

***Advancing Civilian and Military Education:
The Integration of ADDIE and the Joint Planning Process in Curriculum Design***

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Abstract

The military and education sectors' knowledge developmental goals are often similar. Literature notes it can be advantageous to integrate civilian and military design (Cai et al., 2020). Civilian sector education benefits from academic and culturally derived models for curriculum design. The military often uses its own culturally derived models of design and implementation. However, the end goals are often the same, providing knowledge to close gaps, inspire growth, or prepare for future challenges. Each group benefits from proven methods tailored to their specific requirements. How can each sector pursue evidence-based methods of curriculum design while still finding efficiencies in efforts with precision in creation? Perhaps an answer exists in the blending of the military planning processes with proven academic curriculum design models. The ADDIE model provides educators a five-step model for curriculum development that has been utilized by civilian educators since the 1970s. The Joint Planning Process provides United States military planners a set of steps and guidelines for accomplishing tasks that requires choosing courses of action and forecasting success and failure of implementation. The integration of the ADDIE model's considerations while moving through the steps of the Joint Planning Process is a synchronization of each sectors' models proposed in this study that provides both sectors with a series of best practices when engaging in future curriculum design. Furthermore, it presents an opportunity for these two sectors to examine and flourish through the use of multiple-combined best practices through a new and unique lens of understanding.

Keywords: ADDIE, Joint Planning Process, Curriculum Design

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Introduction

The integration of the ADDIE (Analyze, Design, Develop, Implement, Evaluate) model and the Joint Planning Process (JPP) provides a viable methodology for curriculum design. Literature notes that design and integration thinking is not always effectively practiced with respect to education (Zweibelson et al., 2018). Therefore, the combination of the ADDIE model and the JPP process as explored in this paper posits an option for integration as opposed to advocating for the integration as the best option. This paper explores integration of the systems as an option to capitalize on the strengths each process poses while providing mutual support to each respective system's opportunities for improvement. An explanation of each model and their respective strengths, areas for improvement, and a description on methods to combine the two methods for curriculum design provide the basis for conclusions and further recommendations. Additionally, preliminary research centered on literature, diverse focus group participant input, and a beta-developed curriculum serve as background for conclusions and recommendations.

Analysis, Design, Development, Implementation, and Evaluation (ADDIE)

ADDIE, an acronym for analysis, design, development, implementation, and evaluation, first emerged in literature as an umbrella process for instructional design (Molenda, 2015). ADDIE evolved from instructional design systems research developed by the United States (U.S.) military in World War II (Allen, 2006), finds additional origins in the Interservice Procedures for Instructional Systems Development (IPSID) produced by Florida State University for the U.S. Army (Branson, 1978; Molenda, 2015), and has been adapted in the intervening time to meet the less rigid structure of civilian training methodologies. Designed with feedback loops in mind to support continuous process improvement, ADDIE as a concept allows for rapid prototyping of training and has been implemented across a wide range of industries with over 7,000 articles and books having been published on the model (Mayfield, 2011). This review covers the steps of the ADDIE model, the key strengths of the model, and opportunities to improve upon the model based on up research and literature over the past 10 years.

Overview of the Model

The ADDIE model consists of five steps: analysis, design, development, implementation, and evaluation (Ahmadigol, 2015; Moradmand et al., 2014; Taylor, 2004). Figure 1 depicts these steps along with key activities performed during each. Analysis includes project planning, including defining the instructional goals, stakeholder analysis, and content analysis. Content analysis specifically focuses on the performance solution to be addressed through the training (Labin, 2012). The second step, design, involves defining the learning objectives and organizing and preparing the content (Labin, 2012). During development the specific training content is created and refined based upon the pre-identified learning goals and objectives. The fourth step, implementation, the training takes place and initial refinement occurs. Finally, evaluation reactions and learning objectives are measured based upon the executed content. Several training evaluation approaches have become popular, including the Kirkpatrick and Kayser Kirkpatrick (2016) New World Model for training evaluation, but ADDIE itself does not prescribe a particular approach to training evaluation (Allen, 2006).

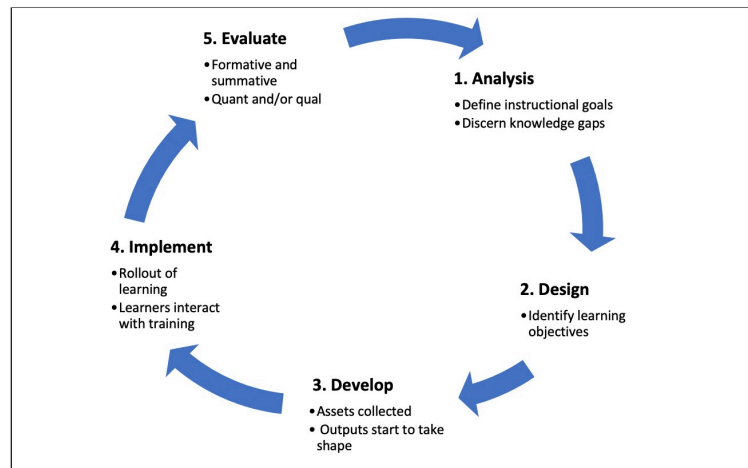


Figure 1: Steps in the ADDIE Model

Key Strengths

The ADDIE model has proven effective at achieving desired training outcomes in peer reviewed studies. Lu et al. (2016) were able to demonstrate a statistically significant impact on a population of nursing students following a training implementation using the ADDIE model. Following training course completion, the self-efficacy reported among nursing program participants significantly ($p < .000$) improved compared to pre-test, and 88% of participants passed the pragmatic exam (Lu et al., 2016). Abidin and Tho (2018) conducted experiments in which two mobile applications (TrueTone and Advanced Spectrum Analyzer) were used to support interactive teaching methodologies for physics experiments at a university in Malaysia. The experiments produced results with small error (5-14 %), and the flexibility of doing experiments at low cost increased.

Opportunities for Improvement

ADDIE presents several opportunities for improvement, including clarity in how to execute each step, inefficiencies in process sequencing, and the assumptions that drive the overall training design. A key criticism of the ADDIE model leveraged by Bates (2014), which is particularly relevant to this paper, is the model does not provide for *how* to make decisions within each step. Additionally, the model's design does not lend itself to thinking through the practicalities of instructor-student interaction during implementation (Bates, 2014), which also presents as an opportunity for further exploration. ADDIE can also be considered inefficient due to not being an iterative process. In this regard the model's design assumes the designer knows all of the requirements in advance and evaluation is designed around these pre-established criteria without opportunity for behavior change to be considered (Drljača et al., 2017).

The Joint Planning Process

The Joint Planning Process is a systematic and procedural methodology used by the United States military for planning activities. The process is a framework by which forces operate as a joint team, across the full range of joint and interagency activities (Joint Staff, 2017). Furthermore, it provides information for key leaders to attain information and make both strategic and operational decisions (Joint Staff, 2017) A keystone for senior leadership development, curriculum for Joint Planning Processes as well as joint planning systems are a

requirement for senior military officers in the United States military. (Kamarck, 2016). The Joint Planning Process enables decision-making and aids senior leaders in the application of knowledge and judgement with situational understanding as it enables problem solving (Alkire et al, 2018). Thus, the joint planning process provides an established, systematic, and repeatable method for addressing current and future problems by both planners and decisionmakers if utilized, assuming the steps are followed.

Overview of the Joint Planning Process

The Joint Planning Process consists of seven steps. In a pre-determined and repeatable order, the steps are: planning initiation, mission analysis, course of action (COA) development, COA analysis and approval, COA comparison, COA approval, and order development. Figure 2 depicts these steps.

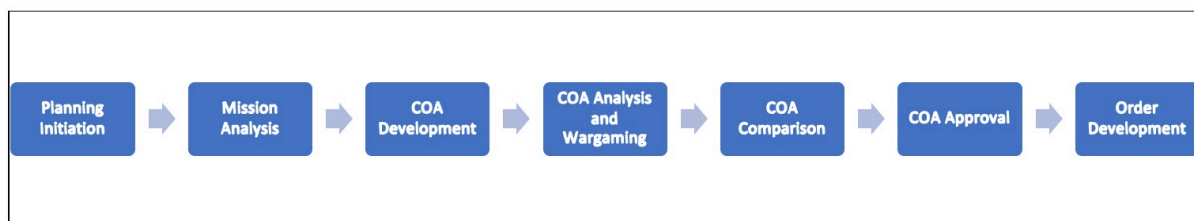


Figure 2. Seven Steps of the Joint Planning Process

In step one and appropriate authority or commander directs or explores a capability to be used in support of an objective. Subordinates and planning staffs begin planning activities in preparation for the reception of direction or guidance. In step two, the staffs review guidance, begin to develop mission estimates, and develop a mission statement focusing on the problem and an understanding of the situation with sound judgment (Alkire et al., 2018) to be addressed leading to development of a problem statement. During step three, multiple courses of action (proposed methods to accomplish an action) are developed which planners hypothesize will lead to mission success. These methods consider guidance and estimates based on mission analysis with considerations of risk and previous planning guidance. Step four consists of course of action analysis and wargaming. During this phase the validity of each COA is analyzed and the COA is wargamed against likely opposition actions and environmental conditions as well as contingencies. During step five, an agreed upon set of criteria is applied to the COA based on the COA characteristics and wargaming considerations to determine its strengths and weaknesses and lead to step six. Step six is characterized by the selection of the overall COA that best meets the Commanders criteria and guidance, based upon earlier analysis, risk, and environmental considerations, ideally having the best chance of success (Joint Staff, 2017). The process concludes with step seven which is characterized by orders, or plans, development. This step packages and quantifies in direct statements and assignments the commanders chosen course of action and provides instructions to commence detailed planning and assignment activities to execute. The seven-step process can be iterative (Cunningham, 2020) and is ideally briefed at the end of each step to provide progress checks and prevents wasted time and regression beyond a single step. The process can maximize efficiency (Pandey et al., 2011) and can be characterized by time and regiment by a planning lead acting on behalf of the commander's authority providing a mechanism to achieve milestones in a limited time or resource environment.

Strengths

The systematic and thorough, yet simple, design of the joint planning process provides the process strength. The Joint Planning Process is a typically predetermined process, which makes it both repeatable and effective (Cunningham, 2020). Cunningham (2020) further noted that the process gives the how, with what resources, and in what amount of time a problem can be addressed. The process is adaptive and constantly evolving to make it relevant and adaptable to environmental change (Scott, 2017). The process identifies and highlights strengths and weaknesses of multiple approaches to potential problem-solving solutions (Joint Staff, 2017). As noted in Joint Publication 3-0, Joint Planning enables execution through appraisal, estimation, assessment, and integration that reduces redundancies in planning and operation (Joint Staff, 2017). Thus, by remaining simple, yet relevant by reducing redundancy, the process is potentially useful to multiple stakeholders.

The Joint Planning Process could provide the opportunity to maximize time, efficiency, and flexibility early on with other frameworks (Pandey et al., 2011). Desk-top exercises utilizing a methodology or process in conjunction with, or like, the Joint Planning Process could be suitable for development or planning workshops attempting unity of effort and agreement among various experts and backgrounds (Alkire et al., 2018). Thus, utilizing the Joint Planning Process can aid a development effort with multiple stakeholders providing curriculum development a systematic potentiality for success.

Opportunities for Improvement

The Joint Planning Process is not without its weaknesses and opportunities for improvement. The joint doctrine used for the Joint Planning Process can struggle to differentiate, or describe, the differing levels or magnitudes of problem solving (Kendrick, 2018). Kendrick (2018) further noted that the language provided in the process might not be useful or adaptable to all situations. The process can also demonstrate weakness if adequate representation of all pertinent stakeholders is deficient (Andres, 2007). Furthermore, stakeholders present in the process can find themselves trapped in the problem definition stages of analysis equally if they find themselves identifying solutions as differing perceptions of problems are often likely to present themselves (Greenwood, 2008). Additionally, should members of the planning group be unfamiliar with the steps of the process, errors or omissions during early planning stages intensify as the process proceeds (Joint Staff, 2011).

There exist opportunities for improvement to the planning process regarding familiarization training, measures for ensuring adequate subject matter expertise presence, common criteria for problem statement definitions, and baselines for terminology usage throughout the process. Andres (2007) noted that using Joint Planning Processes to its full potential requires integration of the entirety of the components in the process. When used deliberately, and early, in in planning or development, joint planning can enable overall effectiveness for a team when complimenting or integrating with a separate methodology or systematic process.

Integration of the ADDIE Model and the Joint Planning Process

Embedding the joint planning process steps throughout each component of the ADDIE model presents a potentiality to build on the research backed success of the ADDIE model with clarity on how to execute each step. By dividing the seven steps into relevant stages within

each ADDIE phase, the joint planning process reinforces ADDIE with structured, prescriptive, predictable, and repeatable steps. The sub-sections below are organized according to the integrated approach: planning initiation, analysis, design, development, implementation, and evaluation. Once the discussion of each of the integrated processes is complete, key tasks informed by the Joint Planning Process, including personnel actions, timing, and program of action and milestones, that are recommended by this approach will be discussed. Providing an entry point into the ADDIE model is the first step of the Joint Planning Process, planning initiation.

Planning Initiation

The design process posited in this paper begins when a relevant authority designates the need for curriculum development and assigns a relevant stakeholder(s) to pursue a given line of effort. It is the responsibility of the receiver to accept the tasking, identify resources and time available for planning, assess the current environment, and create an atmosphere in which to begin the first phase of the ADDIE model.

Analysis

The beginning of the ADDIE process requires the identification of goals, the specified target audience and content analysis. Similarly, the injection of joint planning process step two, mission analysis, provides specific questions for planners to ask: what it will take to accomplish, will the curriculum address the desired objective, what limitations exist, what personnel and resources are required, and how will success be defined. Planners will know they are complete when they can answer what the specific tasks required of them are in the process of the desired curriculum design, an approach to achieving the design, what potential pitfalls to success exist, and how the current environment can affect the process and the output. Successful synthesis of these concepts will move stakeholders to step two of the ADDIE model, design.

Design

The design phase of the ADDIE model includes the determination of desired learning objectives, content preparation, and delivery and evaluation strategies. These deliverables are supplemented by step three, four, and five of the Joint Planning Process (COA development, COA comparison, and Wargaming). As an example, Ahlawat et al. (2017) notes that wargaming processes in the education environment can enabled lessons learned.

Development

This phase of the model begins with step six in the Joint Planning Process: COA Approval. The outputs of this step will include the presentation of the chosen course of action for validation with modifications and a refined approval for implementation. The development phase of the ADDIE model consists of resource and content refinement. Additionally, production, testing, feedback, validation, and revision are accomplished during this phase.

Implementation

The implementation phase of the ADDIE model includes preparation and interaction or engagement with both trainers and learners. The phase of the model is supported by step

seven of the joint planning process: order development. During this stage of the joint planning process supported and supporting individuals are engaged by the convening authority and notified of mission, resources, and limitations with clear and concise guidance from the convening authority. As an output, the step identifies and designates specific groups or parties responsible for certain tasks. This allows for commencement preparation in the form of either written or verbal plans to execute.

Evaluation

The evaluation phase of the ADDIE model assesses the overall quality or efficacy of learning and resources and provides a mechanism for feedback for future improvement. This phase, although not supported by a Phase of the Joint Planning Process is the transitory step back to step one of the Joint Planning Process, initiation, providing an iterative cycle to begin the ADDIE model supported by the Joint Planning Process anew.

Personnel Duties

This paper posits that the convening authority will designate a party or parties responsible for the curriculum design. Given this assumption, the responsible stakeholder should, resource dependent, appoint an individual in charge of knowledge management. This individual is responsible for capturing, quantifying, and preparing for presentation the outputs of each phase. Furthermore, the responsible stakeholder or designee should be prepared to receive an in-progress review, or status update presentation, at the end of each phase and determine whether to progress to the subsequent phase or refine insufficient deliverables. Lastly, the orchestrator should coordinate or delegate the task of preparing a suitable workspace or forum in which members are able to conduct the design process.

Timelines

Derived and discussed during initiation, a timeline should be developed that considers time available and splits it equitably, but not necessarily equally, among the phases. Furthermore, the timeline should be refined to include the comprehensiveness with which each Joint Planning Process step will be executed within each ADDIE phase. The notional timeline for planning derived from the Joint Planning Process provides further structure and guidelines that support the structural integrity of the ADDIE model execution.

Program of Action and Milestones

The previously mentioned individual responsible for overall orchestration of the ADDIE model and Joint Planning Process integration is enabled by developing a timeline that is modeled as a program of action and milestones. The orchestrator conveys to their respective team the notional timeline, be it hours, days, weeks, or months. They must also clearly designate the definitive beginning and ending criteria for each of the phases. This data is best presented in a one-page visual that can be displayed in multiple easily accessible and readily visible locations for the entire team.

Initial Research

In support of the posited integration method the authors pursued literature review and focus groups. They also conducted an initial beta of the integrated design process concept in

conjunction with an initial curriculum development for a newly conceived course. Literature previously denoted in the introduction section encompassed the ADDIE Model, the Joint Planning Process, Joint Planning, and systems integration. Three focus groups were utilized. Focus groups consisted of personnel from both the military as well as academia. Focus groups were representative of differing academic and military departments, backgrounds, and geo-graphic regions within the United States to solicit a diversity of thought, experience, and background. The course chosen for beta-testing the model was a three-week, 127 hour course with a student target population of 30-45.

Focus Group One

Focus group one utilized a perspective that prioritized the Joint Planning Process as the primary curriculum design method. The ADDIE model took a secondary role. Although structured, primary focus of the half-day group was centered on the process and timelines needed to complete a curriculum design. There was varying focus on the content or material resources needed to fulfill desired learning objectives. The group hypothesized a foundational program of action and milestones that provided a framework that could complete a course but was non-specific with respect to instructional goals, outcomes, or strategies.

Focus Group Two

Focus group two utilized a perspective that prioritized the ADDIE model with the Joint Planning Process taking a secondary role. Learning goals and methodologies, learning paradigms, and pedagogies were of significant discussion as was the detailed discussion and explanation of instructional systems design. The group discussed the worthiness of the ADDIE model at length. However, the group did not quantify or note techniques on how to operationalize the model itself. The group ultimately agreed on the merits of the models' considerations but was not able to quantify how the process itself would assign roles and responsibilities or direct the group in the logistical production of a curriculum moving forward beyond the discussion.

Beta-Testing

An initial beta test combining the ADDIE model with the Joint Planning Process was utilized to accomplish a newly directed course. Stakeholders with background in ADDIE as well as stakeholders with Joint Planning Process experience represented the available personnel utilized for development. Overall course development, including syllabus, digital and material resources, and lessons plans, amounted to a 3-month completion time. Although the course was approved, areas of deficiency were noted. These deficiencies included lack of direction, lack of understanding of each of the individual processes by individuals, inability to meet specified timelines, and significant variance in the differing delivery methods for the separate blocks of instruction that supported the course.

Conclusions

The combination of the ADDIE model and the Joint Planning Process provides a viable method for curriculum design. The combination of the ADDIE model and the Joint Planning Process can be a viable option, but there is more room for improvement. There is also more to be understood to determine how effective this hybrid approach may or may not be and where greater efficiencies and understanding can be gained. Culturally, there is much to be

understood between the individuals who possess deep understanding in either one of the approaches but possess little understanding of the other when working in a combined atmosphere.

The combination of the ADDIE model and the Joint Planning Process provides a viable method for curriculum design. However, although the combination of the ADDIE model and the Joint Planning Process can be a viable option, there is much room for improvement and more to be understood to determine how effective it may or may not be and where greater efficiencies and understanding can be gained. Culturally, there is much to be understood between the individuals who possess deep understanding in one of the two but possess little understanding of the other when working in a combined atmosphere towards a common curriculum.

Potential Areas of Friction

Area for potential friction exist in the future development efforts of individuals seeking to utilize the combined model. The paper's authors noted on several occasions that the process itself can stop forward progression for arguments and understanding of where certain steps best fit into the overall process when not fully utilized or seemingly significant dependent upon the curriculum to be designed. Although as previously noted in literature, as long as steps are acknowledged before decision made, the overall effort can be successful. Additionally, a hazard to the overall process exists should individuals invert the priorities of the joint planning process over the intent of the ADDIE model. The ADDIE model drives the educational foundation of the overall proposed method whereas the joint planning process provides a guideline by which to execute and operationalize the model providing the potential for iterative processes. Ergo, a common cultural understanding between the two knowledge bases within the stakeholders is a baseline or potential friction becomes a distinct possibility.

Resources, or lack thereof, represent a potential pitfall for successful completion. Although resources can often be a constraint on any developmental process, resources in the case of combining the ADDIE model and the Joint Planning Process are best exemplified by personnel with the requisite knowledge of both systems and personnel available to fill the required roles of the joint planning process itself. The authors posit that a lack of either of these resources would produce a similar result to the beta test, elongating the overall timeline and incomplete development or actuation of each individual step in ADDIE or the Joint Planning Process leading to an overall failure to fully integrate the two.

Possibilities for Improvements

Future improvements on the proposed model encompass cross-cultural understanding, resources, and iteration. Based upon the literature review, focus groups, and beta-test, the following recommendations for a better actuation of the model are made:

- 1- Before curriculum development commencement, provide to all involved curriculum planners a baseline knowledge presentation by subject matter experts on each of the respective two models to level a common cross-cultural understanding between the educational and military aspects of the combined method.
- 2- Appoint a singular primary stakeholder responsible with tasking authority and accountability of the timeline, deliverables, and process.

- 3- At the conclusion of each ADDIE phase, brief the convening authority on the outputs of the given phase and overall progress towards completion for a progress check.
- 4- Provide a dedicated workspace or forum for development and adequate job aids that, at a minimum, provide literature and visual aids on both the joint planning process and the ADDIE model as well as the proposed program of action and milestones.
- 5- Ensure the stakeholder group consists of one ADDIE model and one Joint Planning Process subject matter expert throughout planning to adjudicate friction points or process and phasing questions.

Future Areas for Exploration

As this was an initial proposal and iteration of a potential model for curriculum development there exists many possibilities for future research and experimentation through iteration. This paper recommends future iterations of this model executed against varying course lengths. Although the initial course tested was a three-week course totaling 127 hours, future iterations could explore week-long workshops, an academic quarter, or a semester long course. Similar research might utilize the method to evaluate its utility when planning the entirety of a family of course. Researching the differing lengths of curriculum might yield results which demonstrate the methods usefulness only on a particular length of course or demonstrate it is useful independent of the subject course length.

Future research or study might also examine putting constraints on time available to utilize the method. This research might determine that the method is useful, or not, for certain periods of time and not others. Although in this case three months was the time used, perhaps future iterations might determine it is best used over the course of a day, week, months, or a year or perhaps might yield time available is not a distinctly significant factor.

Future iterations or research might explore shifting steps of the joint planning process into different phases of the ADDIE model. This paper's authors focused specifically on where step six of the Joint Planning Process (COA approval) best fit between ADDIE's design or development phase. Future research or iterations might find similar steps that have the potential to move on phase forward or back, so long as they are considered.

Closing

A cross-cultural understanding of utilization of the academic ADDIE model and the military Joint Planning Process provides one of many potential methods to use for curriculum design. Although only initially developed and researched and consisting of many potentials for future improvements and research, the method initially appears viable. Key strengths come from combining military and education sectors proven systems, many potentials for friction exist as well. Much is yet to be done with the need for more research and iterations but as literature and initial focus groups and testing demonstrates, systems integration and cross-cultural cooperation can yield positive benefits. Researchers and future curriculum developers would do well to explore combing the two methods given they are able to capitalize on each sectors systems strengths and minimize their weaknesses through stakeholder knowledge, cooperation, and understanding. Ultimately determining for themselves if the method presents a viable potentiality.

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