ELIMINATING THE SQUARE ONE SYNDROME: NICNAK: A ONE YEAR STUDY

Mary F. Bratton-Jeffery, Kirk L. Schultz
and Glenn R. Griffin
Naval Education & Training
Program Management Support Activity,
Pensacola, Florida

ABSTRACT

Military downsizing and budget reductions are reducing Navy training resources, including instructor personnel. Without effective interventions Navy training may be adversely affected. A technology solution that has widespread appeal in the training arena is the development and use of interactive courseware to reduce the time to train and to diminish overall training costs.

An emerging technology at the Naval Education and Training Program Management Support Activity (NETPMSA) in Pensacola, Florida, is a unique design and development process which helps classroom instructors or subject matter experts create interactive courseware for computer-based training. The courseware may be used to facilitate, remediate, or replace classroom instruction. NETPMSA's Interactive Courseware Novice Authoring Kit (NICNAK) helps individuals and military commands create interactive courseware which will meet their specific needs. Service personnel receive a one-week intensive training session in the NICNAK process. Once the NICNAK graduates leave NETPMSA, they receive on-going assistance from the various resident experts at NETPMSA. Whether the request is an instructional design question, a programming problem, or a need for state-of-the-art visual technology, NETPMSA stands ready to assist the novice team.

Importantly, NICNAK is a synergistic effect of team interaction and people dynamics. The underlying tenet of the NICNAK process is the elimination of the "Square One Syndrome." Individuals that participate in the training receive more than just a manual, software and stand-up lectures. They become vital members in an interactive, interservice network which shares ideas, projects, templates and lessons learned. NICNAK facilitates collaboration and innovation while reducing competition and repetition.

This paper will take a brief look at NICNAK's inception one year ago and describe how it has evolved in just a short time from an in-house survival model to one that is being adopted by development teams throughout the NAVEDTRACOM and beyond. Additionally, a description of the actual NICNAK Training Week 1 class is presented including the course's scope and methodology. Student participants are identified by command and a short discussion of a Trainee Selection Instrument which, currently in development, is presented. Since NICNAK is a service-oriented process, the NETPMSA staff must be readily available to field novice questions and solve problems. Electronic access allows NETPMSA's staff to meet with development team members individually; users' group teleconferencing will allow NICNAK graduates to share the projects' library, new templates, and lessons learned. The paper concludes with trainee critiques of the NICNAK process, resulting course changes and plans for the future.

THE AUTHORS

Ms. Mary F. Bratton-Jeffery is a doctoral candidate in Instructional Design and Development from the University of South Alabama in Mobile. As an intern in the cooperative education program, she blends the classic academic approach of Instructional Systems Design and Development with the practical issues of the military training environment. She has also worked with the US Army in the Basic Skills Education Program-Europe.

Mr. Kirk Schultz is the Projects Coordinator for the Instructional Technology Department. As an engineer and programmer, Mr. Schultz' creates templates and ICW flowcharts and programs which can be used by novice developers who lack programming experience. His skill in simplifying a complicated process is a major factor in NICNAK's success.

Dr. (Ray) Griffin is the NICNAK Coordinator in the Instructional Technology Department. A trained psychologist, Dr. Griffin is exploring how to identify individuals more suited for ICW development by evaluating a trainee selection instrument.

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TODAY'S SITUATION

In this period of military downsizing and budget reductions, Navy training resources, including instructor personnel, are being reduced. Without an effective intervention, Navy training may be adversely affected. A technology solution that has widespread appeal is the application of interactive courseware (ICW) to reduce the time to train and diminish overall training costs. However, creating instructionally sound ICW is labor-intensive, time-consuming, and if not done with quality control methods in place, can lead to costly mistakes.

NICNAK'S INCEPTION

Just over a year ago, two instructional systems specialists were assigned to design, write, and develop a Navy Bureau of Medicine course. *Basic and Refresher Food Services Sanitation* is a nine hour classroom course for anyone who deals in food service. While the two developers, Jerry Burns and Frankie Jeffery, had instructional design expertise, they had no experience with the Quest authoring system or the in-house ICW development process as they were relatively new NETPMSA employees. Fortunately for this novice duo, the Projects Coordinator, Kirk Schultz, was experienced in flowcharting and programming. He requested to join the team. About this same time, LT Chris Smith, a helicopter trainee, with a lot of enthusiasm and no background in instructional software was assigned to the team as well.

What began as a means of survival for the novice developers, i.e., defining the project for the team, tracking the files, managing the paperwork has evolved into a dynamic process which is simple to understand and use. Development teams who have been trained in the process have included experienced as well as novice developers. Almost all have expressed that the process is sound, that it meets their needs, and it answers the questions: " How do I get started?" and "What should I do next?" From NETPMSA's perspective, as an agency which develops and distributes ICW, it is a means of standardizing the development process as well as providing an effective means for life-cycle management.

TRAINING WEEK 1

After the NICNAK concept was demonstrated at the '96 Interservice Correspondence Exchange (ICE) Conference in Pensacola, Florida, commands began to request formal training in the NICNAK process. The first class was held the week following ICE. Six trainees attended that first class and provided invaluable formative evaluation comments which have been used to improve future classes. Students in that first class experienced "Everything you could want to know about Instructional Systems Design (ISD) and ICW in 40 hours or less." Bombarded with presentations, class exercises, and evaluation forms, the students identified what they believed to be the critical elements. Additionally, they provided useful classroom management comments from "Provide coffee at breaks" to "Don't punch holes in papers that don't go in the training notebooks." It has been through their insight and evaluations as well as those of the classes who have followed them that the NICNAK training program has now emerged into a tightly-structured course.

The Week Begins

The first step in the NICNAK model is one which acquaints the students with the need and purpose for a sound Instructional Systems Design model. *ISD the Navy Way* is a short refresher in the standard Plan, Analyze, Design, Develop, Implement, and Evaluate model (PADDIE) advocated in MIL-STD1379D but tailored specifically to ICW development. One of the failings characterized by novice developers is the lack of attention given to the tried and true ISD model. While many of the students thus far have been subject matter experts, a review of the military standard helps the class to begin thinking and planning their ICW project, systematically.

Dialing into the Defense Instructional Technology Information System (DITIS)

Following the PADDIE model, students learn how to dial into DITIS, an electronic database catalogue of ICW projects funded by the DoD. They learn how to search the system as well as the procedures for registering their own projects. Again, the idea is to eliminate starting from square one. The NETPMSA team of instructors recognize that many of the students may already be familiar with the DITIS database. However, the NICNAK philosophy is that the students will receive quality encapsulated information regarding every recommended standard, document, or process and it will be up to the individual to absorb or ignore the information as they see fit. Students who come to the NICNAK course with a specific project in mind are encouraged to write the DITIS summary during the week.

The Instructional Media Design Report (IMDR) Template

Documentation is a major stumbling block for many "first" projects. One of the most critical documents in a quality ICW project is the Instructional Media Design Report (IMDR) which details to the customer/supervisor the scope of the project and specific design and development concerns. However, the carefully written IMDR is a working document for the team as well. Each student receives a templated IMDR in the word-processing program he or she designates. Within the template is a short description of the required information in each of the major blocks as well as an example. The students are encouraged to either tailor the IMDR to their project or adopt the example. Just as the lesson guide prevents hip-pocket stand-up instruction, the IMDR is the quality control document for the ICW design and development process.

Media Selection--Is Your Project a Likely Candidate?

A major concern for subject matter experts as they begin to transfer classroom courses to computer-based presentations is whether or not the course is indeed suitable for ICW. A short scenario-based exercise steps team members through the decision-making process. The Force-field Analysis exercise is the technique used to quantify the feasibility and the scope of the project. Each class member receives a checklist and training in its use. The technique can be used at the command level or with individual teams to make decisions about project suitability for ICW development.

Objectives & Question Writing for ICW

One of the most difficult tasks in ICW development is the writing and testing of objectives. A common mistake in novice development is simply taking the classroom-intended objective and pouring it over onto the computer screen. While many objectives may be the same, the medium must be addressed. Objectives which require the student to discuss or explain, while not impossible in ICW, certainly present a challenge for the development team. Performance-based scenarios and alternate forms of testing are discussed with novice teams. Examples of various testing templates are demonstrated and students are encouraged, early on, to think about how to test knowledge acquisition in the computer medium.

The Class Project

Based on comments made by the first two classes, a class project was developed as a basis for the demonstration and application of the NICNAK process. Students stated that they wanted to be able to look at their neighbor's computer and see if they were coming up with the same flowchart patterns or developing similar screens. The Command Indoctrination Project is one with which all of the students can identify. Each step of the design and development process is explained through lecture and exercises. Then students are tasked to demonstrate the process by actually designing and developing the Command Indoctrination Project themselves.

The Course Map & Supplemental Information (CMSI)

NICNAK has been described as a process which bridges the gap between the instructional design process and the authoring system. ICW developers need a course curriculum map to define the project. The programmers and developers also need information that is not traditionally found on a course map such as the procedure for initialization of variables, log-on requirements and help features. The CMSI contains these requirements in a one page diagram. Groups of students brainstorm the CMSI and make recommendations to the class. Once a final decision is reached, the students learn to document the CMSI by using a flowcharting package.

The Flowcharting Process

Flowcharting is one of the most difficult tasks in the entire process. An accurate flowchart provides the development team with a procedure and documentation process similar to that of storyboards. After the course has been implemented it provides the life-cycle manager with information for troubleshooting and updating. Unfortunately, the flowchart is another one of those critical documents that is often ignored by the novice team. The NICNAK team has designed a series of flowcharting templates that are keyed to responses in a questioning session. Questions range from "Do you want a pretest?" to "What types of remediation loops would you want in the final exam?" Each response pulls a flowchart template that represents the answer. By the end of the consultation session, the novice team has a workable flowchart to begin its development process. As the team becomes more experienced, it is capable of modifying or correcting the flowchart to reflect the project.

Script Writing from Flowcharts

An examination of a number of ICW projects has lead these authors to conclude that writing teams should use the flowchart as a method to ensure that each writer is using the same structural format as his or her teammates. Many ICW projects have lessons that are wonderful and creative unto themselves, but when

placed within a much larger course project, they no longer look like the other lessons. While writing teams may think they are using the same format, it is only after many hours of drafting that a comparison can be made. All too often with novice teams, the comparison does not take place until the screens have actually been authored. Then it is too late to try and retrofit the writing. Novice teams are taught how to design instructional and informational flowcharts. Practical writing exercises which use the flowchart as a model ensure similarity in introductions, content, transition, and question frames throughout the course modules.

The Visual Arts

Interactive courseware is an instructional medium that relies heavily on the visual presentation of material. While at NETPMSA, students learn how ICW development projects can be supported by the NETPMSA Visual Information (VI) Department. With locations at San Diego and Norfolk, as well as Pensacola, developers can request visual digitized photography support throughout the US Navy by contacting the Saufley Field, VI office. The VI graphic artists and broadcast quality announcers can provide novice authoring teams with the professional look to their project. Rather than having a "clipart" or "home movie" look, the novice team has access to NETPMSA on-call team members in this very specialized field. For those commands who need specialized line drawings or graphics related to military equipment, NETPMSA maintains the CD Graphics Library which is an interservice repository of available clip art on CD-ROM and accessed through Boolean word searches.

BUILDING A COMMON LANGUAGE

Multimedia technology has advanced to the point that nonprogrammers can work within the medium. ICW designers and developers are at home in an object oriented environment. However, the age old problem of documenting files, naming graphics, etc., still exists. While technology has advanced, our means of controlling the minutiae has not. Invaluable time is lost while team members try to find files or objects named by other team members. Scrolling and searching through files becomes a way of life. As projects grow, the problem of documentation grows exponentially. NICNAK teaches a file documentation structure and a list of protocols that can be learned in just a matter of minutes. Every team member learns to speak the same language. This allows team members from one project to understand the structure and share files of other projects. This means that if a Navy design team has created a lesson in Navy Rights and Responsibilities in San Diego, a design team in Norfolk could incorporate that same module into their project without starting over. Wide applicability becomes a way of life rather than the exception. Templates built in one authoring system, can be adapted to another authoring system. Learning time is minimized, and (again) novices do not have to start from square one.

As the Navy and other military services consider how courses are designed and developed they must address the issues of reduced resources and loss of contract dollars. Rather than taking the traditional approach of courses designed by instructional systems specialists or contractors who must first spend time learning the course content from subject matter experts, the subject matter experts are given the tools to write their own content. ISD personnel are more judiciously used as subject matter experts in instructional design, learning theory, or development within the specialized medium. In essence ISD personnel force-multiply their expertise rather than be single project focused.

STUDENT PARTICIPANTS

Thus far, courses have been scheduled on a monthly basis at NETPMSA. An open enrollment policy has allowed individuals from commands across the

the services to attend and participate in the development of the prototype course. Table 1 below, identifies Navy commands, number of participants and years of ICW development experience for NICNAK trainees.

Table 1. Command Participation in NICNAK Training

Command	No.Part.	Yrs.Ex.
Consolidated Training, Norfolk Naval Shipyards	3	5
Expeditionary Warfare Training Group, Pacific	2	0
Fleet Intelligence Training Center, Pacific	10	0
Naval Aerospace Medical Institute	2	0
Naval Air Maintenance Training Group	3	0
Naval Aviation Training Center, Millington	8	0
Naval Education & Training Security Assistance	2	0
Naval Hospital, Pensacola	2	0
Naval Recruiting Orientation Office	10	0

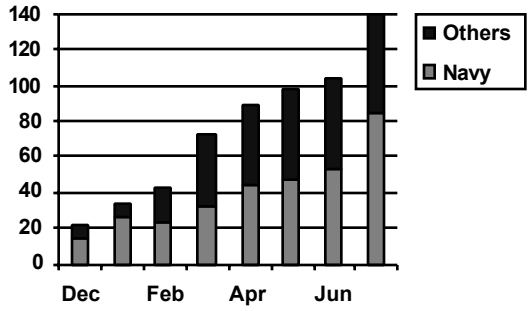
Naval Ship Systems Engineering Station	1	0
Naval Surface Warfare	5	0
Naval Technical Training Center, Corry Station	2	0
Naval Technical Training Center, Meridian	4	0
Trident Training Facility	2	0

The NICNAK class has been developed for the novice designer and developer. However, course attendees, thus far, have had a range of skills from subject matter expert with no multimedia skills to instructional systems specialists with years of experience in the medium.

Additional training requests and participants have come from all of the US Armed Forces and Reserves. In addition, Foreign Service Officers visiting NETPMSA or attending conferences at which the process has been presented have expressed a marked interest as well. To date, there appears to be no other command who is offering the same type of training in a compressed timeframe. Frequently, interservice representatives comment that the Navy ICW training course should be shared across services rather than each investing the substantial time and money to create their own. A benefit would be that all services could share projects, templates, and lessons learned.

There is a great deal of interest in the course and the small NICNAK staff at NETPMSA cannot meet the present demand. Figure 1 represents the number of accumulating training requests (beyond those being trained).

Figure 1: Accumulating Training Requests



To meet this training shortfall, the Chief of Naval Education and Training (CNET) has directed that NETPMSA explore additional NICNAK training alternatives including the establishment of multimedia Centers of Excellence at major Navy shore facilities, the use of distance learning technology to support user/graduate groups and increasing classes and class size at NETPMSA.

TRAINEE SELECTION CRITERIA

Multimedia development is an exciting and sometimes frustrating profession. People who are drawn to multimedia production come from many walks of life, including writers, programmers, designers, classroom instructors and artists. Each individual team member brings to the project a unique combination of knowledge, skill and creativity. The question that commands must address is the identification of team members for multimedia production. Training is too expensive in money and man-hours to send someone who is not interested or who is not suited to the training. As a result we are investigating various psychological instruments to create a test composite which may be beneficial to commands as they address this issue. The NICNAK Trainee Selection Instrument should be available within the next year.

ON-GOING SUPPORT

NETPMSA's intent in the multimedia training environment is twofold. First, we want to provide quality multimedia training to subject matter experts, education technologists, or instructional systems specialists who are faced with creating alternative instruction to meet their individual command training needs. Second, we must provide on-going and easily accessible support to NICNAK graduates involved in the development process.

ICW development can be a very lonely avocation. All too often when the team concept for ICW development is discussed in the training class, one or more of the participants will point out that they are a team of "one." To meet this challenge, NETPMSA provides a help-line to novice developers. Readily accessed via the telephone or the electronic mail system, questions are fielded on a daily basis. Assistance can be provided from which authoring system or equipment to purchase to reprogramming a current template. NETPMSA staff can also help with concept development or design considerations.

NICNAK information currently resides on the Internet under NETPMSA's home page: http://www.cnet.navy.mil/netpmsa/nicnak/nicnak.htm. Immediate plans for the future include providing the names and contact numbers for all those trained in the NICNAK process. A template bulletin board is also in the very immediate future. Finally, the Interservice Interactive Courseware Consortium (I^2C^2) will be unveiled at the ICE Conference in Montgomery. It is envisioned that commands who

are presently developing ICW will demonstrate projects and share templates and "best practice" ideas through the consortium.

PROGRAM EVALUATION

Each NICNAK class provides a critique of the various instructional sessions. Also, verbal as well as written evaluations are solicited throughout the week. The following presents class evaluation results.

- Course facilitators were well prepared and organized. 83% strongly agree; 17% agree.
- Course facilitators are knowledgeable in subjects presented. 81% strongly agree; 19% agree.
- Course content and materials were: 7% too much; 19% moderate; 74% just right.
- Order of presentation was logical and easy to follow. 63% strongly agree; 33% agree; 4% moderately disagree
- The number of software programs introduced and training was adequate. 7% strongly agree; 88% agree; 5% slightly disagree
- Assignments and practice exercises were helpful and enough time was allotted. 59% strongly agree; 41% agree
- More computer expertise on my part would have been helpful. 3% strongly agree; 41% agree; 3% moderately disagree; 53% no comment
- Time spent in training was productive. 81% strongly agree; 19% agree
- Environmental factors were adequate. 25% strongly agree; 45% agree; 30% disagree
- Workspace was adequate: 19% strongly agree; 81% agree
- Overall satisfaction with the course. 74% highly satisfied; 26% average
- Would recommend this course to others at my command. 83% strongly agree; 17% agree

Course Changes Resulting from Student Evaluations

Based on the evaluations, course materials have been revised from the initial training class. Participants receive two notebooks: the Training Notebook contains course materials written in a narrative format; the References Notebook is a collection of articles, resource numbers, and support personnel.

The class agenda has been designed to follow the sequenced steps in project development from brainstorming to final production.

Environmental factors are an issue in any training situation. NETPMSA has recently opened its own Learning Resource Center which is a computer based training classroom.

Practice exercises and class assignments have been revised to reflect the unique military environment. Non-service specific scenarios enhance joint service participation.

Additional training time is given to commands who come to the NICNAK course with specific projects in mind. Participants are stepped through the process, given a common project to complete and then meeting with NETPMSA staff the exercises are restructured to meet the actual command's project.

THE FUTURE

In one year's time NETPMSA's Interactive Courseware Novice Authoring Kit has gone from an idea, through a rigorous prototype, and is now a successful training course. However, that does not mean that it is static in nature. In fact, the NICNAK process changes constantly to adapt to technology and changing student demands.

Future directions for the NICNAK team include:

- Providing common language configuration across authoring systems
- Assisting commands with selecting authoring systems to fit the training requirement rather than the budget line item
- Creating a template database for each of the major authoring systems
- Creating a database of completed projects
- Building a network of distance learning users groups
- Exploring interactive courseware development on the Internet
- Continuing template development in the three critical processes: flowcharts, scripts, and screen designs
- Developing a trainee selection instrument
- Building collaboration and eliminating needless competition

COMMENTS

Comments related to this paper may be directed to either of the following e-mail addresses of the authors:

frankie.jeffery@netpmsa.cnet.navy.mil
kirk.schultz@netpmsa.cnet.navy.mil
ray.griffin@netpmsa.cnet.navy.mil

RECENT DEVELOPMENT

As of 1 October the prototype became an official Navy Course, CIN: A012-0053, *the Navy Interactive Courseware Novice Authoring Course*. Classes will be offered at NETPMSA, twice monthly. Class size is limited to 12. Commands are encouraged to send a minimum of two team members. Commands may also book the entire class for their team. More information about the Navy course is available through the CANTRAC system.