peer interaction. Peer interaction brings robust construction of knowledge and social development (Wiggins et al., 2017).

2. What recommendations do you have to deliver effective active learning in the classroom at the NSSI?

This question expands on the faculty's awareness of active learning and evaluates their approaches toward their use of active learning in the classroom. Faculty must identify the differences between a didactic lecture classroom and an active learning classroom. Classroom activities encouraging student engagement increase problem-solving and knowledge retention (Inra et al., 2017).

3. How should the NSSI prepare its faculty for active learning in the classroom?

This question seeks to understand the faculty's perception of NSSI faculty development processes and how those processes are or are not preparing the faculty for the transition to active learning classrooms at the NSSI. Effective faculty development programs that advance teacher skills, strengthen the use of classroom technology, and seek to drive faculty pedagogies beyond individual comfort zones are vital to successfully implementing new teaching practices. With the effective implementation of teacher programs, there is an increase in teacher participation and increased student outcomes (Hursen, 2021).

4. What technology is effective in an active learning environment?

This question seeks to verify if faculty and administrators are aware of technology uses in active learning classrooms to ensure enhanced student learning experiences. Adding technology to an active learning environment does not result in effective learning outcomes. However, when teachers combine technology with other vital active learning teaching strategies, effective learning outcomes are increased compared to technology alone (Nicol et al., 2017).

5. What does facilitation mean?

This question seeks to determine if faculty understands the value of facilitation over traditional didactic teaching in active learning classrooms. When faculty recognize that active learning comprises allowing the students to work together to solve learning problems and issues through faculty facilitation through the learning steps over direct delivery of the information, advancing the student learning experience and enhancing learning outcomes (Park et al., 2021).

6. How do you encourage problem-based learning?

This question seeks to identify the faculty and administrators' ability to encourage effective active learning strategies to fellow faculty, staff, and students at the NSSI. When organizations develop and track the evolution of their teaching strategies and their active learning program, data is leveraged to evaluate the maturity of such programs and drive programs to long-term success (Arruda & Silva, 2021).

7. What does an ineffective learning environment look like?

This question seeks to identify the faculty and staff's ability to identify indicators of ineffective learning environments, causes of those environments, and develop strategies to correct those environments. When institutions cannot recognize and intervene in early indicators of ineffective student engagement, problem-solving, effective study skills use, and poor

responses to feedback and evaluation, it becomes increasingly challenging to ensure sustained engagement and learning success (Suave et al., 2018).

8. What does an effective faculty development program look like?

This question seeks to confirm if faculty and staff identify positive attributes with effective faculty development programs and how those programs provide impactful training that benefits the faculty, students, and organization. When STEM institutions offer faculty continued training on multiple practical teaching approaches and given the chance to experiment with strategies like active learning surrounded by knowledgeable and supportive peers, they are highly likely to succeed (Mutambuki et al., 2020).

9. Describe your level of preparedness to use active learning?

This question seeks to validate a faculty member's readiness to teach in an active learning environment. Faculty must recognize their ability to develop curriculum and foster a classroom environment that leverages effective technology use, inspires student engagement, and intensifies problem-solving, improving knowledge retention (Inra et al., 2017).

10. What does effective student feedback and evaluation mean to you?

This question seeks to identify a faculty member's ability to provide adequate student feedback and leverage effective student evaluation strategies. Feedback and evaluation are crucial faculty skills necessary for a positive learning experience for students in active learning classrooms. Students who experience poor feedback and evaluation from faculty are less likely to embrace active learning strategies (Park et al., 2021).

### **Quantitative Survey Procedures**

The third data collection approach was a quantitative survey administered to the National Security Space Institute faculty. The third approach used to provide recommendations for the problem that 80% of the faculty at the NSSI faced a forced transition into active learning with no pre-evaluation, coordination, or effective training with the faculty was a quantitative survey using a purposeful sampling. Survey questions were close-ended, Likert scale, written based on the scholarly literature on topics investigated as part of the applied research. The participants comprised 17 government contractors serving in faculty positions. These participants were purposely selected because they directly impacted active learning classroom strategies or faculty development processes.

The questions focus on the faculty's understanding of successful faculty attributes, individual faculty strengths, and individual faculty weaknesses. The survey was conducted on the NSSI internal Learning Management System, allowing flexibility in completing the survey at either work or home. Respondents were given one week to complete the survey and one reminder on the fourth day for those who had yet to complete the survey. The survey responses were calculated based on the frequency of each Likert question response. The highest, lowest, and average response for each question was calculated and presented in tables or charts. The survey included three demographic questions and ten questions developed from the scholarly literature.

#### **Survey Questions**

1. Which category best describes your age in years?

- 21–29
- 30–39
- 40–49
- 50–59
- or older

2. What is your race?

- White
- Black/African-American
- Asian
- Native American/Pacific Islander
- Two or More Races
- Other

3. How many years have been teaching?

- Less than two years
- Two to five years
- Five to 10 years
- Greater than 10 years

4. I feel my administration enables my professional development.

- Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree

This question seeks to determine faculty’s perceptions of support from their leadership on their professional development and how that support elicits their perceptions and performance in an active learning classroom (Steinert et al., 2019). As technology and teaching pedagogies advance student’s technology adoption, critical thinking processes, and problem-solving skills,

teachers must also advance in these areas to ensure they remain effective in the classroom (Hursen, 2020).

5. I have a strong desire to try new things in the classroom.

Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree

This question seeks to evaluate the faculty's comfort with changing teaching strategies. When teachers challenge their professional development and seek to enhance areas specific to active learning strategies such as critical thinking, they are likely to achieve greater success relating to and facilitating students' critical thinking process on course topics (Hursen, 2020).

6. I adapt to technology changes in the classroom effectively?

Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree

This question seeks to evaluate the faculty's ability to adopt new classroom technology required for active learning classrooms. When faculty develop a curriculum incorporating new technology, which drives student engagement, collaboration, and problem-solving, knowledge retention is increased (Inra et al., 2017).

7. The NSSI provided me with enough training on active learning to be an effective teacher.

Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree

This question seeks to determine the perceived attributes of faculty members at the NSSI and whether the identified attributes impact effective active learning strategies. Teachers engaging in effective questioning techniques and other student-driven dialogue focused on scientific problem-solving advance the learning process (Roll et al., 2018). Faculty should recognize the importance of facilitating active learning processes and avoid limiting their teaching strategies to only traditional didactic teaching methods.

8. I am comfortable in the role of a learning facilitator vs. a lecturer.

Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree

This question recognizes whether faculty members identify essential traits associated with effective active learning strategies. When faculty display comfort in serving as a facilitator of learning in active learning classrooms, students display favorable adoption and report positive learning effects from the active learning process (Park et al., 2021). Faculty members that show traits common with direct delivery of knowledge and rigidity toward student group problem solving may require more development training on implementing active learning strategies.

9. Faculty weaknesses at the NSSI will impact the transition to active learning?

Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree

This question identifies faculty awareness of their weaknesses and further clarifies if any identified weaknesses related to facilitating cooperative learning and problem-based learning. Cooperative and problem-based learning, when executed by teachers, effectively shows increased student learning outcomes (Ghufron & Ermawati, 2018).

10. The faculty should provide more input into the faculty development program process.

Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree

This question intends to identify faculty awareness of personal shortfalls related to personal teaching strategies. Also, those shortfalls can be evaluated against key attributes associated with successful faculty development and active learning strategies. When faculty partake in effective development programs, they evolve their feedback and evaluation techniques toward learners (Jeremiah et al., 2021).

11. My teaching style is adaptable.

Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree

This question intends to identify if faculty appropriately identify their specific approach to teaching in this STEM environment and whether their teaching style aligns with techniques that indicate success in active learning classrooms. When teachers apply effective teaching styles to applicable classroom settings, learning outcomes increase for students (Strawhacker et al., 2018).

12. The transition to active learning will have a negative impact on my teaching effectiveness.

Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree

This question seeks to validate faculty's understanding of what changes will be necessary for their role as teachers in an active learning classroom to ensure effective learning outcomes.

Effective facilitation techniques founded on practical faculty training with a foundation on effective feedback and evaluation skills ensure the highest chance of successful active learning outcomes (Jeremiah et al., 2021).

13. The NSSI's transition to active learning will have a positive impact on the learner.

Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree

This question seeks to validate the faculty's understanding of effective teaching strategies, classroom technology use, and physical configurations to improve learning outcomes for the student. When faculty engage in effective facilitation strategies and encourage student group participation and technology use, they demonstrate higher acceptance and use of active learning strategies (Park et al., 2021).

### **Summary**

The purpose of this research study was to provide recommendations to university leaders to improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado. The problem is that 80% of the faculty at the National Security Space Institute faced a forced transition into active learning with no pre-evaluation, coordination, or

effective training with the faculty. (NSSI, n.d.). This chapter covered the data collection procedures. The first data collection procedure was interviews. The second data collection method was a focus group. The third data collection procedure was a quantitative survey.

## **CHAPTER FOUR: FINDINGS**

### **Overview**

The purpose of this research study was to provide recommendations to university leaders to improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado. The problem is that 80% of the faculty at the National Security Space Institute faced a forced transition into active learning with no pre-evaluation, coordination, or effective training with the faculty. (NSSI, n.d.). This chapter presents the interview, focus group, and survey findings.

### **Interview Findings**

The first approach used in this study was semi-structured interviews. Interviews comprised ten questions, and each interview was conducted individually. The interview focused on the department head's understanding of active learning, their development experience, baseline knowledge of active learning, any applicable implementation strategies they may employ, and changes to their curriculum development process to support active learning. Interviews were conducted on-site at the NSSI in a small conference room or the individual's private office. Eight department heads participated in the face-to-face interviews. The criteria for interview selection required the individual to serve as a government contractor and serve in a department head leadership role over others at the NSSI. Participants were given a summary of the purpose of the research when they were invited to take part and then again at the start of the interview. Each interview lasted between 40 and 50 minutes, was recorded, and then transcribed for data analysis.

### **Interview Descriptions of Participants**

Participant one has five years of faculty teaching experience at the NSSI, including 20 years of military experience as an intelligence professional, affording the participant the essential leadership experience to fulfill the role of the department head of the Joint/Combined Leadership division. He holds two master's degrees, one in IT systems for business and the other in management information systems. For the past two years, he led nine faculty members and two course directors within the department. Participant one had no prior experience with active learning strategies before the NSSI.

Participant two serves as the Policy and Strategy division's department head, overseeing eight instructors and three course directors. She has 18 years of teaching experience at the NSSI. She brings five years of military experience, 26 years as a lawyer, a Juris Doctorate, and three years of leadership experience as the department head. Participant two had no prior experience with active learning strategies before the NSSI.

Participant three has 15 years of military teaching experience, including two at the NSSI. For the last year, he has been the department head of the Intelligence, Plans, and Integrations division. He holds two master's degrees, one in international relations and the other in operational art and science (Military). He completed a twenty-year military leadership career, positioning him to oversee ten instructors and seven course directors within his department. Participant three had no prior experience with active learning strategies before the NSSI.

Participant four serves as the Deputy Program Manager at the NSSI, overseeing all department heads and course directors. He has 14 years of military and collegiate teaching experience, including two at the NSSI. He had a 24-year career in the Air Force and holds a

Ph.D. in Civil and Environmental Engineering. Participant four had experience with active learning strategies prior to the NSSI.

Participant Five has 20 years of military teaching experience, including two at the NSSI. For the last year, he has been the department head of the Cross Spectrum Development division. He holds a Master of Business Administration and completed a 25-year military career in the Air Force. He oversees eight instructors and five course directors as department head. Participant five had no prior experience with active learning strategies before the NSSI.

Participant Six serves as the department head of the Instructional Systems Development (ISD) division. He handles all curriculum development, training analysis, course design, and classroom administration procedures within the NSSI. He has over 30 years of experience in ISD process within the United States Military and holds a bachelor's degree in business management. Participant six had prior experience with active learning strategies before the NSSI.

Participant Seven has 12 years of military teaching experience, including five years at the NSSI. For the last three years, he has been the department head of the Mobile Education division. He served in the U.S. Navy for 30 years and holds two master's degrees, one in information technology and the other in financial management. He oversees all courses and instructors who travel remotely to execute various NSSI courses. Participant seven had no prior experience with active learning strategies before the NSSI.

Participant Eight serves as the Program Manager of all faculty and staff at the NSSI. He manages 82 members of the NSSI team. He has over 15 years of military teaching experience, supported by a 21-year active-duty Air Force career. Participant eight is a certified Project Management Professional with a Master of Business Administration and a master's degree in

information operations. Participant eight had no prior experience with active learning strategies before the NSSI.

### Interview Results

Interviews were conducted with eight department heads at the National Security Space Institute to identify themes associated with implementing active learning at the NSSI. Notes were made during the interviews on specific topics and phrases, and then this was re-evaluated during playback of the recorded interviews during transcription. Each interview recording was uploaded to an automated transcription tool and then edited for correctness during a final review. After final transcription edits, each transcript was reviewed, and codes were identified. Quotes were highlighted and saved, which supported applicable codes. Codes were grouped into themes based on their relationship. Themes, codes, and quotes are identified in table 1.

**Table 1**

*Codes, Themes and Quotes (Interview Data)*

Themes	Codes	Quotes
Teaching Strategies	Collaboration	“So the only thing there is just really the whiteboards is kind of kind of old school telling, breaking students into a group, telling them to go to the board. You six people go to the board on here on the left, and you six go to the board on the right and start writing stuff. And that is better than nothing.”
	Facilitation	“And so that one not really so much board work, but it’s a lot of class discussion where I kind of go off where the students take the discussion. And so sometimes we go off in these different areas that maybe didn’t plan to, but it’s still within the realm of what the lesson objectives are for that day. So we kind of let it go down that path rather than I steer them back.”
	Methodology	“So me personally, as an instructor, I employ in all of my lessons. Okay. So, I completely rewrote the space

		200 lessons to make it more active, learning a little more kinetic, lots of QA, very Socratic,”
	Lecture	“I would imagine that. Conservatively, 80% of the instructors are not necessarily doing any active learning or anything like that. They’re more lecture-based. There may be some components of the course that are more active learning. But that’s not. Necessarily throughout the entire course.”
Professional Development	Autonomous	“That said, we clearly need to have a faculty development program. So that’s something that I’m wrestling with. I got to figure out what is a what is a good battle rhythm. It’s a once a month. It’s a once a quarter. Is it just 30 minutes? Is it an hour? Do we dedicate a Friday afternoon,”
	Active	“done a in-person faculty development a couple of times that I’ve been able to attend, and those have included active learning tips and methodologies.”
	Accountability	“I think they leave it up to us to figure out what’s the best way to do it. I don’t think that any of them necessarily have an education background, and some may have a training background, but I don’t know that that’s necessarily always the case.”
Classroom Considerations	Low Technology	“the most that was available is to use it as a whiteboard, virtual electronic whiteboard. In that sense, that way, you can highlight things and write on things and or have people go up to the board and say, Okay, here’s what’s on the slide.”
	High Technology	“just having a dedicated monitor on the wall for each of the four pods and a KVM switch that services the six computers on that pod where when we’re doing, say, space Control, Group one is working on a specific problem that is different than group two, 3 or 4. When it comes time to debrief, I can take all the information that Group one has, and I can throw it on any of the monitors in the room.”

	Layout	“The classroom in the 200 is configured in pods of four with six people around it. The configuration of the space 300 is in the SCIF, and that’s in a horseshoe layout environment.”
Student/Teacher Attributes	Adaptable	“it’s providing learning in a way that best reaches your audience. So ideally, the best active learning is adaptable to the audience and responsive to the audience.”
	Expertise	“I think you have to be a lifelong learner. You have to acknowledge that you may not know everything, but you always need to be striving to increase your knowledge level.”
	Approachability	“need to be personable. To some extent, you need to be likable, relatable, credible.”
	Enthusiastic	“Enthusiasm. Students seem to right away pick up on enthusiasm.”
Roadblocks	Scheduling	“I am aware that the day-to-day churn, the tempo of our line instructors is pretty high. And so, I need to strike a balance. We, the necessity, need to strike a balance as to the frequency and the length of our faculty development seminars or brown bag lunches, etcetera so that we don’t occupy too much of our instructor.”
	Logistics	“So the one that I’m most interested in as an intel professional and teaching mostly intel lessons is finding a way to integrate these technologies into the scif.”
	Change Resistance	“So I probably kind of dropped off during my initial time here because I was refocusing my efforts on just getting to know the lessons and lesson material. So I self-admit that I kind of dropped off on that one.”
	Frustration	“So I’ve been thrown into multiple lessons where I wasn’t even expecting to speak on it for that day, but the person who was supposed to present the information flaked out and wasn’t present. So instead of having a hole in the schedule, I decided to go ahead

		and give that material based on what I had heard the previous speakers say and then fill up any additional time.”
	Ambiguity	“I really don’t know, to be honest with you, because I haven’t seen but like five, ten minutes of any instruction being given over there. So I haven’t really been able to sit through any of the courses, so I don’t know exactly how they utilize the technology.”
Leadership Impacts	Effective	“But also we need to keep developing ourselves, instructors. So I know that’s been very clear from the contract leadership, and I’ve relayed that down to our instructors to is I like to everybody suit to submit for at least one professional development trip each year based on the funding that we have.”
	Ineffective	“I think it was really kind of just on-the-job training, talking to other instructors. I don’t think it was truly formalized. It was here’s the process of how you get certified. So start reading this, the lesson plan, and the PowerPoint. Go and observe the lesson a few times, and then we’re going to have you team teach it With the certified structure in the room. They’ll jump in if needed to help you out. And after they gave me the thumbs up,”
Faculty Understanding	Active Learning Clarity	“getting the students to be as involved in the facilitated discussion as possible, leveraging the information that they know, starting with that as a foundational knowledge, and then try and build that higher scaffolding of critical thinking on top of that.”
	Active Learning Confusion	“involving different activities is how I see it. So involving games, quizzes, and different types of interactive teaching styles. So it’s not just lecture is how I if I have to summarize it, that’s how I see active learning.”

Themes were identified, and similar codes were combined for clarity. Themes, codes, and quotes were evaluated using AtlasTi. The occurrences of similar codes were tracked and merged

for clarity. The frequency of occurrences of codes in all forms is listed by the final merged code listed in Table 2.

**Table 2**

*Themes, Codes and Occurrences (Interview Data)*

Themes	Codes	Occurrences (Merged)
Teaching Strategies	Collaboration	33
	Facilitation	18
	Methodology	12
	Lecture	7
Professional Development	Autonomous	26
	Active	20
	Accountability	8
Classroom Considerations	Low Technology	12
	High Technology	11
	Layout	7
Student/Teacher Attributes	Adaptable	15
	Expertise	11
	Approachable	9
	Enthusiastic	8
Roadblocks	Schedule	17
	Logistics	14
	Change Resistance	13
	Frustration	12
	Ambiguity	7
Leadership Impacts	Ineffective	28
	Effective	14
Faculty Understanding	Active Learning Clarity	17
	Active Learning Confusion	15

### **Interview Discussion of Findings**

During the research, seven themes developed from the interviews and five themes from the focus group. Both methods shared a common theme of roadblocks, which will be discussed further in this section. The discussion of the findings section addresses the similarities and differences between the data collection process, an analysis of the gathered data from all three processes, and how it relates to the scholarly literature.

The first theme present during the interviews was teaching strategies. Scholarly literature shows that organizations must balance research with a focus on quality teaching strategies while also including students' critical thinking and social learning (Zhan et al., 2022). The participant data gathered during the interviews shows that department heads are aware of student collaborative learning and attempt to incorporate this approach when practical, regardless of the classroom configuration, showing how limited their approach may be. One interview participant stated, "So the only thing there is just really the whiteboards is kind of kind of old school telling, breaking students into a group, telling them to go to the board. You six people go to the board on here on the left, and you six go to the board on the right and start writing stuff. And that's better than nothing." This approach and similar approaches to small student group collaborative learning came up 33 times during the eight interviews, the highest occurrence within the theme of teaching strategies, though it was addressed as a single repetitive approach. This concept was also evident when facilitation was mentioned 18 times, though, as stated by one participant, "...but it's a lot of class discussion where I kind of go off where the students take the discussion. And so sometimes we go off in these different areas that maybe didn't plan to, but it's still within the realm of what the lesson objectives are for that day." Department heads indeed stated in their response that they try to adjust their methodology, which was discussed 12 times, though data shows that the use of lecture as presented by one participant who stated, "I would imagine that. Conservatively, 80% of the instructors are not necessarily doing any active learning or anything like that. They're more lecture-based. There may be some components of the course that are more active learning. But that's not necessarily throughout the entire course" shows a stronger faculty propensity for lecture rather than active learning strategies beyond the occasional small-group collaboration when it can be easily included.

The second theme discovered during interviews was professional development. Scholarly literature shows that active learning implementation is successful when organizations incorporate training regarding active learning strategies across their faculty development programs (Hursen, 2020). Participants' discussions show an autonomous, self-regulating approach regarding the professional development program with few formal processes for professional development. Participants indicated that what occurs requires active motivation on behalf of the faculty member. One respondent stated, "we clearly need to have a faculty development program. So that's something that I'm wrestling with. I got to figure out what is a what is a good battle rhythm. It's a once a month. It's a once a quarter. Is it just 30 minutes? Is it an hour? Do we dedicate a Friday afternoon," as addressed by another participant who stated, "I've done an in person faculty development a couple of times that I've been able to attend, and those have included active learning tips and methodologies" The autonomous nature of the professional development program was mentioned 26 times while the need for active involvement to get any form of faculty development was mentioned 20 times. Poor professional development creates an organization where faculty lack the skills to develop adequate active learning course materials or establish and use an effective active learning environment. (Fixen & Wald, 2021). Eight times, interview respondents discussed the accountability issues within the organization relating to professional development, reinforcing an autonomous, unorganized, and ineffective professional development program with little enforcement for those who do not participate in any form of professional development. One respondent stated, "I think they leave it up to us to figure out what's the best way to do it. I don't think that any of them necessarily have an education background, and some may have a training background, but I don't know that's necessarily always the case." The data shows that the lack of a formal and enforced professional

development program significantly impacts the faculty's understanding and use of active learning within the NSSI.

The third theme discovered during interviews was classroom considerations. The scholarly literature supports a classroom deliberately configured so that appropriate technology integration supports the desired active learning strategies. It is also essential that the competency of the integrated technology remains a crucial component of such integrations within active learning environments (Kossybayeva et al., 2022). The participant responses focused on three key areas: Low technology use, High technology use, and the classroom layout. NSSI has nine classrooms, three configured for active learning use and two more classrooms under construction, transitioning to active learning. The respondents addressed their use of low technology solutions within the classroom 12 times. Low technology solutions typically centered on using whiteboards or digital whiteboards in the increased technology (active learning) classrooms. One respondent stated, “the most that was available is to use it as a whiteboard, virtual electronic whiteboard. In that sense, that way you can highlight things and write on things and or have people go up to the board and say, okay, here’s what’s on the slide” showing a limited scope of active learning strategies used at the NSSI regardless of the classroom configuration. 11 times respondents mentioned high technology use within the classroom. However, most responses were similar to one participant who stated, “just having a dedicated monitor on the wall for each of the four pods and a switch that services the six computers on that pod where when we’re doing...Group one is working on a specific problem that is different than group two, 3 or 4. When it comes time to debrief, I can take all the information that Group one has and I can throw it on any of the monitors at the room” indicating a limited knowledge available to them when using the technology in the active learning classrooms. In fact, most

discussions about technology showed that instructors knew the active learning classrooms enhanced the learning experience using technology but showed little understanding of how to leverage the technology to support genuine active learning strategies and often relegated to small group work and display functions only. In active learning classrooms, layout is vital when it encourages small group collaboration between groups of four to six (Kepez & Ust, 2020). The layout of the classroom came up seven times and, as one respondent stated, “The classroom in the 200 (course) is configured in pods of four with six people around it. The configuration of the space 300 (course) is in the SCIF and that’s in a horseshoe layout environment.” showing a good understanding of the importance of classroom layout regarding active learning success. Even in classrooms at the NSSI, which are not explicitly configured for active learning, the NSSI tries to facilitate learning collaboration and avoids standard lecture layout configurations.

The fourth theme present during interviews was student/teacher attributes and how they impact the success of active learning. The scholarly literature supports the importance of proper faculty development programs to increase faculty motivation and performance attributes in the classroom (Gerard et al., 2022). As students experience a positive learning environment, primarily through their faculty, it enhances their academic performance and motivation (Jian-Peng et al., 2022). The four most common student/teacher attributes clear in the interview data were adaptable, stated 15 times; expertise, stated 11 times; approachability, stated nine times; and enthusiastic, stated eight times. Regarding adaptable, one respondent stated, “it’s providing learning in a way that best reaches your audience. So ideally, the best active learning is adaptable to the audience and responsive to the audience.” While another respondent had this to say about expertise, “I think you have to be a lifelong learner. You have to acknowledge that you may not know everything, but you always need to be striving to increase your knowledge level.”

Approachability was addressed in this statement, “need to be personable. To some extent, you need to be likable, relatable, credible.” While enthusiastic was discussed when one respondent said, “Enthusiasm. Students seem to right away pick up on enthusiasm.” Overall, the department heads showed a firm understanding of the value of positive student/teacher attributes and worked hard to ensure their faculty often portrayed these attributes in the classroom.

The fifth theme present and likely the most vital to impacting successful active learning adoption at the NSSI was roadblocks. According to scholarly research, poorly and hastily executed faculty development programs significantly impact faculty adoption and use of active learning technology and strategies (Jez, 2022). Ideal programs designed to mitigate roadblocks are programs that build deliberately, slowly and sustain training over the long haul. Within the theme of roadblocks, the respondents identified primary roadblocks as schedule 17 times, logistics 14 times, resistance to change 13 times, and ambiguity seven times, all of which drove the mention of frustration 12 times. Regarding schedule, one participant stated, “I am aware that the day-to-day churn, the tempo of our line instructors is pretty high. And so, I need to strike a balance. We, need to strike a balance as to the frequency and the length of our faculty development seminars or brown bag lunches, etcetera, so that we don’t occupy too much of our instructor,” which was a sentiment present during all interviews. Task saturation related to the teaching schedule leaves little time for personal learning and organized training events. One participant stated, “So the one that I’m most interested in as an intel professional and teaching mostly intel lessons is finding a way to integrate these technologies into the SCIF (classified classroom)” when discussion logistics as a roadblock to implementing or using active learning. The NSSI classrooms have specialized classrooms for classified lesson material. These classroom restrictions currently prevent the integration of crucial technology associated with

effective active learning classrooms. Most participants were unaware that alternate technology solutions were possible for these classrooms. The respondents showed that change resistance is prevalent throughout the organization but was often tied to schedule. One participant explained this when they stated, “So that kind of dropped off during my initial time here because I was focusing my efforts on just getting to know the lessons and lesson material. So, I self-admit that I kind of dropped off on that one.” High faculty teaching demands also showed impacts on the participants’ level of frustration, which impacted their motivation to participate in activities geared toward enhancing active learning at the NSSI.

The sixth theme present during interviews was leadership impacts, which the participants split into two perspectives, either effective or ineffective. Participants noted they felt the impacts of their leadership as ineffective twice more than effective. Twenty-eight times participants addressed effective leadership as demonstrating the mindset to take action to support active learning, though not directing action of substance or consequence. One participant showed this common mindset stating, “But also, we need to keep developing ourselves instructors. So, I know that’s been very clear from the contract leadership and I’ve relayed that down to our instructors too is I’d like to everybody to submit for at least one professional development trip each year based on the funding that we have.” When participants addressed the ineffective attributes of their leadership impacts, they expressed that the action of little substance or consequence was a concern but provided little solutions to improve in the future. One participant stated, “I think it was really kind of just on-the-job training, talking to other instructors. I don’t think it was truly formalized. It was here’s the process of how you get certified. So, start reading this, the lesson plan, and the PowerPoint, go and observe the lesson a few times and then we’re going to have you team teach it with the certified structure in the room. They’ll jump in if needed

to help you out. And after they gave me the thumbs up,” which shows the informal and disjointed nature of development, evaluation, and leadership processes present at the NSSI.

The seventh and final theme present during data analysis of interview transcripts was faculty understanding, specifically understanding active learning concepts, integration, and teaching strategies. The scholarly literature supports that successful active learning strategies evolve out of practical physical and technical configurations within an organization’s learning space, proper integration of lesson strategies that rely on proven active learning approaches, and effective training programs for the faculty members teaching in active learning classrooms (Eickholt et al., 2021). During interviews, respondents showed a balanced understanding and confusion of active learning. Participants understood some components of active learning strategies, but only one clearly understood all the components of effective active learning strategies. Participants showed active learning clarity 17 times, often centered on facilitation and collaborative learning growth. One participant addressed this when they said, “getting the students to be as involved in the facilitated discussion as possible, leveraging the information that they know, starting with that as a foundational knowledge, and then try and build that higher scaffolding of critical thinking on top of that.” However, participants showed active learning confusion 15 times, which was apparent by similar statements made as this one “involving different activities is how I see it. So, involving games, quizzes, different type of interactive teaching styles. So, it’s not just lecture is how I if I have to summarize it, that’s how I see active learning.”

### **Focus Group Findings**

The second approach used in this study for data collection was a focus group. The focus group comprised ten questions presented in order. The focus group was conducted in person, on-

site in the NSSI learning commons. Only the focus group participants, researcher, and recording equipment were present during the focus group. The participants comprised six participants pulled equally from the government contractors (administration) and active-duty military (administration and academics). All participants have direct decision-making and interaction with active learning strategies, faculty development matters, and student learning outcomes, which made these participants the correct choice to include in the focus group.

Focus group questions focused on the faculty's awareness of the effects of active learning on improving student learning, classroom learning environment, and faculty development.

The focus group was conducted on-site using the faculty development center with only the participants and researcher present. The focus group was scheduled for 90 minutes and concluded in 50 minutes. Notes were taken during the focus group on observed behaviors, expressions, and actions. The focus group was audio recorded and transcribed after the focus group session for data analysis. Once the transcripts were completed, they were reviewed for common themes present. These themes were categorized and coded. The data was analyzed and organized in groups applicable to research-specific topics. Participants were provided a summary of the purpose of the research when they were invited to participate and then again at the start of the interview.

### **Focus Group Descriptions of Participants**

Focus group participant one is an active-duty service member who serves as the NSSI Provost. As the Provost, he oversees three colleges, approximately 40 faculty and staff, 36 different courses across nearly 300 offerings a year. He has 19 years of military leadership and teaching experience. He holds a master's degree in aviation technology. Participant one had some prior experience with active learning strategies before the NSSI.

Focus group participant two is an active-duty service member and serves as the Director of Academic Affairs at the NSSI. As the Director of Academic Affairs, he oversees 30 military and contractor personnel supporting 10,000 DoD and international military students across 30 graduate-level course offerings. He has 15 years of military leadership and teaching experience, including three years at the collegiate level. He holds a Master of Business Administration degree. Participant two had no prior experience with active learning strategies before the NSSI.

Focus group participant three is an active-duty service member and serves as the Dean of the College of Space Warfare at the NSSI. As the Dean, she establishes and sustains her courses for United States Space Command warfighters. She manages ten unique courses and 20 faculty members. Participant three has ten years of military teaching and leadership experience. She brings an educational background in diversity, equity, inclusion, and ethics to the NSSI. Participant three had no prior experience with active learning strategies before the NSSI.

Focus group participant four is an active-duty service member and serves as the Dean of the College of Professional Development at the NSSI. As the Dean, he manages the establishment and sustainment of courses as required by the United States Space Force. He has six years of military teaching and leadership experience. He holds a master's degree in leadership. Participant four had no prior experience with active learning strategies before the NSSI.

Focus group participant five is a civilian government contractor and serves as the Deputy Director of Information Management at NSSI. She has experience as a former library director at the NSSI. Participant five manages all the internal and external digital media shared by faculty, staff, and students at the NSSI. She has 16 years of experience in marketing, library management, and information systems and services. She holds a master's in information

management. Participant five had no prior experience with active learning strategies before the NSSI.

Focus group participant six is a civilian government contractor and serves as the Deputy Director of Digital Learning at the NSSI. As the Deputy Director of Digital Learning, she manages the educational technology innovation laboratory, serves as the Learning Management System administrator, and coordinates all curriculum development for 18 online courses supporting 6,000 students. She has 22 years of secondary education teaching experience. She holds a Master of Arts in education focusing on curriculum and instruction. Participant six had prior experience with active learning strategies prior to the NSSI.

### **Focus Group Results**

The focus group was conducted with four military members and two civilian contractors filling senior leadership roles at the National Security Space Institute to identify themes associated with implementing active learning at the NSSI. Notes were made during the focus on specific topics and phrases, and then this was re-evaluated during playback of the recorded interview during transcription. The focus group recording was uploaded to an automated transcription tool and then edited for correctness during a final review. After final transcription edits, each transcript was reviewed, and codes were identified. Quotes were highlighted and saved, which supported applicable codes. Codes were grouped into themes based on their relationship. Themes, codes, and Quotes are identified in table 3.

### **Table 3**

*Codes, Themes and Quotes (Focus Group Data)*

Themes	Codes	Quotes
Active Learning Attributes	Facilitation	"Because the student is the center of active learning, and it makes them more engaged in the content versus a professor in instructor talking at the student.

		They are more engaged with the content than just a lecture style Delivery.”
	Collaboration	“in that theoretical situation, either plants a question or creates the environment for us to hash things out and learn from each other.”
	Problem Solving	“I know it was mentioned earlier, but I think preparation for the activities is key right there. Again, making sure you have a plan going in. Try to think of different directions you can go and come up with different, I guess, lack of a better phrase. Courses of action to help direct redirect. Get yourself involved. Not involved as necessary.”
	Student Engagement	“No. You’re getting when you do the active, you’re getting more of a buy-in from the student that requires them to put more effort into it because typical lecture teacher teaches. Then you go home and reread everything, or you have to be a little more prepared. So more of a buy-in involvement from the student, which drives higher learning, I think.”
Roadblocks	Leadership factors	“I think we’re getting there. I know a lot of my course directors. I poke them a lot during our synchs and everything. What are you doing with the digital learning team, or what’s going on? I think we’re trying, and we’re not quite there yet, but I think that motivation is kind of lacking, and I think it is because the why is missing. So yeah, Now in this discussion, I’ve learned, okay, yeah, I should probably get on that and explain to people why we’re doing this. So instead of just telling people to do it.”
	Personality Traits: Negative	“And I think the other thing in there is the active learning environment, tailors to the new type of student that we see. Again, we grew up in an era of shut up and color where new lieutenants come in and stuff like that, captains, even especially lieutenants, they’ve never had a job in their life. They’ve only been to school. And what does a school teach you? Instant gratification with our cell phones and everything else.

		But you take a test, you get a grade, you get that instant gratification where for some of us,”
	Frustration	“The one thing I think, though, is we got to explain the why. Why are we going to this? And then, you get the how and the outcome from there. We have a lot of old heads leading. Most of us here have been brought up in one way, and that’s it. So if you can explain the why up front, that will help that transition because you get the some of our other senior leaders that aren’t in the classrooms and stuff.”
	Logistics	I think some of it’s difficult. I expect this is one of the challenges for 200 is classified content. If I want you to go read it at home. Whatever. Sorry, you’re kind of out of luck,
Learning Environment	Faculty Expertise	“You got to know your stuff if you’re going to facilitate well, not only to keep things on topic, but if you know you’ll you’ll get people who’ll say stuff. Yeah, right, buddy. Yeah. So you got to be able to. To be able to moderate in that in that fashion to make sure, hey, we’re staying truthful. We’re not planting bad seeds in people’s minds.”
	Classroom Configuration	“I would say yes with that. But also, there is just limitations like the SLC course 23 Alpha. We started off with your typical two desks, two desks, two desk two desks. Senior mentors were towards the front, so they couldn’t all see them. And then halfway through, we switched to a U-shape, so a little bit better.”
	Learning Tools	“People who have different ways that they learn, like versus just like listening. So, it does incorporate the different methods by doing so and maybe some visual aspects depending on how the conversations are going. Maybe there’s a whiteboard person who can help the students engage a little better. I think it can definitely reach those other students a bit better than some of the more traditional methods.”
Preparedness	Effective Planning	“As an instructor, you think, Oh, gosh, that’s one thing that I have to do. So you got to try and make it as easy as possible, as visual as possible. Simple things that

	they could turn around and do tomorrow in class versus, oh, this is one more thing that I've got to plan out."
Adaptability	"I think it takes pre-planning on the instructor side. It's not just, Oh, I'm going to stick in this pair, share activity, Go like you have to. You have to think logistics and what do I do if nobody talks? So it takes some pre-planning on the intentionality and pre-planning on the instructor side."
Expertise	"And then at the end, just making sure you can tie it all back into the lesson. Like, yeah, these points just lead right into our next topic of why this is important or what we're moving on to."

Themes were identified, and similar codes were combined for clarity. Themes, codes, and quotes were evaluated using AtlasTi. The occurrences of similar codes were tracked and merged for clarity. The frequency of occurrences of codes in all forms is listed by the final merged code listed in Table 4.

**Table 4**

*Themes, Codes and Occurrences (Focus Group Data)*

Themes	Codes	Occurrences (Merged)
Active Learning Attributes	Facilitation	11
	Collaboration	9
	Problem-Solving	5
	Student Engagement	4
Roadblocks	Leadership Factors	9
	Personality Traits: Negative	8
	Frustration	7
Learning Environment	Logistics	5
	Faculty Expertise	5
	Classroom Configuration	4
Preparedness	Learning Tools	3
	Effective Planning	12

Adaptability	4
Expertise	2

### Focus Group Discussion of Findings

Four main themes were identified in the data gathered from the focus group. The first theme present during the focus group was active learning attributes. Scholarly literature shows that crucial attributes associated with successful active learning strategies involve social interaction, technical integration within the classroom, and lessons that take on a problem-based approach, all of which focus on a scaffolding approach to the learning process (Arruda & Silva, 2021). The participant data gathered during the focus group shows that participants have only a basic awareness of active learning attributes. Participants showed their understanding of facilitation, discussed 11 times; collaboration, discussed nine times; and problem-solving, discussed five times, regarding active learning. However, they showed a minimal understanding of other vital attributes of active learning beyond these three. Focus group participants showed understanding of facilitation when one participant stated, “Because the student is the center of active learning, and it makes them more engaged in the content versus a professor in instructor talking at the student. They are more engaged with the content than just a lecture style delivery.” Another participant addressed collaboration when they said, “We’ll break into our groups and maybe work on developing pieces for a PowerPoint presentation...the technology makes it easier for collaboration.” Regarding problem-solving, one focus group participant stated, “try to think of different directions you can go and come up with different, courses of action to help direct, redirect” which shows their understanding of how proper development of problem-solving curricula should be developed in active learning settings. The only other attribute discussed during the focus group related to active learning was student engagement, which was only

mentioned four times. Student engagement is pivotal to active learning, though it seemed to be used for active learning because participants saw an importance but not necessarily because they understood active learning. One participant addressed student engagement by saying, “Because the student is the center of active learning, and it makes them more engaged in the content versus a professor or instructor talking at the student. They are more engaged with the content than just a lecture style delivery.” This response was similar among other focus group participants, showing they understand the importance of engagement in the classroom but not how a direct correlation is related to active learning attributes.

The second theme present in the focus group was roadblocks, a shared theme seen in the interviews. According to scholarly research, oversights in faculty development and implementation strategies often result in ineffective active learning program results (Rhodes, 2021). Successful programs avoid confusing the faculty on the approach and execution of active learning within an organization. Within the theme of roadblocks, the respondents identified primary roadblocks as leadership factors nine times, negative personality traits eight times, frustration seven times, and logistics five times. Regarding leadership factors, one participant stated, “you want people to show up because they’re interested in whatever the faculty development is, right? You don’t want. I’m here so I don’t get fined. Yeah. Okay. Well, they’re not, not, not engaged, not interested in what’s being taught.” This showed an understanding of the importance of a faculty development program, yet solutions for implementing or requiring an effective one were not provided. One participant stated, “I think we’re trying, and we’re not quite there yet, but I think that motivation is kind of lacking, and I think it is because the why is missing. So yeah, now in this discussion, I’ve learned, okay, yeah, I should probably get on that and explain to people why we’re doing this.” when discussing negative personality traits as a

roadblock to implementing or using active learning. This overall idea of “were not quite there yet” was common among the group members. However, there seemed to be no genuine concern about how negative personality traits may impact successful active learning implementation. Though tangible solutions to roadblocks were not discussed during the focus group, frustration with the best implementation strategy was present among participants. One respondent expressed frustration when they stated, “I don’t want to have to sit there and write out a long explanation because I’m already fried, I’m tired and want to go home. But it’s how do you and it’s not the filling in the bubbles. In my personal experience, I’m going to click through them as fast as I can” which seemed to be related to the workload placed on all the leadership team members, leaving little energy to focus on removing roadblocks. Logistics specifically related to classified content also added to the theme of roadblocks. Much of the taught content at the NSSI is classified, which requires special handling and classroom limitations. These limitations impact how active learning can be employed from classroom to classroom. One respondent stated, “I expect this is one of the challenges for the Space 200 course, is classified content. If I want you to go read it at home, whatever. Sorry, you’re out of luck. I mean, having the facility set up the right way, I think, makes it much easier. But I don’t think that’s I think that’s a hurdle you can overcome if you want to.”

The third theme discovered during the focus group was the learning environment. The scholarly literature supports an effective learning environment transition when leadership maintains an internal effective agreement on the execution and transition (Bennett, 2022). When leadership cannot coordinate effectively and agree on effective classroom environment transitions supporting active learning, there is a high likelihood of poor faculty support and adoption. The participant responses focused on faculty expertise, classroom configuration, and

learning tools. During discussions of the current and future learning environment supporting active learning at the NSSI, the participants discussed faculty expertise five times. One respondent stated, “You got to know your stuff if you’re going to facilitate well, not only to keep things on topic, but if you know you’ll get people who’ll say stuff.” During the discussion, the general focus of expertise remained focused on technical content expertise rather than faculty performance expertise. Participants addressed classroom configuration four times, though it centered on the non-active learning classrooms and how they are attempting to bring some active learning strategies to the classrooms awaiting conversion. One participant stated, “There’s a point when a group becomes too big that it’s difficult for everyone to participate, or maybe depending on the personalities in the group, a couple of people might be like driving a particular item or project or conversation, and a couple of people might start falling back a little bit.” The focus group members understood the importance of collaborative learning and facilitation versus lecture. However, their focus group did not clearly understand how a properly configured classroom designed for active learning could be used appropriately. Participants discussed classroom learning tools three times. Though, as one respondent stated, “People who have different ways that they learn, like versus just like listening. So, it does incorporate the different methods by doing so and maybe some visual aspects depending on how the conversations are going. Maybe there’s like a whiteboard person that can help the students engage a little better. I think it can definitely reach those other students a bit better than some of the more traditional methods,” demonstrating an understanding of different learning styles but not correlating well with how active learning impacts learning within the classroom through integrating collaboration and technology.

The fourth theme present during the focus group was preparedness. The scholarly literature supports the importance of proper faculty preparedness to appropriately foster student collaboration, facilitate effectively, integrate effective technology, and sustain student engagement in an active learning environment (Nardo et al., 2022). Effective planning was the most common attribute related to preparedness, which was mentioned 12 times. As one participant indicated, “I know it was mentioned earlier, but I think preparation for the activities is key right there. Again, making sure you have a plan going in. Try to think of different directions you can go and come up with different, I guess, lack of a better phrase. Courses of action to help direct redirect” shows the participants understand the importance of effective preparedness for classroom teaching but often could not demonstrate specifics related to active learning preparedness. Adaptability and expertise were also discussed during the focus group under preparedness four and twice, respectively. One participant addressed adaptability by stating, “You have to read the read a room. If you’re losing them, you got to you got to have some tricks in your in your back pocket. If I’m losing them, what am I going to do?” Another participant addressed expertise when they said, “And then at the end, just making sure you can tie it all back into the lesson. Like, yeah, these points just lead right into our next topic of why this is important or what we’re moving on to.” The focus group participants showed a strong understanding of the value of preparedness and how it can improve the learning experience, however, specifics about what preparatory actions are necessary for effective active learning integration were rarely addressed.

### **Survey Findings**

The third data collection approach was a quantitative survey administered to the National Security Space Institute faculty. The survey comprised three demographic questions and ten

Likert scale questions. The Likert scale questions allowed for five responses: Strongly agree, agree, neutral, disagree, strongly disagree. The survey was created, sent, and managed using Microsoft Forms. The survey was sent to 36 faculty members. All participants were sent instructions regarding the purpose of the survey and how to complete the survey. All participants were given one week to complete the survey. Seventeen faculty members completed the survey during the access window.

### **Survey Description of Participants**

All survey participants serve as teaching faculty at the NSSI. One participant was aged 21-29, two were aged 30-39, six were aged 40-49, seven were aged 50-59, and one was older than 59 years. 11 participants were White, one was Black/African American, one was Asian, three were two or more races, and one participant reported as other. Three participants have less than two years of teaching experience, seven have two to five years of teaching experience, four have five to ten years of teaching experience, and three have over ten years of teaching experience.

### **Survey Results**

The survey was conducted with 17 faculty members from the NSSI faculty to help provide recommendations to university leaders to improve active learning implementation at the NSSI. The surveys were accessed on Microsoft Forms to complete data analysis. The survey responses were calculated based on the frequency of each Likert question response. The highest, lowest, and average response for each question was calculated and presented in tables or charts.

**Table 5***Frequency and Average of Survey Responses*

Question	<u>Frequency</u>					Mean
	5	4	3	2	1	
I feel my administration enables my professional development?	6	9	2	0	0	4.2
I have a strong desire to try new things in the classroom?	7	8	2	0	0	4.3
I adapt to technology changes in the classroom effectively?	5	9	2	1	0	4.0
The NSSI provided me with enough training on active learning to be an effective teacher.	2	8	5	2	0	3.6
I am comfortable in the role of a learning facilitator vs. lecturer.	8	8	1	0	0	4.4
Faculty weaknesses at the NSSI will impact the transition to active learning.	5	4	5	1	2	3.5
The faculty should provide more input into the faculty development program process.	1	7	8	1	0	3.5
My teaching style is adaptable.	5	11	1	0	0	3.0
The transition to active learning will have a negative impact on my teaching effectiveness.	0	0	3	8	6	1.8
The NSSI's transition to active learning will have a positive impact on the learner.	8	6	3	0	0	4.3

### Survey Discussion of Findings

The survey focused on faculty perception of leadership support regarding active learning transitions, faculty understanding of their role and active learning concepts, and perception of the overall success of the active learning transition at the NSSI. Questions four and seven focused on the faculty perception of leadership support, with faculty feeling positively that their administration supports their professional development, though they feel indifferent regarding

the level of training support they received, specifically on active learning. Questions five, six, eight, nine, ten, and 11 centered on the faculty's understanding of their role within the organization and the understanding of active learning concepts. Faculty felt strongly about their ability to try new approaches and in their ability to adapt to new technology in the classroom. Faculty shows they have a strong awareness and desire to be a facilitator over a traditional lecture. However, this research did not evaluate faculty performance in the classroom to validate using facilitation over lectures in active learning lessons. Faculty were neutral on their confidence to transition effectively to active learning, their level of participation and investment in their current faculty development program, and their confidence in teaching style adaptability, all vital components to a successful active learning implementation process. Finally, questions 12 and 13 focused on the perception of transition success. Faculty felt that a transition to active learning would not negatively impact their teaching effectiveness and felt strongly that an active learning transition would positively impact the learner.

### **Summary**

The purpose of this research study was to provide recommendations to university leaders to improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado. The problem is that 80% of the faculty at the National Security Space Institute faced a forced transition into active learning with no pre-evaluation, coordination, or effective training with the faculty. (NSSI, n.d.). This chapter presented the interview, focus group, and survey findings and concluded with a discussion of the findings for each research method.

## CHAPTER FIVE: RECOMMENDATIONS

### Overview

The purpose of this research study was to provide recommendations to university leaders to improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado. The problem is that 80% of the faculty at the National Security Space Institute faced a forced transition into active learning with no pre-evaluation, coordination, or effective training with the faculty. (NSSI, n.d.). This chapter presents the recommendations, the roles and responsibilities of stakeholders, needed resources, a recommended timeline, and a summary.

### Recommendations

The purpose of this research study was to provide recommendations to university leaders to improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado. The problem is that 80% of the faculty at the National Security Space Institute faced a forced transition into active learning with no pre-evaluation, coordination, or effective training with the faculty. (NSSI, n.d.). Based on a review of the scholarly literature, the data collected, and an analysis of the data, three recommendations are suggested to answer the central research questions. The three specific recommendations are establishing 1. a formal faculty development program with accountability, 2. an “active learning” lesson development guide, and 3. an “active learning” technology implementation/use guide.

#### **Recommendation 1: Establish a Formal Faculty Development Program with Accountability**

The first recommended solution for the NSSI is to establish a formalized faculty development program with accountability and oversight. Faculty need exposure early and often

to the vital teaching strategies and technology integrations necessary to establish an effective active learning classroom setting (Denaro et al., 2022). The current faculty development program is not mandatory, scheduled at inconsistent intervals, and often centers on topics specific to lesson knowledge enhancement. Department heads during interviews and leadership during the focus group showed that the faculty development program rarely focuses on performance and teaching strategy improvements. As a result, many faculty members do not attend the available development sessions because their workload prevents attendance, and since there is no negative professional impact for lack of attendance, there is no negative motivation to attend.

The NSSI needs to establish a formalized faculty development program that starts with an emphasis on the components of successful active learning strategies and then sustains the program on other vital faculty professional development programs. The NSSI formal faculty development program should comprise one monthly session, with the first two months focusing on active learning teaching, and learning strategies. Faculty need a strong understanding of student-centered teaching, how to deliver project and problem-based learning approaches, and ways to avoid a common tendency to engage in lecture-based teaching (Sreyasi et al., 2022). The first session should emphasize these critical attributes of active learning. The second faculty development session should focus on technology integration, use for technology-configured classrooms, and alternative approaches for classrooms awaiting upgrade with active learning technology. The focus of this session should help faculty understand how to use all classroom levels of technology to support cooperative and constructive learning strategies (Hafizah & Hassan, 2022).

Future monthly faculty development sessions should alternate between faculty professional development, which focuses on areas such as teaching skills, classroom strategies,

evaluation techniques, and lesson development, and content enhancements, which focus on sustaining and enhancing faculty knowledge of presented lesson content. Faculty development sessions should last at least 50 minutes and not exceed 100 because of high faculty schedule requirements. Since interview and focus group participants addressed the high demands placed on faculty and the increasing course throughout, the NSSI should offer access to the monthly session via live webinar and provide access offline to the recording via the learning management system for the rest of the applicable month. This availability should ensure maximum access to the monthly faculty development sessions. Besides a consistent and pre-defined monthly schedule with multiple access options, attendance, and completion must be tracked and reported to department heads for validation.

It is recommended that leadership holds faculty accountable for missed faculty development sessions. No faculty member should miss more than one month consecutively or three months total during each academic year. Increased modes of access to monthly sessions should mitigate workload demands preventing session completion. Faculty who cannot meet attendance standards should have teaching assignments restricted until completing all outstanding sessions. Leadership should consider administrative action under the contract hiring standards for those violating the faculty development standards.

### **Recommendation 2: Establish an “Active Learning” Lesson Development Guide**

The second recommended solution for the NSSI would be to create a lesson plan development guide that helps faculty members appropriately create active learning focused lesson presentations at the NSSI and within the newly converted active learning classrooms. The NSSI should integrate the active learning lesson plan guide into the existing unit's ADDIE development process. The ADDIE model starts with an analysis of the needs and lesson

requirements. Step two involves a design of the lesson objectives, delivery format, and applicable exercises and activities. Step three requires the development of the initial draft of lesson content, which should include the execution of a pilot course for testing. Step four involves implementing evaluated and adjusted lesson material evolved from the development step. The final step requires an ongoing evaluation of the content and how it impacts student learning and behaviors, and then recommendations and adjustments should be provided (Spatioti et al., 2022).

The NSSI uses a standard lesson plan shell that follows Air Force and Space Force regulations. The NSSI's current shell centers on traditional lecture-based delivery. The NSSI should evolve that shell to account for presentations of lessons that would benefit from active learning techniques over traditional lectures. Teacher facilitation techniques, technology use requirements, collaborative group activities, and problem/project-based approaches must be included in the lesson plan development guide, requiring faculty developing lessons, to include these items in creating a new active learning lesson.

Since all current lessons at the NSSI follow a lecture-based approach regardless of lesson classroom location, they should select one lesson to convert from lecture-based to active learning-based. This lesson will follow the new active learning lesson plan guide required for delivery in one of the converted active learning classrooms. Once completed using the guide, the team must evaluate the lesson and adjust it using all the steps in the ADDIE model. Data gathered from the ADDIE process of the new active learning lesson will enhance both the final active learning lesson plan and the active learning, lesson plan development guide. While there may be a transition period where lessons can be presented in either a lecture or active learning format, once the team validates the active learning lesson format, the lecture format should be

retired (when applicable) instead of the more appropriate lesson format for the updated classroom.

### **Recommendation 3: Establish an “Active Learning” Technology Implementation/Use Guide**

The third recommended solution for the NSSI would be to create a formalized technology and use guide for converted classrooms designed to deliver active learning strategies. The NSSI has done an excellent job integrating technology that supports an active, cooperative, and constructive learning environment while ensuring these classrooms are separate from traditional ones (Aguirre-Aguila, 2020). However, there appears to be a lack of agreement and support among the leadership, ensuring everything is in place to enable a successful transition and buy-in among faculty. One such example is the conversion of classrooms with technology designed to support active learning at the NSSI, but a set-up/use tool does not exist to ensure faculty knows how to configure each classroom to leverage all technology effectively. Faculty at the NSSI only received an introduction to the technology in the converted classrooms after the construction and have received no future training on the use and set-up of the technology. This limitation creates a situation where existing faculty stray from using the technology and new faculty lacks training on how to use the technology, so faculty in the classroom quickly revert to skills used in a traditional lecture classroom.

Each active learning classroom needs a set-up binder followed by each faculty member holding courses in one of the converted active learning classrooms. Following this set-up guide ensures that all technology in the classroom is used at its maximum designed potential, creating a learning environment geared toward effective active learning outcomes. The guide should provide clear instructions on configuring each piece of technology to be ready for lesson

execution. The classroom comprises personal laptops at each student desk, presentation touchscreen monitors at each six-student pod for small group collaboration, two central touchscreens, intelligent boards for lesson presentation, and the instructor console driving all activity during course execution.

Once instructions are developed and placed in the active learning classrooms, the NSSI should host several training sessions. These training sessions should be separate from the new faculty development session recommendation. These sessions should serve as a complete demonstration and practice session for all attendees. At the end of the session, all attendees should know how to power up and log in to each student laptop and how to cast student laptops to the six-student pod monitors, display lesson content on the main presentation screens and student pod monitors, use the intelligent board features on all monitors, change to display information from the instructor console, and how to reach the IT technical support team.

Last, the guide should include a set-up/use instructional sheet for students to ensure they can effectively display to their six-student pod monitor. The NSSI should establish a classroom certification tracker that prevents faculty members from teaching in the active learning classroom yet to complete the training. At a minimum, non-certified faculty should be assigned along with a certified faculty member until certification is complete.

### **Roles and Responsibilities of Stakeholders**

The purpose of this research study was to provide recommendations to university leaders to improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado. The central research question was: How can this research study improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado? The roles and responsibilities associated with establishing an accountable faculty

development program, creating an active learning lesson development guide, and creating a technology use and integration guide are addressed.

**Recommendation 1: Establish a Formal Faculty Development Program with Accountability**

***Administrators' Responsibility for Recommendation 1***

Administrators and military leadership are crucial in creating and enforcing an effective faculty development program. This group must establish a formal program in writing as part of the organization's current execution plan. The administrators and leadership must establish a start date for the new development program, supported by an ongoing annual schedule tied to the current academic year execution schedule. Administrators and leadership should work with department heads to define the topics discussed during each faculty development session. The administrators and leadership must develop and publish an accountability matrix that defines the disciplinary consequences if active faculty members miss applicable development sessions.

The administrators and leadership must work with department heads, instructional design teams, and the digital learning team to establish a session topic schedule and session location for monthly presentations, create an online learning strategy for offline viewing for missed attendees, and create a required attendee roster. The administrator and leadership team must ensure a proper training location is available for each monthly development session, establish an evaluation tool that assesses the effectiveness of each faculty development session, and adjust future sessions based on current feedback. Administrators and leadership should attend faculty development sessions regardless of teaching qualifications.

***Department Heads' Responsibility for Recommendation 1***

Faculty department heads are a vital part of a successful faculty development program. Department heads must address the topics with administrators and leadership during the applicable faculty development sessions. Department heads should coordinate with leadership on the scheduled dates for each monthly session and ensure that faculty within their department can attend the monthly session during the week each session is scheduled. Each department head should report on faculty members who cannot attend the in-person sessions and ensure enrollment in the subsequent make-up online session. Department heads should counsel members on their team who miss a monthly faculty development session to mitigate future missed sessions and refer those who miss two consecutive monthly sessions or a cumulative total of three sessions in a year to the administration and leadership team. Department heads must attend faculty development sessions.

***Faculty Responsibility for Recommendation 1***

Faculty must attend each monthly session in person when possible and should only attend the make-up online sessions as a backup when circumstances affect in-person attendance. Faculty must coordinate their teaching assignments with other faculty and department heads to ensure minimal conflicts for teaching during monthly development sessions. Faculty members should report conflicts to their department heads within two business days after conflict identification. As a best practice, each faculty member should create a development binder as a personal reference to information learned and received during each faculty development session. Faculty members should complete all provided evaluation tools to help leadership adjust future faculty development sessions.

***Instructional Design Team Responsibility for Recommendation 1***

The instructional design and digital learning teams at the NSSI must develop the learning management system (LMS) online environment hosting the online faculty development sessions. The teams should record all live sessions and edit the completed video for upload and use during the online monthly session. The digital learning team will report all student participation analytics to the department heads and applicable faculty members. The design team will provide all account and session access and standard technical support to all users of the NSSI LMS.

**Recommendation 2: Establish an “Active Learning” Lesson Development Guide*****Instructional Design Team Responsibility for Recommendation 2***

The Learning design team must create a lesson plan development guide for incorporation across the NSSI. The guide should include examples of inputs required for each section of the required lesson plan. The design team should provide examples of how to use technology in the active learning classroom to achieve the desired collaborative learning present in active learning. The design team should provide examples of project/problem-based learning scenarios so lesson developers know a successful active learning scenario to develop their scenario. The design team should provide examples in the guide of various questioning and facilitation techniques that are successful and often present in active learning classrooms. The design team will be responsible for executing the ADDIE process on all newly created active learning lessons.

***Department Heads Responsibility for Recommendation 2***

The NSSI department heads must ensure that all faculty are familiar with developing lessons using the new active learning development guide. Department heads should work with all faculty teaching in the active learning classroom to ensure their lessons are updated or in the queue for future updates. The department head will ensure that they evaluate new active learning

lesson plans for practical lesson objective presentations using active learning and that they review all student feedback for effectiveness and relevance.

### ***Faculty Responsibility for Recommendation 2***

All NSSI faculty must attend the applicable active learning faculty development sessions before they may develop and teach in the active learning classroom. Faculty should include relevant project/problem-based scenarios within their active learning lessons to ensure collaborative work groups. Faculty must clearly define their technology usage strategy within the active learning classroom, ensuring they use the appropriate level of technology and that it achieves the desired collaborative learning effect within student groups. Finally, faculty should clearly define their expectations regarding what learning outcomes from student collaborative learning and define the correct level of facilitation to ensure students continue to meet the desired learning outcomes.

### **Recommendation 3: Establish an “Active Learning” Technology Implementation/Use Guide**

#### ***Digital Learning Team Responsibility for Recommendation 3***

The NSSI digital learning team must create the technology use and integration guide. Their efforts should produce a checklist identifying how faculty turn on all instructor/student technology within the active learning classrooms. The digital learning team will use paper and video-based instructions to show how to configure a classroom. The team must use paper and video-based instructions to show how the student monitors and the primary display center function during various points in any lesson. The team must show how to deliver lesson presentations to all monitors in the classroom, how to use the digital whiteboard functions, how to use the touch screen features on all monitors, and how to switch between various presentation

mediums throughout the entire lesson delivery. Finally, the digital learning team should develop instructions on shutting down all the active learning technology after their lesson to ensure the room is ready for the next instructor's presentation. The digital learning team will serve as the technical support team for all active learning classroom technology.

### ***Department Heads Responsibility for Recommendation 3***

The NSSI department heads should evaluate all developed use and integration guides upon delivery from the digital learning team. The department head should run through each guide to ensure no errors are present that could create confusion during an active learning presentation. The department heads should immediately identify errors for correction with the digital learning team. Once department heads approve all integration guides, they should host training sessions with all faculty approved to teach using the active learning classrooms. Department heads should prevent any faculty member from teaching in the active learning classroom until they attend the integration and use demonstration.

### ***Faculty Responsibility for Recommendation 3***

Faculty members allowed to teach in the active learning classroom must attend the training provided by the NSSI department heads and should communicate directly with the digital learning team for any technical support matters related to the technology present within the active learning classrooms. Faculty that reach sporadically within one of the active learning classrooms should establish a personal refresh training regiment to ensure their comfort and ability to use and integrate the technology offered in the active learning classroom. Faculty members scheduled as primary instructors must prepare their backup instructor to leverage the active learning technology for the applicable lesson.

### **Resources Needed**

Resources must be considered to ensure a successful implementation of improvements for active learning. Failing to consider these specific resources may result in a failed implementation of the NSSI active learning program. Fortunately, the current structure at the NSSI allows for little to no increased cost when considering resources for these improvements.

### **Recommendation 1: Establish a Formal Faculty Development Program with Accountability**

#### ***NSSI Leadership***

The lack of leadership direction regarding a faculty development program allows the program to falter. The NSSI leadership must direct the faculty development director to start the new faculty development program per the listed recommendations.

#### ***Director of Faculty Development***

The NSSI currently employs a director of faculty development. The director of faculty development should dedicate 40–50% of their time focused on preparing content, scheduling sessions, and delivering the monthly session.

#### ***Classroom Scheduling Team***

The development sessions require a classroom, often in use throughout the year. Long-term planning will ensure that appropriate scheduling happens regarding classroom availability. There is enough flexibility in the primary classroom schedule to secure a classroom for one to two hours, three to four times a month, depending on the topic discussed during each monthly session. If classroom scheduling prevents training locally within the NSSI, there are several large conference rooms on the installation that the NSSI could reserve, free with schedule planning.

All NSSI classrooms have the multimedia technology required for faculty development presentations. For sessions specific to active learning technology and approaches, only one unclassified classroom affords significant scheduling flexibility and offers routine availability. However, this classroom is at our secondary campus and would require most faculty members to commute ten minutes to complete training. Potential travel to the secondary campus is currently an expectation of all employees at the NSSI. For training at a tertiary conference room, appropriate multimedia technology exists to deliver the training without requiring support equipment.

### ***LMS Administrator***

The LMS uses a license-based approach to account management. Since all faculty development sessions are available after the in-person training, all faculty will require access to the faculty development training classroom on the LMS. The NSSI currently has adequate license overhead to support all faculty members' accounts on the LMS without exceeding their current license allotment. Should the faculty continue to grow year-to-year, planning for faculty growth and license use increases with the LMS is easy.

### ***Subject Matter Experts***

The director of faculty development will require instructor subject matter experts (SME) to assist with some faculty members' development sessions. SMEs should be identified during annual schedule de-confliction to ensure maximum availability. SME should help develop their assigned training session and work with the director to ensure all training objectives meet unit faculty development requirements. Each SME should plan to teach at least two development topics per year.

**Recommendation 2: Establish an “Active Learning” Lesson Development Guide*****Instructional Systems Design Team***

The chief of instructional systems design (ISD) department is critical to successfully developing the lesson development guide. This department only comprises the chief and is task-saturated with the current ISD requirements. The NSSI should hire a new full-time ISD professional to assist in this effort and ultimately reduce the burden currently placed on the chief of ISD. Since the national salary range for an ISD professional is between \$50,000 and \$90,000, with a median salary of \$67,743 (Payscale, n.d.), the NSSI contract leadership should be able to fund this additional position.

If the NSSI fills the position, the chief of ISD and the new hire should attend the first two faculty members development seminars (designated for active learning) before developing any lesson development guide. All other ISD-specific requirements are already in place and would be cross-utilized for developing the active learning lesson development guide.

***Faculty***

Once the guide is complete, two faculty members trained in active learning strategies should develop the first lessons using the newly developed guide. Since the school offers online and in-resident courses, the selected instructors should come from both course mediums to ensure both formats benefit from active learning strategies. The two selected instructors shall be designated as active learning SMEs and support future active learning lesson development by other NSSI faculty.

***Director of Digital Learning***

The director of digital learning will work with his team of developers to create a training module for the online faculty development training. This training module will support the new

lesson development guide with visual examples of design layout, scenario-based examples showing how to use various active learning strategies in the classroom, how to deal with various student/faculty interactions, and provide an online reference site, frequently asked questions, and lessons learned for future faculty to leverage in the development of their required active learning lessons.

### **Recommendation 3: Establish an “Active Learning” Technology Implementation/Use Guide**

#### ***Director of Digital Learning***

The director of digital learning is critical to successfully developing the active learning technology use and integration guide. The director is the most experienced member of the NSSI on active learning strategies and technology required in the active learning classrooms.

Development of faculty training tools falls under the purview of the digital learning department.

The director will coordinate with his multimedia development team to create a physical training document in each active learning classroom. Once the training document is complete, the director and multimedia developer will create a training video that provides a live demo of each step listed in the classroom guide. Requests for this development requirement must follow the established development request form at the NSSI.

#### ***Digital Learning Team***

The digital learning department will need their video recording equipment, audio recording equipment, green screen studio, the active learning classroom connected to the digital learning team offices, and Adobe production software suite. The NSSI’s digital learning team already owns these requirements; therefore, there will be no additional cost for the development hardware and software. While payroll hours are necessary for developing both the guide and

demo video, the payroll required for the development is currently accounted for in the existing contract and is not considered an additional cost. Other development projects should have a lower priority during the completion of this development project.

### **Timeline**

An implementation timeline ensures that recommendations are successful. The applicable timeline for the faculty development program, lesson development guide creation, and the technology use and integration guide creation are discussed in this section.

#### **Recommendation 1: Establish a Formal Faculty Development Program with Accountability**

It will take approximately three months to develop and begin the formal faculty development program and five months to ensure the active learning lessons are delivered as part of the program. To ensure a program initiation, concurrent development is necessary with the faculty development program. While the program is an ongoing monthly topic-based program, each topic should be developed the month before planned delivery.

**Table 6**

#### *Recommendation 1 Timeline*

Date	Action Item
1 Jan 2024	Schedule faculty development training locations (2-3 session options each month).
15 Jan 2024	Define faculty development topic schedule (first two dedicated to active learning) One unique session per month.
1 Feb 2024	Assign active learning lesson one SME and begin lesson development.
21 Feb 2024	Lesson one due for review, validation, and edits.
26 Feb 2024	Final lesson one submitted for use.

1 Mar 2024	Assign active learning lesson two SME and begin lesson development.
21 Mar 2024	Lesson two due for review, validation, and edits.
26 Mar 2024	Final lesson two submitted for use.
1 Apr 2024	Begin the faculty development training program with lesson one.  <i>Note: Lesson development after lesson two is not required specific to Active learning but is addressed for the first year to ensure a complete effective faculty development program remains in place.</i>  Assign lesson three SME and begin lesson development.
14 Apr 2024	Lesson one classroom sessions conclude, and the online version begins.
21 Apr 2024	Lesson three due for review, validation, and edits.
26 Apr 2024	Final lesson three submitted for use.
1 May 2024	Lesson two begins.  Assign lesson four SME and begin lesson development.
14 May 2024	Lesson two classroom sessions conclude, and the online version begins.
21 May 2024	Lesson four due for review, validation, and edits.
26 May 2024	Final lesson four submitted for use.
1 Jun 2024	Lesson three begins.  Assign lesson five SME and begin lesson development.
14 Jun 2024	Lesson three classroom sessions conclude, and the online version begins.
21 Jun 2024	Lesson five due for review, validation, and edits.
26 Jun 2024	Final lesson five submitted for use.
1 Jul 2024	Lesson four begins.  Assign lesson six SME and begin lesson development.
14 Jul 2024	Lesson four classroom sessions conclude, and the online version begins.
21 Jul 2024	Lesson six due for review, validation, and edits.

26 Jul 2024	Final lesson six submitted for use.
1 Aug 2024	Lesson five begins. Assign lesson seven SME and begin lesson development.
14 Aug 2024	Lesson five classroom sessions conclude, and the online version begins.
21 Aug 2024	Lesson seven due for review, validation, and edits.
26 Aug 2024	Final lesson seven submitted for use.
1 Sep 2024	Lesson six begins. Assign lesson eight SME and begin lesson development.
14 Sep 2024	Lesson six classroom sessions conclude, and the online version begins.
21 Sep 2024	Lesson eight due for review, validation, and edits.
26 Sep 2024	Final lesson eight submitted for use.
1 Oct 2024	Lesson seven begins. Assign lesson nine SME and begin lesson development.
14 Oct 2024	Lesson seven classroom sessions conclude, and the online version begins.
21 Oct 2024	Lesson nine due for review, validation, and edits.
26 Oct 2024	Final lesson nine submitted for use.
1 Nov 2024	Lesson eight begins. Assign lesson ten SME and begin lesson development.
14 Nov 2024	Lesson eight classroom sessions conclude, and the online version begins.
21 Nov 2024	Lesson ten due for review, validation, and edits.
26 Nov 2024	Final lesson ten submitted for use.
1 Dec 2024	Lesson nine begins. Assign lesson 11 SME and begin lesson development.
14 Dec 2024	Lesson nine classroom sessions conclude, and the online version begins.
21 Dec 2024	Lesson 11 due for review, validation, and edits.

26 Dec 2024	Final lesson 11 submitted for use.
1 Jan 2025	Lesson ten begins. Assign lesson 12 SME and begin lesson development.
14 Jan 2025	Lesson ten classroom sessions conclude, and the online version begins.
21 Jan 2025	Lesson 12 due for review, validation, and edits.
26 Jan 2025	Final lesson 12 submitted for use.
1 Feb 2025	Lesson 11 begins.
14 Feb 2025	Lesson 11 classroom sessions conclude, and the online version begins.
1 Mar 2025	Lesson 12 begins.
14 Mar 2025	Lesson 12 classroom sessions conclude, and the online version begins.

### **Recommendation 2: Establish an “Active Learning” Lesson Development Guide**

The lesson development guide should take about one month to develop and two months to create, test, evaluate, and change a lesson using the new guide. It would be difficult to determine the time necessary to create other lessons, as each lesson involves different content and requirements, nor have course directors determined the volume of all lessons per course presented in the active learning classrooms that will require conversion. However, the timeline to develop the first lesson should serve as a reasonable expectation.

**Table 7**

#### *Recommendation 2 Timeline*

Date	Action Item
1 Dec 2023	Post new ISD position for hire – estimate 30 days to fill position.

	<i>Note: Additional position needed for long-term support, not to develop new guide. However, filling position initially is best choice.</i>
1 Jan 2024	Begin new guide development.
31 Jan 2024	New guide due.
1 Feb 2024	Begin new active learning guide use with initial active learning lesson.
30 Feb 2024	New active learning lesson due.
1 Mar 2024	Begin lesson evaluation (beta test with course faculty)
20 Mar 2024	Beta test modifications complete and new active learning lesson published.
1 Apr 2024	Active learning lesson available for use in faculty development program lesson one or two as defined by director of faculty development program.

### **Recommendation 3: Establish an “Active Learning” Technology Implementation/Use Guide**

The technology use and integration guide should require the least time to develop and implement. It will take one month of development and testing by the digital learning team to develop a final product for all active learning classrooms.

**Table 8***Recommendation 3 Timeline*

Date	Action Item
1 Jan 2024	Digital learning team creates hardcopy guide instructions for use in the classroom.
15 Jan 2024	Hardcopy guide instructions due for use.
16 Jan 2024	Digital learning team creates demonstration video using hardcopy guide instructions.
31 Jan 2024	Final demonstration video published to assist in active learning lesson plan development.
1 Feb 2024	Hardcopy guide and demonstration video delivered to faculty development program lesson one SME.

**Summary**

The purpose of this research study was to provide recommendations to university leaders to improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado. The problem was that 80% of the faculty at the National Security Space Institute faced a forced transition into active learning with no pre-evaluation, coordination, or effective training with the faculty (NSSI, n.d.). Specific recommendations were identified by the researcher, roles and responsibilities of stakeholders along with needed resources were addressed, and finally, a timeline showed the time needed for each recommendation to be

implemented effectively. Finally, a summary concluded the section to help university leaders apply recommendations to improve active learning implementation at the NSSI.

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**Appendix A**

Dec 10, 2022

National Security Space Institute  
  


Mr. Moschgat,

I am writing to seek your permission to conduct applied research at the National Security Space Institute. This research is a requirement for partial fulfillment of my doctoral program at Liberty University. The purpose of my research is to provide recommendations to university leaders to improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado. The central research question is, “How can this research study improve active learning implementation at the National Security Space Institute in Colorado Springs, Colorado?” Proposed data collection methods will include interviews with faculty department heads, a focus group with civilian administrators and active-duty leadership, and the collection and evaluation of survey data from school faculty. I plan to collect data for one week between January and February 2023 of this year. Before I can conduct this research, I must have a permission letter from the gatekeeper at the school. I respectfully request you copy and paste the included attachment in your email response granting permission, so I may conduct this research.

Sincerely,

Mark Mitchell



**DEPARTMENT OF THE AIR FORCE  
UNITED STATES SPACE FORCE  
SPACE TRAINING AND READINESS COMMAND**

11 January 2023

Mr. Mark Mitchell

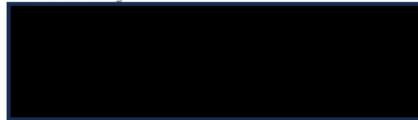


Dear Mr. Mitchell

This letter is to confirm that the National Security Space Institute approves Mark Mitchell to conduct research related to their applied research project. First, like medicine's Hippocratic Oath, you must do no harm in your research, to either faculty, staff, or students. In general, that includes not imposing a significant added burden to their academic workload. Second, you must abide by any Federal, DoD, or DAF rules or restrictions that apply to research conducted within a Government/Space Force organization. Finally, remain engaged with Lt Col Durand, the Provost, ensuring he is aware of your status and progress throughout your research.

This approval applies only to the approved research period slated for one week between January and March 2023. The National Security Space Institute understands that this approval is an exemption to the previous restrictions for publishing, presenting, or disseminating of the applied research project beyond the site. To maintain confidentiality, the presenter will use pseudonyms to preserve the anonymity of the site and participants.

Sincerely



James E. Moschgat  
Deputy Commandant  
National Security Space Institute