

Technical Report 1414

The Potential of Cognitive Apprenticeship: A Review of Best Practices for Instructor Certification in the Maneuver Captains Career Course

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THE POTENTIAL OF COGNITIVE APPRENTICESHIP: A REVIEW OF BEST PRACTICES FOR INSTRUCTOR CERTIFICATION IN THE MANEUVER CAPTAINS CAREER COURSE

EXECUTIVE SUMMARY

Research Requirement:

Military institutions face the challenge of transitioning Soldiers to educators. Swaim (2017) referred to this as the operator-to-educator transition, where military institutions must transform and prepare “highly trained technical experts from the realm of combat operations into the very different arena of academic education” (p. 2241). In other words, while Soldiers who are slated to become instructors likely have the necessary content knowledge, they must also develop the pedagogical knowledge and skills to teach that content to students. Well-structured instructor certification courses can support the development of pedagogical knowledge and skills. Thus, the purpose of this report is to describe MCCC’s certification process, highlighting best practices and our recommendations for further alignment with a cognitive apprenticeship approach. We outline how a cognitive apprenticeship approach has the potential to help instructors feel more prepared to teach, develop their own instructional style, and to become effective instructors earlier in their careers. The outlined approach also serves as a set of recommendations for how similar military institutions can transform competent Soldiers into effective educators.

Procedure:

Working with the Maneuver Center of Excellence, Command and Tactics Directorate (CATD) at Fort Benning, GA, researchers conducted a targeted assessment of the Maneuver Captains Career Course’s (MCCC) instructor certification course to identify best practices and opportunities to improve the approach. The research team conducted focus groups and class observations and found that the certification process was a major strength of MCCC’s instructor development process but could be improved with further alignment to a cognitive apprenticeship approach. Therefore, the research team worked collaboratively with MCCC’s Certification Chief to outline how to adjust the certification course to accomplish this objective.

Findings:

The MCCC’s instructor certification course is a major strength of their instructor development process. In particular, the course is a collaborative learning environment where small group leader (SGL) students have the opportunity to learn and model teaching techniques demonstrated by more experienced peers. However, the course could be improved with further alignment to a cognitive apprenticeship approach by fading the use of modeling and gradually increasing the teaching responsibility of the SGL students during certification. We present suggested changes for each progressive instructional period in the certification course.

Utilization and Dissemination of Findings:

MCCC’s certification process can serve as a model for other programs that need to transform competent Soldiers into effective educators. The descriptions of the best practices and

recommendations in this paper can help guide similar institutions that are looking to improve their instructor certification processes.

THE POTENTIAL OF COGNITIVE APPRENTICESHIP: A REVIEW OF BEST PRACTICES FOR INSTRUCTOR CERTIFICATION IN THE MANEUVER CAPTAINS CAREER COURSE

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The Potential of Cognitive Apprenticeship: A Review of Best Practices for Instructor Certification in the Maneuver Captains Career Course

Introduction

Military institutions face the challenge of transitioning Soldiers to educators. Swaim (2017) refers to this as the operator-to-educator transition, a transition which consists of military institutions moving Soldiers who are “highly trained technical experts from the realm of combat operations into the very different arena of academic education” (p. 2241). In other words, Soldiers who are slated to become instructors likely have the necessary content knowledge but must develop the pedagogical knowledge and skills to teach that content to students. In the Army, Soldiers must learn and understand how to implement the Army Experiential Learning Model (ELM; see The Army University, n.d., *Adult Teaching and Learning User’s Guide*). The Army’s Common Faculty Development - Instructor Course (CFD-IC) typically serves as the introduction to and source of instruction for the ELM. Building on CFD-IC, individual programs of instruction have to bridge the gap from general instructional methods to the specific application of those methods for a particular content area. The bridging of this gap presents challenges that a well-structured instructor certification program can overcome. Specifically, best practices of successful instructors need to be passed on to incoming instructors while allowing incoming instructors to find their own paths to success that leverage their own individual strengths. Fortunately, frameworks for accomplishing such transitions of knowledge have been developed and can be employed in instructor certification courses.

Cognitive apprenticeship is one such approach that can be applied in the operator-to-educator transition. In a traditional apprenticeship, the task or process to be learned is directly observable, the apprentice can see the different steps the expert takes to perform the task and can progressively assist the expert (Collins et al., 1991). Alternatively, for learning cognitive skills, such as in a typical classroom environment, the processes apprentices need to learn are more difficult to observe. Unlike observing a tailor creating a garment, it is not as readily apparent how an apprentice or student might observe the thought processes that takes place while a teacher is demonstrating or teaching students to solve a math problem. Therefore, Collins and colleagues (1989; 1991) presented a cognitive apprenticeship approach to instruction to bridge this gap that stresses making those expert thought processes visible.

Collins et al., (1989) describe a cognitive apprenticeship as “learning through guided experience” that is focused on cognitive and metacognitive skills and processes (p. 456). It is an inherently social learning process where an expert or more experienced person utilizes modeling, coaching, and scaffolding to guide student learning (Collins et al., 1989; Collins et al., 1991; Dennen & Burner, 2008). A key part of this type of instruction is making thinking visible, because traditionally “too little attention is paid to the reasoning and strategies that experts employ when they acquire knowledge or put it to work to solve complex or real-life tasks” (Collins, et al., 1991, p.1). Therefore, through modeling, coaching, and scaffolding the expert or instructor makes these thinking processes visible so the learners can observe, reflect, and practice them. Coaching is a central component to the apprenticeship process (Collins, et al., 1991). It is the role of the instructor to monitor the learners’ understanding, provide guidance and support,

and know when to fade that support to challenge the students with more difficult tasks (Collins et al., 1991; Collins et al., 1989; Dennen & Burner, 2008). The purpose of this approach is to promote expertise and to move learners “from a position of observation to one of active practice” (Dennen & Burner, 2008, p. 427). Therefore, the instruction needs to be tailored to the students’ zone of proximal development (ZPD), understanding their current ability level to determine what they could accomplish with support (e.g., teacher hints and cues) to push their learning further (Vygotsky, 1978). An essential part of this process is successfully fading support so students can be challenged and advance their learning (Puntambekar & Hübscher, 2005). Without some element of fading, the jump to full participation may be difficult to achieve, with corresponding risks to both performance and self-efficacy.

The purpose of this report is to describe the Maneuver Captains Career Course’s (MCCC) certification process highlighting best practices and our recommendations to better align the process with a cognitive apprenticeship approach. First we describe the unmodified certification process and identify its strengths and opportunities for improvement. Then we describe suggestions for the modified certification approach and outline how to implement it in the MCCC’s certification course. The outlined approach also serves as a set of recommendations for how similar military institutions can transform competent Soldiers into effective educators through a cognitive apprenticeship approach.

Overview of the MCCC Certification Course and Unmodified Course Format

The MCCC certification course, like other courses, faces the challenge of quickly transitioning Soldiers to educators. The certification course develops skilled instructors in facilitating adult learning by providing the small group leaders (SGLs) with the tools to apply the ELM to MCCC’s program of instruction (POI). To do this, incoming MCCC instructors undergo a six-week certification process to become SGLs. The SGL certification process consists of the two-week CFD-IC and four weeks of certification specific to MCCC. During CFD-IC, SGL students are taught the ELM, introduced to various instructional strategies and methods, as well as foundational theories relevant to adult learning and education such as Bloom’s Taxonomy (1984; Bloom et al., 1964), Lewin’s Change Management Model (Lewin, 1951) as well as the work of Knowles (1980; 1984), Pratt (1993; Pratt & Associates, 1998), and Wlodkowski (1999). Building off of the CFD-IC, the four-week MCCC SGL certification course reviews foundational content of MCCC’s 22-week POI, examines contextual application of the ELM as it pertains to MCCC, and trains SGL students on effective teaching methodologies within MCCC. Under ideal conditions¹, the four-week certification process immediately follows the CFD-IC and focuses on teaching five doctrinal classes that represent the foundational content to which other MCCC classes can be tied (e.g., Terrain and Enemy Analysis). If SGL students master these five classes, they should be able to generalize both the instructional methods and content (doctrinal fundamentals) to other lessons within the course.

¹ CFD-IC serves not only the MCCC, but also all instructional units responsible for a variety of POIs within the Maneuver Center of Excellence, and seats are limited. Therefore, due to time and seating constraints, some new SGLs may attend the MCCC certification course first then the CFD-IC.

In the unmodified certification course format, the Certification Chief first taught and modeled the five selected doctrinal classes for the SGL students. MCCC refers to these as class pitches. The SGL students then taught or “briefed” each of these foundational classes to a panel of experienced SGLs and their Team Chief in order to receive feedback on both content understanding and teaching practices. To become a certified SGL, the SGL students briefed all five doctrinal classes and a company level Operations Order (OPORD). The SGL students also completed and passed a fitness test and the MCCC Certification Examination. The certification exam closely resembled the tactics exam MCCC students take upon entering the course. It covered tactical tasks, foe and friendly weapon systems, and other basic doctrinal concepts and processes. Along with a focus on Troop Leading Procedures (TLPs), the certification exam included a set of Military Decision-Making Process (MDMP) questions in order to gauge the SGLs’ familiarity with MDMP, as they are expected to teach this process to MCCC students. The overall purpose of this exam was to ensure the SGLs were proficient in the material they are expected to teach MCCC students.

After SGL students successfully briefed the five required classes and completed the certification exam, they briefed a predetermined company level OPORD. This is the same OPORD MCCC students brief after they complete the first phase of instruction focusing on Company level TLPs. It is imperative that SGL students are able to brief the OPORD effectively because it is a central component and culminating event for this phase of instruction at MCCC. Intrinsically, the OPORD confirms whether an SGL student can effectively package the analysis and concepts taught in the five foundational classes and turn them into a detailed plan. During this process, the majority of the SGL students’ gaining team observed and evaluated them, as well as the Certification Chief and CATD senior leaders [Chief of Tactics (CoT), Director of Training (DoT), and the CATD Sergeant Major]. In addition to these requirements, SGL students typically observed classroom instruction from certified SGLs to further contextualize what instruction at MCCC looks like. It was also an opportunity for SGL students to observe different teaching techniques. Timeline permitting, SGL students also observed MCCC students brief OPORDs to certified SGLs. Importantly, the SGL students observed the after action reviews (AARs) for these OPORDs to gain a better understanding of how MCCC students are evaluated. These observations gave the SGL students the opportunity to observe other teaching approaches, become more familiar with the MCCC curriculum, and gain insight on typical student performance. Similar to the other requirements for the certification course, this process helped SGL students prepare to apply what they saw in certification to their teaching and to expose SGL students to the different teaching techniques of their future peers.

Strengths of the Unmodified MCCC Certification Course

MCCC’s unmodified certification course successfully follows up the foundational instruction provided by CFD-IC and acts as a bridge to actual instruction at MCCC. It was evident that MCCC’s certification course was designed to develop the SGL students’ content and pedagogical knowledge as well as help facilitate a collaborative environment. Many of the strengths of the certification process align with suggestions for learning environments and teaching approaches for cognitive apprenticeships. Collins and colleagues (Collins et al., 1989; Collins et al., 1991) outlined the principles for designing cognitive apprenticeship environments

as shown in Table 1. The certification course is set up as a collaborative environment where the more experienced peer (Certification Chief) first models the teaching practices and provides coaching during the class pitches. The Certification Chief then provides further scaffolding through their use of feedback and questioning during the certification briefs and subsequent AARs. Modeling, coaching, and scaffolding are the core methods of cognitive apprenticeship.

Table 1.

Summary of Principles for Designing Cognitive Apprenticeship Environments (Collins et al., 1991, p.14)

Dimensions of Learning Environment	Characteristics to Consider
Content: types of knowledge required for expertise	<p>Domain knowledge: subject matter specific concepts, facts, and procedures</p> <p>Heuristic strategies: generally applicable techniques for accomplishing tasks</p> <p>Control strategies: general approaches for directing one’s solution process</p> <p>Learning strategies: knowledge about how to learn new concepts, facts, and procedures</p>
Method: ways to promote the development of expertise	<p>Modeling: teacher performs a task so students can observe</p> <p>Coaching: teacher observes and facilitates while students perform a task</p> <p>Scaffolding: teacher provides supports to help the student perform a task</p> <p>Articulation: teacher encourages students to verbalize their knowledge and thinking</p> <p>Reflection: teacher enables students to compare their performance with others</p> <p>Exploration: teacher invites students to pose and solve their own problems</p>
Sequencing: keys to ordering learning activities	<p>Global before local skills: focus on conceptualizing the whole task before executing the parts</p> <p>Increasing complexity: meaningful tasks gradually increasing in difficulty</p> <p>Increasing diversity: practice in a variety of situations to emphasize broad application</p>
Sociology: social characteristics of learning environments	<p>Situated learning: students learn in the context of working on realistic tasks</p> <p>Community of practice: communication about different ways to accomplish meaningful tasks</p> <p>Intrinsic motivation: students set personal goals to seek skills and solutions</p> <p>Cooperation: students work together to accomplish their goals</p>

The certification process, especially the briefs, are also situated learning experiences. Situated learning is a core component of cognitive apprenticeship and represents learning that is context dependent and embedded in authentic activity, meaning learners work through realistic problems that they will directly apply to their future activities (Brown et al., 1989). This is also consistent with the idea of transfer of training (Baldwin & Ford, 1988; Grossman & Salas, 2011) and supports *near* transfer of training in which the training context is very similar to the context where learned tasks or concepts are applied. One key benefit of this approach is the application of recently learned tasks and concepts in a highly familiar context. For cognitive apprenticeship this means that, “apprentices learn skills in the context of their application to realistic problems, within a culture focused on and defined by expert practice” (Collins et al., 1991, p.16). Through the certification process, the student SGLs are introduced to, and begin learning the practices of more experienced SGLs. They are not learning abstract application of the ELM; they are learning how SGLs at MCCC apply the ELM. This learning is part of their larger integration and *enculturation* (Brown et al., 1989) into the community of SGLs.

The certification briefs are an excellent example of this process. More experienced SGLs model real student behavior and ask challenging questions based on their experiences. This pushes the SGL students to solve problems that mirror those they will encounter in their own classes. Although the briefs can be challenging, they give the SGL students a chance to apply what they are learning in certification and receive feedback from their more experienced peers. This is an opportunity for SGL students to articulate and reflect on their current level of understanding, as well as learn more about what to expect when they begin teaching. In the following sections, we outline the strengths of the certification course around the two key components of the course: the Certification Chief’s class pitches (demonstrations of how a class should be taught) and the SGL students’ briefings.

Certification Chief’s Class Pitches

During class pitches, the Certification Chief taught the five foundational classes to the SGL students. The SGL students were expected to participate in these classes and would later brief the classes back to the Certification Chief and other SGLs. By teaching the classes, the Certification Chief modeled the expected teaching approach within MCCC. This is a strength of the certification course because the class pitches provided SGL students opportunities to observe what expert instruction looks like within the MCCC and helped facilitate collaboration among the SGL students. Certification was and still is typically set up to have multiple SGL students going through the process at one time to enhance collaboration and enable discussion during the class pitches. It also provided the Certification Chief the opportunity to model how to facilitate effective classroom discussions. This encouraged peer-to-peer learning and ultimately reinforced the ELM. It also gave SGL students the opportunity to hear from their peers who had different areas of expertise (e.g., Infantry, Armor, Field Artillery, Engineer, Aviation, Special Forces). The SGL students were also highly encouraged to work together while preparing for their briefs following the Certification Chief’s class pitches. While the SGL students were preparing for their briefs, they were encouraged to observe rehearsals and provide peer feedback. This gave them the opportunity to practice working with their peers to improve their teaching. Peer collaboration was and remains an important part of their future role as SGLs.

In addition, the Certification Chief's class pitches provided the SGL students with opportunities to check their understanding of the content and modeled how to apply the ELM to different types of MCCC topics, from more structured and technical areas to less structured lessons. The Certification Chief also provided instructional coaching focused on topics where SGLs struggle to teach and MCCC students frequently struggle to learn. SGL students also had the opportunity to ask questions about the content and how best to teach it. This approach allowed the SGL students to gain a better understanding of how to teach the foundational doctrinal courses using the ELM prior to teaching the class to the panel of SGLs.

SGL Students' Briefings

After each class was pitched by the Certification Chief, each SGL student taught or "briefed" that same class back to a panel of current SGLs who role-played as students. The amount of time between SGL students receiving a class pitch from the Certification Chief and SGL students briefing that class was decreased throughout the certification process to add stress and more closely mirror the class preparation time of practicing SGLs. It is important to note that the SGL students were not asked to brief a class they did not first observe the Certification Chief model. Even as the SGL students progressed through certification, this level of support was not faded. This lack of fading could lead to situations where the SGL students simply copied what the Certification Chief did without understanding the "why" of the approach. However, this approach was still beneficial because the SGL students were challenged during the class briefs to demonstrate their understanding of the content or teaching approach through the SGL panel's questioning. By asking purposeful and challenging questions, the SGL panel likely reduced the possibility that SGL students would fully copy the Certification Chief's approach without reflecting on the purpose behind the approach. Based on observations of the SGL students' briefs and discussions with certified SGLs, the research team concluded that the SGL students' briefs were still a strength of the unmodified certification process because the briefs provided the SGL students the opportunity to teach concepts in an environment designed to challenge them and better prepare them to teach. Additionally, the briefs helped SGL students develop presentation skills, doctrinal mastery, and classroom management skills, while gaining an understanding of how to work through classroom challenges. The SGL students also received formal feedback on their use of the ELM and suggestions on techniques to enhance their teaching effectiveness and student engagement.

The SGL students would brief the class to SGLs who were a part of their future teaching team. This process allowed SGL students to begin building relationships with their future team members as they progressed through certification. The SGL panel consisted of the Certification Chief and at least two certified SGLs. Their future Team Chief was also encouraged to attend all briefs to observe the strengths and weaknesses of their new instructors and assess where they may need to fill gaps in future classes. The Certification Chief provided overall continuity of the certification program, as well as insight into what they taught during the class pitch for the class that the SGL student just briefed. As part of the training, the SGL panel modeled difficult student behaviors and asked hard questions to challenge the SGL students' doctrinal knowledge and teaching abilities. The SGL panel also asked purposeful questions or provided "student" comments to guide the SGL students if they began to struggle. As the level of SGL experience in

the room varied, it allowed for a wider variety of questions to which the SGL students had to respond. This process gave the SGL students an opportunity to practice their teaching techniques and begin to figure out what worked for them before they taught actual students. These briefs were intended to replicate a MCCC class and prepare SGL students for how MCCC students may respond to the class or their teaching approach.

While this was seen as a challenging process, SGLs viewed the certification briefs as one of the most critical aspects of certification because it replicated questions and friction they experienced with students while instructing. The certification briefs ultimately provided an experience for the SGL students to grow as instructors and be better prepared to teach actual students. This process also served as the primary vehicle for the SGL students to receive formal feedback about their teaching practices. Immediately following each SGL student's brief, the student received an AAR from the panel of SGLs and Certification Chief. SGLs provided feedback on their use of the ELM and suggestions on how they could adjust their teaching practices to engage students more effectively. This was an opportunity for the panel of SGLs to share with the SGL students the best practices they had learned during their time as instructors. The briefs also provided an opportunity for the Certification Chief, the Team Chief, and the SGLs to see the class, discuss tactics, techniques, and procedures (TTPs), and ensure they were all teaching towards the same outcomes. The SGLs typically only teach the same class twice a year, so the SGL students' briefings give them an additional opportunity to reflect on best practices.

Further Aligning the Certification Course with Cognitive Apprenticeship

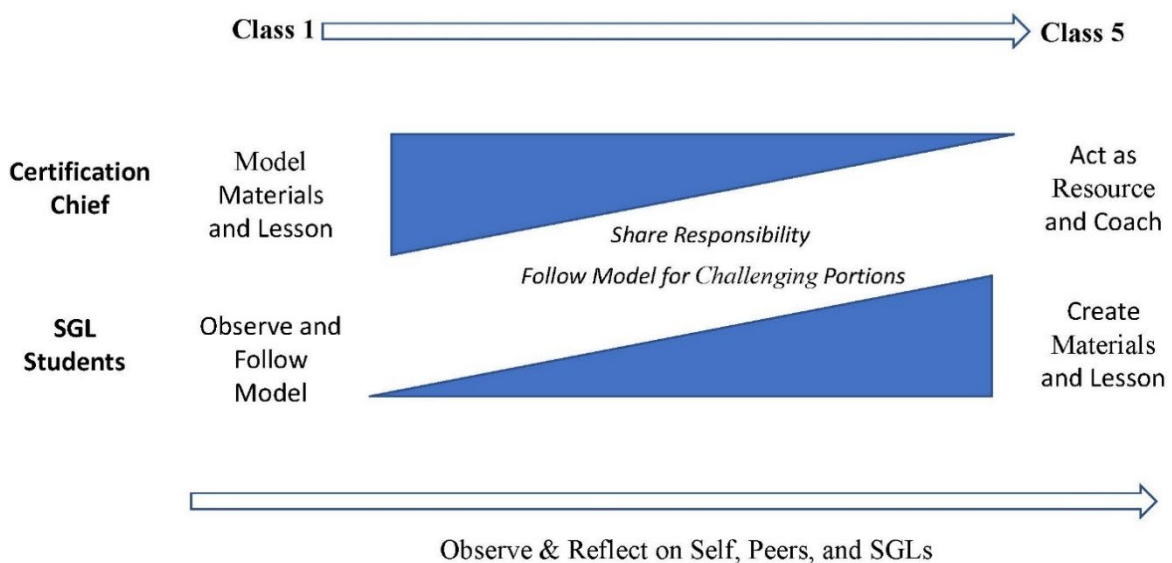
The unmodified certification approach largely relies on the Certification Chief modeling "what right looks like." This approach is highly efficient for allowing SGL students to quickly build a framework for how to teach successfully at the MCCC. Moreover, this modeling technique is important because MCCC follows a very specific teaching approach using the ELM and whiteboarding (i.e., how whiteboards are collaboratively developed with students to organize and share content). Therefore, the SGL students benefit from an initial understanding of what this looks like before they try teaching on their own. Modeling and learner observation are important initial learning experiences within cognitive apprenticeship (Collins et al., 1991; Collins et al., 1989). As discussed previously, through this process the SGL panel challenges the SGL students' understanding through questioning and role-playing student behaviors. However, some of this support needs to be faded as the SGL students gain more experience and knowledge of the teaching approach. By only learning through modeling, the SGL students may miss opportunities to develop instructional problem-solving skills by working through what to do when they are uncertain (e.g., Duckworth, 2006). The students may also miss the chance to reflect on their struggles and to develop their own instructional style and strategies before engaging with actual students.

To more effectively apply cognitive apprenticeship, the Certification Chief needs to fully implement scaffolding by monitoring the SGL students' current level of understanding and identifying when modeling and other supports can be faded to push their learning further (Puntambekar & Hübscher, 2005). Likewise, SGL students need opportunities to teach parts of

the lessons before the content is modeled so they can have opportunities to struggle and reflect on challenges they may face as instructors and learn from them. It is particularly important for SGLs to practice this preparation process while learning more general approaches because SGLs must eventually teach content that is not covered in the certification course. SGLs are expected to teach over ninety lessons and certification only covers five specific classes. By more systematically moving from an observer to active participant, with the coaching of the Certification Chief, the SGL students can also gain a better understanding of “the why” of the approach as they apply the structure of the ELM to new material. By understanding the “why” of the ELM approach, students may be better prepared for the realities of teaching within MCCC, particularly in situations in which they will be challenged to teach less familiar content while applying the overall ELM methodology without a direct model. Figure 1 presents the suggested role progression of the SGL students and Certification Chief throughout the certification course aligned with the tenets of cognitive apprenticeship. It is important to note that this is the *suggested* role progression. In practice, this should be modified based on the needs of the students and parameters of the course (e.g., SGL students’ ZPD, time constraints of the course, or the difficulty of certain content). Such a modification was necessary for MCCC’s certification course as will be described below.

Figure 1

Role Progression for SGL Students and Certification Chief



Although support needs to be faded, it is important that the SGL students are not thrown into the problem (Duffy & Raymer, 2010). They need to be provided the proper support to help them advance their learning as they assume more teaching responsibility. To do this, the Certification Chief or SGLs need to provide checks on learning and ongoing diagnosis (Puntambekar & Hübscher, 2005), along with coaching that encourages deeper reflection (Duffy & Raymer, 2010). This ensures that the SGL students are reaching the appropriate levels of

understanding before they assume more demanding teaching activities. This can be done through formal AARs after the SGL student finishes teaching an entire class, or informally (e.g., a “hotwash”) as required when SGL students finish teaching individual parts of a lesson.

It is also important for the Certification Chief to encourage the SGL students to use articulation and reflection methods to help the students monitor their learning. Overall, these methods make the SGL students’ level of understanding clearer to the Certification Chief so they can assess the students’ ZPD and identify when they are ready to take on more teaching responsibility. This approach also gives the SGL students the opportunity to work through instructional challenges while having support from SGLs or the Certification Chief, gradually leading up to greater responsibility. Gradually fading support during the certification course facilitates later success in that the Certification Chief can use this process to strengthen the students’ confidence in their teaching abilities. The unmodified approach could run the risk of undermining the SGL students’ confidence if the progression from observing classes modeled as SGL students to applying the method as new instructors occurs more rapidly than is warranted given each SGL students’ development. That is, the new instructors may inadvertently learn “I am not good at this” and feel less confident as an SGL.

Suggested Modifications and their Implementation in MCCC Certification

Given this objective, researchers worked with the Certification Chief to outline changes that could be made to the certification process to implement a scaffolding approach to best support SGL students’ individual development, the certification course, and the intended outputs of each foundational class. The approach is a compromise between efficiently introducing new instructors given time constraints and at the same time enabling the gradual assumption of teaching responsibility. In the following sections, we outline the modified approach for the role of the Certification Chief and the SGL students in each foundational class to further align the process with the tenets of cognitive apprenticeship and the intended outcomes of the certification course.

Class 1:

The first class on doctrinal foundations will be fully modeled to provide the most support to SGL students. As with the unmodified approach, the SGL students will be given the doctrine associated with the class to review before the pitch. Then the Certification Chief will act as the coach and expert model teaching the entire class. This class should be fully modeled so the SGL students can have an idea of what “right looks like” and become familiar with the expectations of how a MCCC class should be taught. The SGL students will observe and reflect on the teaching practices they see the Certification Chief use. The SGL students will then brief the class back to the Certification Chief and panel of SGLs after they are given 2-3 days to prepare.

Class 2:

For the second class on doctrinal foundations, the intent is for SGL students to observe another round of instruction and to begin to think specifically about the purpose of the different

components of the ELM and what it looks like at MCCC. Before the class, the SGL students will be given the Certification Chief's teaching materials (i.e., completed whiteboards) along with the doctrine associated with that class. This is intended to help SGL students frame their thinking and have a better understanding of how the course materials will be used to teach the class. The Certification Chief will act as a coach, fully model the class, and facilitate a discussion with the SGL students about the purpose of Concrete Experiences or other components of the ELM. This discussion will make the thinking processes of the Certification Chief and SGL students more defined, which can help the Certification Chief gauge their students' understanding and where they may need further support. The SGL students will observe the Certification Chief's teaching practices, participate in the discussion, and reflect on their understanding of the teaching approaches so far. Then the SGL students will brief the class back to the panel within 2-3 days of the class pitch.

Class 3:

For the third class, the Certification Chief will not model how to teach the class and will mainly serve as a coach. The Certification Chief will present the class similarly to a team train-up that certified instructors complete prior to teaching a new module. During the team train-up, the SGL students will be given example teaching materials (i.e., completed whiteboards, handouts) for the class. The Certification Chief will review each of the whiteboards discussing the Concrete Experiences, intended outputs of each board, and some teaching tips. Additionally, the Certification Chief will describe common errors or friction points that consistently come up with MCCC students. After the train-up, the SGL students will "team teach" the class back to the Certification Chief. Each SGL will be assigned a portion of the class to teach and the SGLs are expected to collaborate as they prepare their whiteboards. During the team teach, each SGL will sequentially teach their portion of the class and receive feedback from the Certification Chief on their instruction. This gives the SGL students additional practice, time to collaborate and rehearse among themselves, the ability to watch a peer teach, and an opportunity to receive additional feedback on their teaching. After the team teach, the SGL students will independently teach the entire class for the panel. This is the first class where the SGL students will take a more active and collaborative role. The Certification Chief fades the modeling approach so SGL students can practice teaching preparation much as they will as an SGL, but still have some support through the practice teach and peer models. The SGL students will have 1 day to prepare between the team train-up and team teach and 1 day to prepare in between the team teach and their individual brief.

Class 4:

With class four, we modified the suggested scaffolding model. This class presented students with conflicting demands between content mastery and mastery of the teaching approach. This class illustrates the significance of role progression and should be adapted to meet the demands of the course. In terms of teaching ability, it would be ideal to further fade the use of modeling with class four and ask the SGL students to be more responsible for teaching the content. The SGL students should be comfortable with the certification process by this time, having gained more teaching experience. However, the lesson is complex to teach because it

combines various pieces of doctrine and has multiple class activities that SGLs need to combine effectively and seamlessly to teach the class. Additionally, this class contains concepts with which many MCCC students struggle. A lack of understanding in this specific class could be detrimental to student success due to the rigid nature and complexity of the content in the context of the course. Therefore, MCCC deliberately decided this class should be fully modeled by the Certification Chief to ensure that the SGL students understand the content and how the various course materials are used to teach the class. This also gives the SGL students the opportunity to ask questions about the content and work through the activities their students will be asked to do. The SGL students will still be given the boards to review prior to instruction, but they will mainly observe and reflect on how the Certification Chief teaches the class, with a focus on understanding the content of this class as well as how to teach it. The SGL students will brief the class to the panel without a team teach before the brief. The SGL students will brief the class to the panel 1-2 days after the class pitch.

Class 5:

In the final class, the Certification Chief provides the class materials and conducts an abbreviated team train-up. The SGL students will not have a team teach before their solo brief. This class will provide the SGL students with the least amount of formal support and follows the typical preparation process they will experience as SGLs in their instructional teams. Based on their initiative, just as in typical teaching, the SGL students will have the opportunity to get peer feedback and reach out to the Certification Chief or other SGLs to review the material. This will be the first opportunity for SGL students to understand what a certified instructor does to prepare for a full class without receiving any formal instruction or having an opportunity to practice teaching it beforehand. It is important for SGL students to learn this in order to gain an understanding of how to integrate the assigned reading, doctrinal concepts, whiteboard photos, and lesson outcomes to develop a lesson plan. It forces SGL students to be comfortable with not knowing everything about the process. Additionally, it allows them to seek out a fellow SGL to guide them in their lesson plan building, which is essential for effective teaching at MCCC. The SGL students will then brief the class to the panel. The students will be given minimal time in between receiving the teaching materials and when they are scheduled to brief the class. This quick turnaround is consistent with the limited lead time SGLs have to prepare for some classes.

Conclusions and Recommendations

Collectively, the MCCC approach provides a useful model to consider when creating instructor certification programs. With an emphasis on both content and instructional practices, the approach provides a holistic solution, providing a bridge from a general introduction, to instruction, to the implementation of that approach for a given content domain. Importantly, the approach capitalizes on mentoring and coaching by more senior members, instantiated in a rigorous process, to help ensure that lessons learned and effective techniques are transferred between generations of instructors. The modified certification approach helps further align MCCC's certification process with a cognitive apprenticeship approach, leveraging best practices from that tradition. This modified approach has been implemented by MCCC and iteratively adapted based on the needs of student SGLs. A subsequent report will carry forward

our recommendations, presenting an assessment of the modified certification approach and provide additional guidance for implementation of similar instructor training programs for other domains.

While this report is a case study concerning a particular instructor certification program for the MCCC, there are a number of generalizable lessons that may apply more broadly to instructor training within the Army. Soldiers selected to be instructors likely have the necessary content knowledge based on their experiences and prior professional military education (PME), however, expertise is not enough. Instructors need to learn how to effectively teach that content to their students. Therefore, new instructors often need additional training to develop the pedagogical knowledge and skills to teach that content to more junior Soldiers. The approach to instructor certification proposed here incorporates science of learning principles to scaffold and incrementally develop Soldiers' pedagogical knowledge and skills to support their transition from operators to educators, as well as their ability to implement the ELM. A similar developmental progression may be adapted from these principles to support other instructor certification courses.

There are key features of this approach that may generalize to other Army instructor courses. First, instructor programs should address both content and teaching expertise in their course. It is important that new instructors understand the content associated with the POI and how to teach that specific content to students. Next, instructor courses should focus their curriculum around the key modules or fundamental doctrine from their POI. This can help new instructors to build their knowledge of the foundational content of the course and the expected teaching approaches. This will also help the new instructors to generalize the teaching approaches to other modules that likely build from these key concepts. When possible, enable new instructors to practice teaching and receive feedback from seasoned instructors. This provides new instructors the opportunity to learn from more experienced peers, hear about best practices, and build a better understanding of what to expect when they begin teaching. Additionally, instructor courses should attempt to replicate the actual teaching environment during these practice teaches. This can be done by having experienced instructors act as students to illustrate common student questions or misconceptions about the material. The courses can also replicate the preparation process of instructors by gradually decreasing the preparation time for the practice teaches while increasing the amount of material the new instructors are required to teach. It is also important for the best practices of successful instructors to be passed on to incoming instructors so that knowledge is not lost when the more experienced instructors inevitably move on to other assignments.

Although we believe that these key features will transfer to other instructor courses, there are potential limitations to the applicability of the MCCC approach. The cognitive apprenticeship approach was designed to support MCCC's established instructor certification processes, curriculum, and the needs of new SGLs. Therefore, some of the recommendations may not fully transfer or address the needs of courses that work with different student populations (e.g., Officers vs NCOs) or have instructors with varying levels of experience and prior PME. Additionally, the approach would likely need to be modified for a more field orientated POI compared to MCCC's focus on formal classes and practical exercises conducted in a classroom.

To mitigate this, instructor courses should be tailored to support the specific needs of their future instructors, the target audience, the POI, and any constraints of the course. These recommendations should be seen as suggested guidelines or a starting point to help determine the best approach to support new instructors in the operator-to-educator transition.

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