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# Student Perceptions of Defense Acquisition University Courses: An Explanatory Data Collection Approach

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***Abstract*—**The overarching purpose of this study was to determine the relationship between the current format of online delivery for Defense Acquisition University (DAU) courses and Air Force Acquisition (AFA) personnel participation. AFA personnel (hereafter named "student") were particularly of interest, as they have been mandated to take anywhere from 3 to 30 online courses to earn various DAU specialization certifications. Participants in this qualitative case study were AFA personnel who pursued DAU certifications in science and technology management, program/contract management, and other related fields. Air Force personnel were interviewed about their experiences with online courses. The data gathered were analyzed and grouped into 12 major themes. The themes tied into the theoretical framework and addressed either teacher-centered or student-centered educational practices within DAU. Based on the results of the data analysis, various factors contributed to student perceptions of DAU courses to include the online course construct and relevance to their job. The analysis also found students want to learn the information presented but would like to be able to apply the information learned in meaningful ways.

***Keywords*—**Educational theory, computer-based training, interview, student perceptions, online course design, teacher positionality.

## I. Introduction

THE purpose of this correlational explanatory qualitative study was to provide a foundation of student perceptions toward DAU courses. Student perceptions were explored in order to address the question "How do students' perceptions toward the current format (i.e., teacher-centered) of online DAU courses affect AFA personnel (i.e., student) participation?" Supporting questions that guided the data collection on the specific phenomena included:

1. How does choice of online DAU courses improve student motivation and participation in online DAU courses?
2. How does the number of online DAU courses taken affect student motivation and participation in online DAU courses?
3. How do students' job experience(s) affect their motivation and participation in online DAU courses?
4. How do students' career fields affect their motivation and participation in online DAU courses?

Finding the answers to the research questions is significant to the field of course design, specifically DAU online courses designed for adults, as the data gathered could lead to course modifications (if necessary) to improve participation. Improved participation may lead to greater achievement in terms of greater retention of knowledge learned. This increase in knowledge retention could ultimately save the Air Force time and money and may improve the understanding of participation in other online courses. Also, the findings from this study could have broader application beyond DAU. Much more needs to be understood about the quality of online instruction. After its creation, online instruction may not consider instructional design, teacher positionality, or meaningful application of content. The findings of this study may give online course designers ideas on instructional design techniques that prove beneficial to adult learners.

## II. Theoretical Framework

The theoretical framework for this study is comprised of eight different educational theories: motivation, instructional design, behaviorism, cognitive learning, constructivism, situated learning theory, connectivism, and adult learning. Each of the eight theories is tied to how students learn through feedback from more capable peers (student−teacher relationship), social interaction (student−student relationship), and student-mediated learning.

Additionally, the application of new literacies is an underlying theme within the theoretical framework. Using a compilation of theories from other new literacies researchers, Lankshear and Knobel [1] claimed, "New literacies hav[e] new 'technical stuff' and new 'ethos stuff' that are dynamically interrelated". The technical aspects are comprised of the hardware and software needed to take part in new literacies work [1]. The ethos stuff is related to the social practices of learning as well as the evolution in technology development [2]. Using these definitions, the ethos part of new literacies directly ties into connectivism, constructivism, and situated learning theory. The technical parts may be related to behaviorism and cognitivism. adult learning theory, motivation, and instructional design incorporate both ethos and technical considerations. A summary of theories is found in Fig. 1.

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| Educational Theory | Highlights | Ties to New Literacies | Application to DAU Courses |
|---|---|---|---|
| **Motivation** | Includes three different types - intrinsic, extrinsic, and amotivation; intrinsic motivation causes students to want to learn because they find the material interesting or can apply it to specific goals; students with external motivation only take part in learning activities due to the influence of outside parties; students influenced by amotivation are affected by forces outside of their control [3] | *"Technology stuff"* - Internal motivation, or presence may be influenced by the personal learning environment [4] *"Ethos stuff"* - The online environment chosen could lead to externally-motivated learners; the learner could be punished or constrained for not supporting the environment [3]. | Students take online DAU courses because of a combination of the three types of motivation; overlaps is motivation such as extrinsic and intrinsic can lead students to take online DAU courses to earn a certification; amotivation may be present if a student does not have a choice in what courses to take [5], [6] |
| **Instructional Design** | Originated from instructional needs of World War II military; offers guidance on how to help learners develop cognitive, emotional, social, physical, and spiritual skills [7], [8] | *"Technology stuff"* - The method of instruction includes the online environment constructed to support educational goals [7] *"Ethos stuff"* - Instructional situation allows the construct of the content-delivery tools to tie back to other educational theories [7] | Instructional designers of online DAU courses could gear courses to help DAU professionals at various stages in their career; entry-level personnel could take courses that reinforce basic concepts while more experienced personnel could take courses that assess application of concepts learned |
| **Behaviorism** | Students do not have prior knowledge of the given subject; educators determine what students have learned through using assessment of student actions [9], [10] | "*Technical Stuff*" - Students need to show their ability to navigate the technology used to gain ownership of the knowledge needed to better perform knowledge analysis and synthesis [11]. | Student learning is determined through the overemployment of rote types of assessment (drill and practice; factual questions) in formative and summative multiple choice assessments [12] |
| **Cognitive Learning** | Students do not have prior knowledge of the given subject; learners work to move information stored in short-term memory to into schemes already present in their long term memory [13] | "*Technical Stuff*" - Students gain foundational knowledge through online literature reviews that may or may not be moved to long-term storage | Learners may/should seek to move knowledge into from short-term memory to long-term memory using potential applications to their job but may be unable due to being passive learners within the online courses |
| **Constructivist** | Students' learning experiences allow them to pair their own experiences with presented facts; students use social and community interaction to build a stronger knowledge base [14], [15] | "*Ethos stuff*" - Online courses can allow students to belong and communicate within a community of fellow learners while giving them the ability to practice their skills through guided, individual activities [11] | Learners may use knowledge gained in future DAU courses |
| **Situated Learning Theory** | Students cannot transfer skills learned if they are gained in one specific context; learners gain more if they are allowed to be active members of the learning process [16], [17] | "*Ethos stuff*" - Learners are required to be active in their own learning while adapting to new situations [4] | Currently online DAU courses are dependent on passive learning techniques such as slide presentations; because of the level and finite context in which the information is presented, students may not be able to apply knowledge to authentic (real-life) situations |
| **Connectivism** | Focuses on considerations on how information changes due to Digital Age; students ingest information then determine its relevance; seeks to amplify learning by tying students' prior knowledge with socially-learned facts [13] | "*Ethos stuff*" - Individual's personal learning environment (PLE) requires high levels of motivation to be involved in the communication and/or collaboration conducted using the new literacy [4] | Online DAU courses teach federal and Air Force regulations which change based on emerging needs; personnel may be able to better apply facts to real-life situations if the knowledge is transferred to the people who need it [18], [13] |
| **Adult Learning in the 21st Century** | Adult learners need to move towards self-directedness and be able to apply their knowledge to real-world tasks; adult learners are more driven by internal motivators [19] | *"Technology stuff"* - Adult learners need to tap into their prior knowledge, to include use of technology, to increase their own competence [20] *"Ethos stuff"* - Social aspect of learning may be fueled by a learner's responsibility to help others [20] | Students who can apply knowledge learned in online DAU courses may be more motivated to internalize the material presented [21] |

Fig. 1 Highlights of Educational Theories

## III. Background and Methodology

A qualitative case study was the approach used for this study. The design of the case study fell in line with Yin's [22] beliefs and procedures. Yin [22] subscribed to a positivist epistemology in seeking to answer "how" and "why" questions in contexts where he had little control. The combination of Yin's [22] emphasis on ensuring validity and reliability (or credibility, transferability, and dependability for a qualitative study) and the influence scientific methodologies had on his practices were especially important as AFA leaders and policy makers tend to have scientific backgrounds. A correlational explanatory lens was employed for this qualitative study. In a correlational study, none of the variables are manipulated by the researcher; all data for this study were collected without the influence of the researcher [23].

Data were collected through interviews, course documents and screenshots provided by participants, and the researcher's reflexive journal. Data collected were analyzed using constant comparison analysis [24], [25]. Grounded theorists specifically use constant comparison analysis to analyze data collected and turn it into theory [26]. After each interview and document submission, the data were inductively coded and compared to other events that fed into the coding [27]. Through the data analysis, recurring codes/words were classified into separate

themes [27]. Applying an inductive process to the data analysis enabled broader generalizations to be made from the specific data collected [28]. The themes and codes constructed using participant data were tied to the eight educational theories forming the foundation of this research.

The target participant population was AFA personnel located at various bases across the United States. The study data were comprised of responses from 18 personnel, ranging from 26 to 46 years of age. This group was particularly targeted, as there is a wide range of individuals who take DAU courses. The wide age range aided in gathering data from participants with different experiences; personnel who had taken a few courses (younger personnel) may view the courses differently than personnel who had completed numerous courses over the years (older personnel). All participants were native English speakers and active duty Air Force members. All participants have at least a Master's degree in their respective science or engineering discipline. Participants were chosen due to their availability and willingness to participate. The majority of participants work currently within the field of higher education, so they were familiar with both Acquisitions and adult learning.

## IV. Results and Discussion

The resulting themes and codes and related educational theories can be found in Figs. 2 and 3.

The data collected showed a tendency for online DAU courses to lean toward teacher-centered educational practices within its instructional design. This was evidenced through the participants' comments on an overreliance on text-filled slides and the memorization of redundant facts as evidenced in Theme 2, "The amount and presentation of information is a hindrance to student learning." Because of the instructional design techniques used, participants found themselves not reading the course material but downloading the slides, illustrated by the codes found within Theme 1, "Students are passing the test but not internalizing the material." Within Theme 1, several students mentioned using a guess-and-check test taking technique or searched through the downloaded slides for the correct answers. The memorization of facts and redundant information fell into cognitive learning theory and Theme 2. Both test-taking techniques are tied to behaviorism and Theme 1.

Participants could not recall most of the information when the course ended as they were not given opportunities to employ the information in a real-world setting. Participants also found the information presented in online DAU courses to be broad and not easily matched to their current job experiences as reported within the codes comprising Theme 3, "The types of information presented as well as the format may influence student learning." Some participants were able to use the material later in their career but only in a general sense, such as remembering terminology or where information can be found within Federal Acquisitions Regulations. The purpose of the courses was not clear to many of the participants as evidenced in Theme 5, "Students who are driven by external motivators approach the courses and learning differently." The participants were informed on the courses needed for their jobs unofficially through supervisors, training managers, and/or peers but did not receive formal mentorship on the path to job certification using online DAU courses. Relying on broad information and unclear certification standards forces participants to construct their own knowledge, which follows constructivist educational techniques which is embodied in Theme 2.

| Motivation | | Instructional Design | | Behaviorism |
|---|---|---|---|---|
| **Students who are driven by external motivators approach courses and learning differently.** | **Students are internally motivated to learn the material and apply it but run into roadblocks.** | **Students are passing the tests but not internalizing the material.** | **Students' background may affect their desire to take online DAU courses in their current form.** | **Students are passing the tests but not internalizing the material.** |
| Working toward mandatory certifications | In-residence courses are helpful | Guess and check test technique | Not knowing audience | Guess and check test technique |
| Supervisor/job provides requirements/guidance | Motivation to learn info outside assigned billet/career field due to perceived value | Not reading course material | Academics/Educational Experience | Not reading course material |
| Training Manager | Hindrances to taking voluntary courses | Using reference materials for testing | | Using reference materials for testing |
| Requirements list for certification | Certification billet as a hindrance | Downloading/ reference | | Downloading/ reference |
| Courses/certification requirement issues | | Information is easy to understand | | Information is easy to understand |
| Course approach - just get it done | | Course design | | |
| Check the box | | Course feedback | | |
| Future career goals | | Teaching Method | | |
| Taking courses and continuous learning points | | Instructor help | | |
| | | In-residence training not helpful | | |
| | | Course graphics | | |
| | | Ineffective group work | | |

Fig. 2 Overarching Themes with Support Codes and Ties to Theoretical Framework – Motivation to Behaviorism

| Cognitive Learning | Constructivist | Situated Learning Theory | Connectivism | | | Adult Learning Theory |
|---|---|---|---|---|---|---|
| **The amount and presentation of information is a hindrance to student learning.** | **The types of information presented as well as the format may influence student learning.** | **Students want to take an active role in their learning.** | **Students' work environment affects their active participation.** | **Students' ability to receive accurate and valuable information affects their active participation.** | **Students want to help DAU address issues within training and processes.** | **The ability for a student to apply the knowledge gained from an online DAU course is dependent on his/her position and rank.** |
| Redundancy | Confusion | In-residence courses are helpful | Work as a distraction | Google/ Researching | DAU Instructor | Rank/job versus training requirements incongruence |
| Memorization of topics/facts; rote knowledge | Scaffolding | On-the-job training is helpful | Road shows | Accuracy of Information | DAU Growth/Improvement | ***Students who could not apply the material*** |
| Too much information | Broad/higher-level information | Hindrances to active engagement | Training Time | Information value | Acquisitions issues | Online courses not useful for job |
| Right amount of information | Courses did not build on each other | Critical thinking | | Updating information | Other organizations providing same type of training | Hindrances to training |
| Note taking | Courses work together | | | | | ***Students who could apply the material*** |
| Reading course material | Group/peer work | | | | | Online courses useful for job |
| Obscure information | No formal guidance/mentorship on courses | | | | | Real/Actual/Applied learning |
| | | | | | | Authentic Learning |
| | | | | | | Timeliness |

Fig. 3 Overarching Themes with Support Codes and Ties to Theoretical Framework – Cognitive Learning to Adult Learning

Educational practices desired by the participants fell in line with student-centered learning practices. Participants desired to take a more active role in their learning as evidenced through recommendations made by participants within the various themes. Participants benefited greatly from on-the-job training and group work within in-residence courses as illustrated in codes within Theme 9, "Students are internally motivated to learn the material and apply it but run into roadblocks," and Theme 10, "The ability for a student to apply the knowledge gained from an online DAU course is dependent on his/her position and rank." The ability to discuss experiences with others assisted in being able to learn how to apply the information presented in individual job settings. The group work included in online and hybrid DAU courses proved to be ineffective in helping participants remember the data presented as evidenced in participants' comments within Theme 11, "Student perceptions concerning the construct and interactiveness of the DAU website and online courses may affect student learning." Wanting to learn and apply the information presented in online DAU courses ties back to motivation, Themes 8 and 9, and adult learning theory, Theme 10.

Participants also wanted to better develop their critical thinking skills using up-to-date authentic activities to think through problems within their work environments, which is evidenced in Theme 9. Using outdated information within the online DAU courses led participants to question to utility of DAU courses in general; this is seen in Theme 6, "Students' ability to receive accurate and valuable information affects their active participation." Participants also were motivated to learn material presented in online DAU courses if they could apply it to their current jobs, as exhibited in Theme 10. Participants who were able to apply the course material took part in applied/ authentic learning activities, which was also seen in Theme 10. The accuracy of information aligns with the connectivist learning theory and Themes 5 ("Students' work environment affects their active participation"), 6, and 7 ("Students want to help DAU address issues within training and processes").

Lastly, participants valued instructor interaction as they could learn from instructors in an unofficial mentor-mentee capacity. Instructor help was a code under Theme 11. Participants valuing group engagement and critical thinking skills falls within situated learning theory or Theme 4. The desire to have instructor interaction and mentorship can be grouped within instructional design theory, specifically Themes 11 and 12 ("Students' background may affect their desire to take online DAU courses in their current form").

Overall, there are three educational theories that emerged as highly influential in the course of this study. Behaviorism seems to be the learning theory that most dominates the current construct of online DAU courses. This is exhibited through the overuse of assessments as the only method to determine if student learning occurred. Behaviorism is also present as the majority of participants reported online DAU courses presented foundational knowledge even within more advanced courses. The learning theory that most drove participants was motivation. Participants were motivated to use the material in their current and/or future jobs and wanted to help DAU improve the learning experience. Not being able to use material from online DAU courses greatly discouraged students from

being active learners in the online DAU environment. Instructional design is the third major educational theory present within the findings. Instructional design is the means to address the concerns discussed by the participants to craft a more beneficial online learning experience. The other five educational theories can influence instructional redesign efforts.

## V. Implications

There are three major implications to this study. The main implications are lack of up-to-date information, waste of time, and not using the training for their jobs. These implications have far-reaching effects to include wasting government resources, improperly executing contracts and/or contracted work, and taking Acquisition professionals away from more beneficial tasks such as hands-on innovation efforts.

The lack of up-to-date training can lead participants to not trust any information presented by DAU. As multiple participants indirectly stated, DAU courses that lack current information can cause participants to lose faith in DAU to train personnel appropriately. If participants do not trust DAU training as a whole, even courses with valuable information will not be seen as value-added by Acquisitions professionals.

Another implication is continuing to take ineffective online DAU courses wastes time. Participants reported online DAU courses can take anywhere from an hour to days and weeks to complete. Participants found this time could be better spent learning daily tasks through on-the-job training, taking courses that directly apply to participants' current jobs, or completing current job requirements.

A third implication is the current DAU course and certification construct may leave Acquisition professionals feeling like they do not have the tools to do their jobs. As all participants believed the online DAU courses were not beneficial to their jobs, they relied on on-the-job training and/or attempting to find needed information themselves. If needed information cannot be found, Acquisition professionals may be left guessing what would be the best course of action may be for major programs. Participants discussed failures within major Acquisitions programs such as the development of the F-35 aircraft. These failures caused participants to wonder why they should bother with certification if the courses taken did not seem to help better develop needed technology.

## VI. Ties to Theoretical Framework

The main educational theories impacting this study were connectivism and instructional design. Connectivism is highly influential because it helps identify to the learner which pieces of information is important to retain while addressing changes in the technological and Acquisitions environments. Instructional design is key as it provides DAU professionals guidance on how to best help DAU participants grow as Acquisitions professionals by incorporating other educational theories. The other six theories can be applied within connectivism and instructional design to define specific issues within the current online DAU course construct.

### *A. Behaviorism*

While participants pushed for more student-centered learning experiences, there is still a need for behaviorist theory within DAU courses. Students' behaviors still need to be seen to determine if learning has occurred. As behaviorism assumes learners have no prior knowledge, incorporating behaviorist principles may be most beneficial in Level One (basic) certification courses [9]. Students taking these courses rely heavily on the instructor to present foundational knowledge needed for more advanced courses. Summative and formative assessments that use instantaneous feedback then need to be designed to gauge if students understand the knowledge presented in the course [12]. Students need to have shown they have understood enough of the basic principles presented to move on to learn more advanced topics in the Level Two (intermediate) and Level Three (advanced) certification courses. For behaviorist theory to work effectively, topics assessed should be more than Federal Acquisition Regulation numbers. Suggested assessments might include matching needed acquisition documents to their correct spot in a project timeline, identifying roles and responsibilities of offices within an acquisitions program, and determining legal and illegal activities that could be presented within a project manager's scope of responsibilities.

### *B. Cognitive Learning Theory*

Cognitive learning theory can help instructional designers bridge the gap between old and new knowledge specifically within online DAU course assessment [29]. First, instructional designers could craft pre-tests given at the beginning of each module to determine how much information a student has previously acquired or retained. Any questions that cover key information that were answered incorrectly would lead the student to a review lesson before bringing them back to the assessment. The assessment questions at the end of the module could ask students to reflect on how they used or could use the information presented within their own practices. Having students tie the information presented in the online DAU courses to personal experiences helps move concepts from short-term to long-term knowledge [13]. The questions should be constructed to have more than one right answer which may mean using short essay questions to determine if learning occurred [29].

### *C. Constructivism*

For online courses to follow constructivist beliefs, instructional designers need to account for the digital learning environment. The learning environment must be interactive and socially driven which motivates students to take an active role in their learning [31]. Instructors can aid those who are not active participants through synchronous means such as online discussions as well as asynchronous methods such as emails or threaded discussions [31]. Online learning environments should also create opportunities for collaboration with peers and more-experienced mentors [31. Participants in this study desired more interactions with others as these experiences helped them construct their own applied knowledge. The digital learning

environment can use what students say, do, and feel to access and incorporate their experiences in course experiences to better aid others in constructing knowledge [30].

*D. Situated Learning Theory*

Online environments can easily be established to support communities of practice. Through archived chat rooms, bulletin board systems, or other asynchronous or synchronous methods, instructional designers can establish online networking environments that allow teams to grow, pursue common understandings in a given topic, and reflect on the knowledge gained [31]. Additionally, establishing communities of practice may help DAU professionals learn skills that are transferrable to various situations which can help them execute daily tasks more effectively [16]. Effective communities of practice can also help Acquisitions professionals keep abreast of changes within the Acquisition environment. Members of the community who work with evolving regulations can help inform others of the changes and aid them in applying the revised regulations appropriately [13]. DAU already attempts to grow communities of learners through newly-implemented forums but they are not widely-publicized nor used [32].

*E. Connectivism*

Connectivism as an educational theory could majorly influence how future online DAU courses are constructed. Participants in this study acknowledged their desire to connect their knowledge to other people's experiences for more meaningful learning environments [33]. DAU instructional designers could build communities of practice that serve many different purposes. One type of community of practice could mimic an integrated product team. Students can learn about each part of the Acquisitions process from someone who specializes in the Contracting career field or interfacing with contractors. This diversity of opinions connects "specialized nodes or information sources" to gain a breadth of knowledge [13]. This type of community of practice could also help students see between ideas and fields they cannot experience on their own [13].

Another type of community of practice could combine less-experienced Acquisitions personnel with senior mentors of the same field. For instance, senior Developmental Engineers could be paired with engineers just earning Level Two certification. This pairing would allow new personnel to see senior-level decision making processes while senior personnel learn about the evolving Acquisitions environment from those who experience the changes at a tactical level [13]. As study participants also discussed learning information using Googling, constructivist theory could help DAU course designers build a searchable database or website Acquisitions professionals can use to find targeted training, case studies, and other useful artifacts [13].

*F. Motivation*

Motivation is critical to DAU students taking part in meaningful learning activities. As participants stated their motivation was affected by taking courses not applicable to their jobs, DAU course designers can use this information to make more meaningful learning experiences. First, online DAU courses could mimic real-world scenarios and activities. Based on participants' comments, active learning would increase if the courses would help them better accomplish their duties. Featuring real world scenarios in an online setting would grow intrinsic motivation as students may be more driven to learn the information [34].

Internal motivation may also increase if students were allowed to pick the certifications they accomplished [34]. Numerous participants discussed choosing to take online DAU courses for certifications that were of interest rather than required. These participants were internally motivated to learn from DAU courses outside of their certification requirements because they found the information helpful for current jobs and future goals.

Unfortunately, external motivation, and amotivation may need to factor in student learning as DAU still needs personnel with specific certifications and learned knowledge [3]. However, DAU personnel can still attempt to grow internal motivation by making certification mandatory when an Acquisitions professional is about to transition into a job in which the information is needed [5].

*G. Adult Learning Theory*

Instructional designers who create courses for adult learners should follow the principles and goals established by Knowles [19] and Merriam [35]. Online courses should have direct ties to real-world applications, which create a need to learn [19]. Courses should provide opportunities for adult learners to reflect on their own progress and their learning processes [36]. For online DAU courses, instructional designers could frame topics around a simulated contract management scenario and ask open-ended questions based on the scenario. The scenario could progress based on the student's response(s), have opportunities for the learner to see and reflect on the ramifications of their decisions. This student reflection is a key point in Merriam's [35] adult learning goals.

*H. Instructional Design Theory*

DAU course designers who employ instructional design theory can scaffold concepts throughout the progression of courses needed to earn certifications. For instance, multiple participants discussed the Acquisition process as a whole. An instructional designer building a course within Level One certification could ask students to identify different parts of the Acquisition process using situational cues such as listening to/participating in avatar-led meetings within the online DAU course. This identification falls in line with constructivist and cognitive learning practices.

Students taking Level Two courses could then apply their Level One knowledge to determine the actions that occur at each Acquisition milestone using an online model. Students would need to continue the activity until all activities associated with the milestone have been addressed. This activity would incorporate pillars of behaviorism.

In Level Three, students could take part in a group project that analyzes case studies to assess the actions taken and what,

if anything, they would have done differently which is part of adult learning theory and situated learning theory. Asking students to include new technological and procedural considerations would bring in aspects of connectivism. Motivation is carried throughout the levels of courses as passing the course serves as an extrinsic motivator and being able to apply the knowledge they learned to their jobs (intrinsic motivation).

## VII. Recommendations

Initial suggested changes incorporate student-centered learning practices that would aid Acquisitions professionals in learning and applying the material to their jobs. The first recommendation is to ensure information presented is up to date. As students rely on the information presented in the online DAU courses when they are performing program management tasks, the information needs to reflect current regulations and best practices. One way to do this is to break the online courses into smaller, objective-based sections that could be replaced if or when information changes. These segmented modules could then be used as refresher training for personnel re-entering the Acquisitions field or as easy online reference. These smaller modules could also be linked together and used as targeted reference material.

A second recommendation is to present information using multiple methods. As many participants commented on the daunting amount of text included in each course or learning better from video, DAU course designers should explore presenting the same information using video and/or animations, transcripts of video and/or audio files, and graphs or pictures when possible. DAU may also choose to use virtual reality to better mimic authentic activities such as discussions in staff meetings, working with contractors, and other actions that may not be fully experienced through online environments. Appealing to a wide variety of learning styles may help more of the Acquisitions population learn the desired objectives.

A third recommendation is to include more meaningful group work in the online courses. Participants wanted more opportunities to work with other Acquisitions professionals to learn from their experiences. Group work in terms of incorporating synchronous sessions with asynchronous work, including discussion boards, blog work, and other cooperative practices could help DAU students better relate the material presented to real-world tasks.

The final recommendation for design changes would be to scaffold learning to improve mastery and application of material. Level One students focus on learning Acquisitions basics such as learning names of important milestones, when necessary paperwork is due, and other such items. This would match typical roles and responsibilities of lower-ranking individuals who would be managing small contracts or serving as a project lead in a large program. Level Two becomes more applications-based but in a sterile environment. This would match the ranks and experience levels of students taking the courses. Students seeking Level Two certifications tend to be managing or seek to manage larger contracts with bigger impact on the Air Force. Level Three could then become completely applications-based authentic learning activities that use real Acquisitions projects to guide students through the knowledge they need to know to be successful in their executive positions. This scaffolded construct may help DAU better meet their intent of designing courses based on the intent of growing Acquisitions professionals capable of serving in increased levels of responsibility.

## VIII. Future Work

As this study served as foundational research in an under-studied field, more work is needed to ensure DAU students have a more beneficial experience. First, more research on student perceptions is needed. This study should be conducted at different Air Force bases that employ Acquisition personnel. The study should then be conducted at Army, Navy, and Marine Corps bases that have the equivalent of AFA personnel. The findings of these studies should then be compared to studies using AFA personnel to identify any trends in student perceptions, issues, and/or recommendations. Any trends found among the Armed Services should then be presented to DAU for consideration.

The next step would be to work to address issues discussed in previous studies of DAU course participants and course administrators. Addressing participant concerns would hopefully lessen any negative perceptions experienced by DAU course participants while ensuring DAU course administrators are delivering beneficial content in a more meaningful yet sustainable way.

The last step would be to conduct this study again once changes in online DAU courses are made. Conducting this study again with the same or similar populations would assist in determining if any Acquisition personnel perceptions have changed. Conducting a cyclical review of DAU courses could also determine if DAU courses were seen as being more applicable to participants' jobs. Changes in participant perceptions and/or job applicability could then lead to further changes in online DAU courses or DAU maintaining any changes made.

## IX. Conclusion

This study examined the research question "How do students' perceptions toward the current format (i.e., teacher-centered) of online DAU courses affect AFA personnel (i.e., student) participation?" The theoretical framework was comprised of eight different learning theories, motivation, instructional design, behaviorism, cognitive learning theory, constructivism, situated learning theory, connectivism, and adult learning theory. Data were divided into similar categories then grouped into themes. Each of the eight learning theories was used to create themes stemming from data collected from the participants.

The findings of this study were reported according to the themes constructed. Participants reported an overuse of teacher-centered practices such as reading copious amounts of text and learning rote knowledge. Participants believed they would learn more from student-centered educational practices such as group

work, applying learned knowledge to scenarios, and learning from instructors in a mentorship relationship. The findings were then used to make recommendations such as incorporating more group work, reinstating DAU course road shows, and including targeted training for various DAU personnel groups. Other recommendations include conducting the same study at different AFAs bases, within other Armed Services, and working with DAU to examine their internal practices and constraints. Ideally, DAU will use the information presented in this study to better train current and future Acquisition personnel as not changing the current DAU course and certification construct will result in a continued lack of benefit for the Acquisitions community.

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