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Personnel



INTERACTIVE COURSEWARE (ICW) DEVELOPMENT AND MAINTENANCE

----- Compliance with this publication is mandatory -----

This instruction implements Air Force Policy Directive 36-22, *Military Training*. It outlines responsibilities of technical training ICW elements and provides guidance on developing and maintaining ICW products for technical training. It also outlines responsibilities and procedures, quality indicators, and analysis standards affecting the production of ICW and video teletraining (VTT) for resident and nonresident technical training courses, to include interactive career development courses (CDC). This instruction applies to all personnel in Air Education and Training Command (AETC) who plan, develop, evaluate, approve, and maintain ICW for technical training. Suggested improvements are welcome and should be directed to the office of primary responsibility (OPR).

1. Primary Responsibility for ICW Training. Training groups' centralized ICW elements have primary responsibility for developing and maintaining all resident and nonresident ICW training, to include ICW for CDCs. The ICW elements provide the expertise required for the entire life cycle of various forms of interactive instructional media, to include ICW and VTT.

2. Terms:

2.1. ICW. ICW is a type of computer-controlled training where the learning experience is based on the interaction between the learner and the computer system. The student's decisions and inputs to the computer determine the level, order, and pace of instructional delivery and forms of visual and aural feedback. More detailed information on ICW is in Air Force Handbook (AFH) 36-2235, volume 5, *Information For Designers of Instructional Systems: Interactive Courseware (ICW) Design, Development, and Management Guide*.

2.2. VTT. For AETC purposes, VTT is live video teletraining where the students and the instructor are geographically separated. VTT will primarily take the form of one-way video, two-way audio.

3. ICW Elements. Each training group will establish a centralized ICW element and place it within the training support function where it best supports the group's mission requirements. Establishing an ICW element within each training group represents the first step in standardizing and centralizing each training group's ICW development procedures and responsibilities, while including ICW as an integral part of the technical training process. The primary purpose of these elements is designing, developing, and maintaining ICW materials for use in training programs administered by their training groups. The ICW elements are also responsible for guiding and directing personnel tasked with developing VTT or with converting course materials to VTT products. These ICW elements enable the command to effectively use the strengths of ICW and VTT to provide mission-ready graduates through cost-effective training.

3.1. ICW Teams. ICW development is accomplished by using a team approach to courseware development as explained in AFH 36-2235, volume 5. Teams are composed of instructional designers, courseware developers, computer programmers and subject matter experts (SME) from the ICW elements, and audiovisual personnel from base support units. Instructional designers are normally team leaders because they design the instructional strategy and are responsible for the overall product design. Teams are formed to accomplish specific ICW projects, and team members may perform more than one function on a team. For example, a courseware developer may support some of the team's graphic requirements by producing routine, computer-generated visual information products. Instructional designers, computer programmers, SMEs, and audiovisual personnel may be members of more than one team.

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3.2. ICW Priorities. The training support squadron (TRSS) commander normally establishes ICW priorities. When the TRSS commander and training squadron (TRS) commanders cannot agree on ICW priorities, the training group commander makes final decisions on ICW priorities.

3.3. ICW Funding. If the training group's ICW element has the resources to support new ICW training requirements, the ICW may be developed in-house. If the ICW element cannot support new ICW requirements, the training group should attempt to locate funding for contractor development of ICW. If funding is not available from the training group or training wing, ICW funding requests should be forwarded through 2d Air Force, Operations Division (2 AF/DO) to Headquarters, Air Education and Training Command, Technical Training Resource Division (HQ AETC/TTR).

4. ICW Element Responsibilities. The responsibilities listed below are described in further detail in AFH 36-2235, *Information For Designers of Instructional Systems: Application to Acquisition* (volume 3), *Manager's Guide to New Education and Training Technologies* (volume 4), *Interactive Courseware (ICW) Design, Development, and Management Guide* (volume 5), and *Guide to Needs Assessment* (volume 6).

4.1. Media Selection Analysis. After receiving preliminary media selection analysis and a request for ICW development from the training squadrons, ICW elements conduct/validate detailed ICW media selection analysis in accordance with Department of Defense Instruction (DoDI) 1322.20, *Development and Management of Interactive Courseware (ICW) for Military Training*. They document results per Department of Defense Directive 1322.18, *Military Training*, and Military Standard (Mil-Std) 1379D, *Military Training Programs*. ICW elements may also be called upon to assist the training development elements (TDE) in conducting media selection analysis for VTT.

4.1.1. Guidance at Utilization and Training Workshop (U&TW). When staffing is available and complex media selection decisions are anticipated, ICW elements should support the training squadrons by providing media selection guidance at U&TWs.

4.1.2. CDC ICW. The ICW elements should establish procedures to ensure that plans to incorporate ICW into a CDC were coordinated with Extension Course Institute (ECI) prior to starting work on an interactive CDC. In addition, they should advise customers to identify the specific hardware platforms for which ICW is to be developed in their initial requests for CDC ICW. When surveys are required to determine the prevalent hardware

platforms used in a functional community, the ICW element should, if staffing is available, assist the training and career field managers in developing the surveys. Normally, an ICW element will not start developing courseware until delivery of hardware is ensured. Refer to Air Force Instruction (AFI) 36-2201, *Developing, Managing, and Conducting Training*, and AETC Instruction (AETCI) 36-2203, *Technical Training Development*, for additional information on CDCs.

4.2. Meet Training Requirements. ICW elements research, plan, develop, and maintain ICW to meet training requirements.

4.2.1. Defense Instructional Technology Information System (DITIS). Perform searches of the DITIS courseware inventory as required by DoDI 1322.20 and AFI 36-2201. Searches will be performed after ICW requirements are defined and prior to ICW program development or acquisition to determine what existing products meet or can be cost effectively modified to meet new training needs. Provide inputs to the DITIS courseware inventory on the group's ICW projects as required by DoDI 1322.20.

4.2.2. Commercial Off-The-Shelf (COTS) Courseware. Assist customers in identifying and evaluating COTS courseware that might meet their training needs. Recommend use of COTS courseware when appropriate. **NOTE:** Due to intellectual media copyright laws, COTS courseware will not be modified or incorporated into Air Force-developed ICW without first obtaining written permission from the copyright holder/owner of the courseware.

4.2.3. Quality Control. Develop and apply quality control measures for all ICW materials developed for the group. Ensure all ICW programs comply with the standard DoD programming protocols and other technical requirements in Mil-Std 1379D and DoDI 1322.20.

4.2.4. Support Learning Requirements. Identify the level of ICW that best supports learning requirements, from baseline presentations to high-level simulations, as defined in AFH 36-2235, volume 5.

4.2.5. Feasibility and Cost Benefit Analysis. Support training squadrons by performing ICW and VTT feasibility and cost benefit studies, using development time guidelines in AFH 36-2235, volume 5, contractor development costs associated with current ICW contracts, and VTT transmission costs in paragraph 7.2 of this instruction. Identify required resources for in-house and contractor-developed ICW projects.

4.2.6. Courseware Development. Develop ICW in

accordance with DoDI 1322.20, Mil-Std 1379D, and Department of Defense Standard (DoD-Std) 2167A, *Military Standard Defense System Software Development* for use in the training group's resident and nonresident instructional programs.

4.2.6.1. **CDC ICW Testing.** The ICW elements will forward copies of completed storyboards to ECI for inclusion in their course files. ECI will ensure all learning objectives of both print-based and computer-based media are tested in the course examinations. ECI will continue to develop course examinations in paper-based mode until computer-based testing is proven feasible based on field conditions and course development student accounting registrar (CDSAR) compatibility.

4.2.6.2. **CDC ICW Distribution.** ECI is responsible for duplicating and distributing CDC ICW. ICW elements will furnish master-quality copies of CDC ICW to ECI.

4.2.7. **Contractor-Developed ICW.** In collaboration with the training squadrons, prepare statements of work (SOW) and perform quality assurance reviews of contractor-developed ICW materials according to Mil-Std 1379D, DoD-Std 2167A, AFI 36-2201, and AFH 36-2235, volume 3.

4.2.8. **Life-Cycle Management.** Provide life-cycle management and serve as the life-cycle management activity for both local and contractor-developed courseware as explained in DoDI 1322.20. Ensure life-cycle availability of the version of the authoring system, assembly language, or higher order language compiler used to develop the courseware; source code for the courseware; accompanying documentation; all associated software libraries; and all other materials necessary and sufficient to modify the courseware as outlined in DoDI 1322.20. Maintain storyboards (electronic or paper-based) to aid training managers (TM) in reviewing ICW as part of their annual review of course materials and SMEs in documenting required changes.

4.2.9. **Revise Courseware.** When staffing is available, revise courseware as required. SMEs should assist the revision effort by providing technical assistance, but they should not be tasked to actually revise the courseware. When staffing is not available or contractor maintenance is more efficient, contractors may be used to maintain ICW when funding is available. When contractors revise courseware, the ICW elements will provide necessary materials and documentation to facilitate revisions.

4.2.10. **Maintain Records.** ICW elements are responsible for maintaining records of the labor hours and costs associated with the individual training group's ICW development and maintenance projects.

4.3. **Support VTT.** Provide guidance and direction to instructors and SMEs in new development or the conversion of existing course materials to a format suitable for use in VTT. Since VTT is not addressed in DoDI 1322.20, Mil-Std 1379D, or DoD-Std 2167A, use the following guidance:

4.3.1. **VTT Uses.** Use VTT when real time instructor/student interaction is required, but "hands-on" training and special equipment requirements are low. VTT also lends itself to situations requiring extensive use of graphics because technical training will operate under a broadcast studio concept. However, situations requiring practice on equipment will not usually lend themselves to VTT.

4.3.2. **VTT Training.** As stated in AETCI 36-2208, *Job Site Training*, anyone analyzing, developing, or converting a course to VTT should attend the Video Teletraining Techniques Course at either Sheppard AFB TX or Ft Lee VA.

4.3.3. **VTT Responsibilities.** In general, training specialists in the TDEs, instructors, and (or) SMEs will convert or develop courses for VTT. Coordination between the ICW elements and the TDEs is essential because the ICW elements are responsible for the instructional design of VTT products, and the TDE personnel are responsible for converting or developing VTT products.

4.4. **New Technologies.** Training technology planning is the responsibility of HQ AETC.

4.4.1. **HQ AETC's Role.** In coordination with 2 AF, HQ AETC will explore new technologies by actively searching and experimenting with technology products. This includes evaluating specific authoring systems, software products, and hardware for their potential application in technical training to meet the evolving needs of the training groups. Suggestions for command use of new technologies should be addressed to Headquarters, Air Education and Training Command, Technical Training Policy and Technology Division (HQ AETC/TTP).

4.4.2. **ICW Elements' Role.** Personnel assigned to ICW elements should keep abreast of new training technologies by attending conferences, reading literature, and receiving training. They should know the advantages and disadvantages of each technology, how these technologies apply in their training arena, and when these technologies will be fielded. They must also keep abreast of changes in instructional design applications to ensure development of effective ICW. The ICW element staff is not responsible for exploring or testing new training technologies or software for application within technical training, except

when tasked by Headquarters Air Education and Training Command, Technical Training Directorate (HQ AETC/TT) through 2 AF to test specific equipment or software.

5. Personnel. The ICW elements are staffed with civilian and military personnel and augmented by base support units and training squadrons. GS-1750 Instructional Systems Specialist positions at GS-11 and above are managed by the Training and Instructional Systems Career Program (TISCP). Deviations from the following organization and staffing require written approval from HQ AETC/TTP.

5.1. Element Chief. Supervisory instructional systems specialist with experience in ICW design and development. The element chief develops standards and instructional strategies for ICW lessons, oversees the ICW element staff to ensure continuity across course design and delivery, and manages the ICW element.

5.2. Instructional Designer. Instructional systems specialists with experience in ICW design and development. Instructional designers develop instructional strategies for ICW lessons, review products for instructional integrity and conformance with ICW quality standards and strategies, and assist with other courseware development requirements.

5.3. Courseware Developer. Military or civilian personnel with experience in ICW development and the use of ICW authoring tools. Courseware developers develop courseware following predetermined instructional design, standards, and strategies.

5.4. SME. Military personnel with expertise in the subject matter and experience working with the target student population. SMEs provide information on course subject matter to other members of their team and review ICW products for technical accuracy. SMEs are assigned to the ICW elements for specific projects. When assigned SMEs are no longer required on a full-time basis, new ICW projects require SMEs with different Air Force specialty codes (AFSC), or other factors require changes to SME assignments, the TRSS submits authorization change requests to the manpower office. After the manpower office makes the authorization changes, new SMEs are assigned from the TRS to the ICW element. Because SMEs must have experience with the target student population, SMEs must have a minimum of 1 year of experience in the course training element, TDE, or a combination of both, prior to assignment to the ICW element.

5.5. Computer Programmer. Military or civilian personnel supporting the courseware development effort by writing computer code.

5.6. Graphic and Audiovisual Personnel. Contract civilian personnel from base support units who support the courseware visual information (VI) production requirements, and inservice personnel (military and civil service) who, as part of their day-to-day job, use computers to produce routine VI products. Inservice personnel may not be solely dedicated to VI production when VI is contracted for the base. Applicable statements of work (SOW) may require amendments to perform VI work load to support ICW.

6. Quality Indicators. Key performance quality indicators are based upon whether training needs were met in the quality, effectiveness, and relevancy of the ICW products. This includes the ICW element's efficiency, including cost and time, in producing the products.

7. Standards. Use the following information as standards to develop cost estimates. Revise as additional data are collected.

7.1. ICW. Calculate in-house ICW development estimates as explained in AFH 36-2235, volume 5. Base contractor cost estimates on contractor development costs associated with current contracts.

7.2. VTT. For estimating costs, determine the number of development/conversion hours required for one delivered hour of instruction. Initially, development/conversion hours may be as high as 50 development hours for one delivered hour of instruction (50:1). As experience is gained, the ratio should decrease and fall within the range of current industry standards (40:1 - 20:1). Standardize VTT transmission costs at \$280 per hour. Although transmission costs will vary for each broadcast, use this figure for initial standardization. If the student training requirements (STR) are known by location, use the STR to determine class size. If STR by location are not known, assume a minimum class size of 50. Until experience is gained with VTT, limit class sizes to 100 people.

8. Manpower. HQ AETC/TT and Headquarters, Air Education and Training Command, Plans and Operations Directorate, Manpower and Organization Division (HQ AETC/XOM) will develop manpower standards to validate AETC/TT ICW requirements.

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Glossary of References and Supporting Information

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

DoD Directive 1322.18, *Military Training*

DoD Instruction 1322.20, *Development and Management of Interactive Courseware (ICW) for Military Training*

DoD-Std 2167A, *Military Standard Defense System Software Development*

Mil-Std 1379D, *Military Training Programs*

AFPD 36-22, *Military Training*

AFI 36-2201, *Developing, Managing, and Conducting Training*

AFH 36-2235, Volume 3, *Information For Designers of Instructional Systems: Application to Acquisition*

AFH 36-2235, Volume 4, *Information For Designers of Instructional Systems: Manager's Guide to New Education and Training Technologies*

AFH 36-2235, Volume 5, *Information For Designers of Instructional Systems: Interactive Courseware (ICW) Design, Development and Management Guide*

AFH 36-2235, Volume 6, *Information For Designers of Instructional Systems: Guide to Needs Assessment*

AETCI 36-2203, *Technical Training Development*

AETCI 36-2208, *Job Site Training*

Abbreviations and Acronyms

AETC	Air Education and Training Command
AFSC	Air Force specialty code
CDC	career development course
CDSAR	course development student accounting registrar
COTS	commercial off-the-shelf
DITIS	Defense Instructional Technology Information System
ECI	Extension Course Institute
ICW	interactive courseware (can include combination of CBT with IVD or CD-ROM)
OPR	office of primary responsibility
SME	subject matter expert
SOW	statement of work
STR	student training requirement
TDE	training development element
TISCP	Training and Instructional Systems Career Program
TM	training manager
TRS	training squadron
TRSS	training support squadron
U&TW	utilization and training workshop
VI	visual information
VTT	video teletraining