

**The Daily Knowledge “Vitamin”:
A Development Guide**

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ABSTRACT

In October 2000, a two-week pilot study was conducted to test an innovative methodology to keep Department of Defense linguists' language skills current. The program provided brief, email-delivered, daily language lessons, or "vitamins," while also encouraging linguists to build an interactive, supportive professional community. The study demonstrated the feasibility of the lesson delivery system and the potential of networking linguists into an online community through a listserv. The successful effort, in terms of motivation and self reported language improvement, resulted in IITA Research Publication No. 5, Language Maintenance At a Distance: The Daily Russian "Vitamin," published in April 2001. This report is a follow-on intended to support development of a similar program. It provides a theoretical foundation for "Daily Knowledge Vitamins," which can be developed for any discipline where knowledge maintenance is crucial. The report utilizes a basic but customized instructional systems design, or ISD, approach and includes a series of considerations that will aid in building a similar program and learning community.

The Daily Knowledge “Vitamin”: A Development Guide

Introduction

The rate of change and progress in using the world-wide-web and computer based communications technology for educational purposes has progressed from evolutionary to revolutionary. Vastly increased computer capability and availability, coupled with the growth of pipelines to deliver enormous amounts of information tailored to individual users, have served to not only deliver multimedia information but also to facilitate authentic communication among learners. As Mason (1995) points out, “Place based education and distance education have been on converging paths for some time. Telecommunications has brought about their collision!”

The ability to communicate has enabled the formation of on-line learning communities. Such communities offer powerful support to distance learning by helping to eliminate feelings of isolation that contribute to high attrition rates, providing feedback, fostering effective cooperative learning, and incorporating levels of interactivity previously only attained in the classroom. While the goals of early web-based distance learning programs were often just to replicate what was being done in the classroom, they are now viewed as integrated learning environments that can combine interactivity, communication, and the vast resources of the internet.

The impetus behind this development guide is a successful test of learning community formation conducted at the US Air Force Academy in October 2000 that combined these elements. The primary feature of this learning community was daily lessons, or “daily language vitamins,” designed specifically to maintain previously learned knowledge or incrementally increase knowledge. The 15-minute daily lessons or “vitamins” were emailed to participants each day in order to help maintain and further develop their foreign language skills. Having a complete lesson and self-test package delivered to participants’ email each morning significantly reduced the effort required to maintain language skills. A secondary component of the study was linking the participants together into a true learning community. Study participants could instantly contact all the other members of the group via email distribution software in order to

further elaborate on the lessons, share ideas, and become part of a professional community. (For a complete report on this study, see Valentine, Supinski, and Sutherland, IITA Educational Series Paper No. 5).

The study showed this methodology to be enormously successful. Subjects indicated that the brief lessons strongly encouraged development of a daily language study habit; motivated learners to elaborate on the content, thereby providing interactivity and feedback; and fostered the development of a social and professional community. The learning environment had minimal attrition of less than 2%, but participation actually grew larger during the study as news of its effectiveness spread. Participants unanimously agreed that this was the best method for knowledge maintenance they had experienced to date. A similar program by Golden, at the University of Nebraska, also used for language maintenance, achieved analogous results (site located at <http://golden.unl.edu>).

The primary objective of this paper is twofold. First, it presents underlying theory that supports development of Daily Knowledge Vitamins (knowledge versus language as they pertain to any content area), or DKV, and a learning community of this type. A review of the theoretical underpinnings will contribute to selecting pedagogical strategies and developing methodologies that will support performance and motivation, and improve the chances of developing a similar, successful program. Analysis of distance learning programs has shown that instructional materials often lack explicit instructional approaches but rather entail a conversion of classroom based instruction to an electronic form. (Lin, 1996) Knowledge of theory will assist in the selection of developing and/or choosing specific approaches.

The second objective is to outline a basic instructional systems design (ISD) approach for developing this type of program and provide a series of “considerations” to support development. The guide is somewhat general in nature, as are most instructional design models. Any learning enterprise developed will be unique, and basic rather than rigid guidance enables both customization and creativity. However, by following a systematic development process, more attention is devoted to selecting specific instructional strategies and methods, making it more probable the instruction will address the actual needs of your learners, and more likely end in success.

Finally, a note on the “daily knowledge vitamin” analogy¹. The analogy of a vitamin is appropriate for this program. Vitamins are taken each day to maintain certain levels of nutrients in the human body. For example, according to the U.S. Food and Drug Administration, the body needs 60 milligrams of vitamin C each day. If we do not consume sufficient amounts of foods or fluids that provide us with this minimum daily requirement, then we can take supplements to meet this need. The same holds true for knowledge. If we do not use a certain type of knowledge each day or regularly, the lack of use will eventually result in deterioration. When the knowledge is needed, it may not be readily available! Furthermore, as we mature our physical/nutritional requirements change. We may need more or less vitamin C as our metabolism slows down. Also true with knowledge: as we develop in our jobs or educational endeavors, and as the world we live and work in changes, so do our knowledge requirements. A flexible, responsive DKV program can supplement our knowledge needs and ensure our knowledge levels are maintained at required levels.

Theoretical Considerations

The study by Valentine, et. al., clearly showed that providing daily doses of knowledge and the means to use that knowledge as content for learning community discussion resulted in an effective and motivating learning environment. The DKV program utilized established methodologies and was supported by accepted theories of educational pedagogy.

Constructivism

Bruner (1966) posited that learning is an active process in which learners construct new ideas or concepts based upon their current and/or past knowledge. In addition to prior knowledge, a second variable that influences learning is organization of the knowledge, which is in turn guided by 2 principles: creating interrelations and making associations. The DKV either supplied new knowledge or helped the learner recall prior knowledge. The telecommunications-based learning community then mediated the joint construction of information. Critical analysis and active use of the information, as well as scaffolding provided by community participants and the moderator, combined to facilitate learning. Providing schema to build upon and

associate new information improves retention and fosters “going beyond the information given”. (Brown, Collins & Duguid, 1989).

Cooperative Learning

Research has shown cooperative learning to be one of the most effective methods to increase learner performance (Johnson & Johnson, 1990). In a meta-analysis, Johnson and Johnson found that achievement gains, averaging .6 standard deviations on achievement measures, most likely occurred when cooperative practice included holding participants individually accountable for their own learning, making group members positively interdependent on each other, and providing promotive or on-task time to discuss specific content. The brevity of DKV lessons and directed discussion in the learning community ensured each of these rules is addressed.

Tailored Feedback

The daily knowledge lessons offered in this type of program provide knowledge of correct response (KCR) feedback and remediation. Research has indicated that KCR, when provided immediately, is the most effective form of feedback (Driscoll, 1993). However, research has also indicated that elaborated response feedback can be more effective when the learner is motivated and ready to receive elaborated information. Learning communities typically avail flexible elaborated response feedback for any participant that desires it at any time (Gilbert & Moore, 1998).

Interactivity

Interactivity can be defined as transactions in learning, which involve “real-time, dynamic and mutual give and take between the instructional system and the learner, including exchanges of relevant information (Merrill, Li & Jones, 1990). Gilbert and Moore (1998) further elaborate that the interactivity should be both instructional and social. Computer-based, media-rich DKV lessons should be developed with instructional interactivity (between the learner and the lesson) in mind. This interactivity can be further complemented by social and instructional interaction with the learning community. The Valentine, et. al., study showed interactivity was present at varying levels, depending on the level of interest toward the specific subjects of the lessons.

Interactivity promotes higher levels of achievement and clearly reduces levels of attrition (Moller, 1998).

The Instructional Systems Design Process and Distance Learning

ISD is a process for producing effective learning by: applying principles of learning and instruction; using a systematic approach; applying the process to every aspect of a course or pedagogical effort; using it for any delivery medium; and ending it with a “blueprint for instruction.” This paper is not meant to serve as a detailed guide of the instructional design process. It is, however, meant to refresh the knowledge of the DKV course designer with an instructional design background of the basic steps of the process. It will also serve as a very basic description for developers that have no formal instructional design experience. For further, in-depth information on the ISD process, the following publications, which served as the basis for what is found here, offer proven, broadly used ISD models:

The Systematic Design of Instruction, Dick & Carry (1990)

Instructional Design, Smith & Ragan (1993)

Principles of Instructional Design, Gagne, Briggs, & Wager (1992)

The basics of designing instruction specifically for distance applications are essentially the same as those for any other type of instruction. However, there are a few new concerns not required in the traditional classroom. Good distance teaching practices are fundamentally identical to good traditional teaching practices and “those factors which influence good instruction may be generally universal across different environments and populations.” (Wilkes & Burnham, 1991). However, a mistake educators often make is simply taking what’s done in the classroom and “putting it on the web.” Bell (1999) notes that the real challenge is in “preserving the original value of the instructional design and adapting the pedagogical nuances to best leverage the modalities of on-line instruction” (p. 43). In other words, ISD can be used to provide a methodology to take what is known about how to structure learning and use it to effectively design media-based instruction, a distance learning program or a DKV and/or learning community effort.

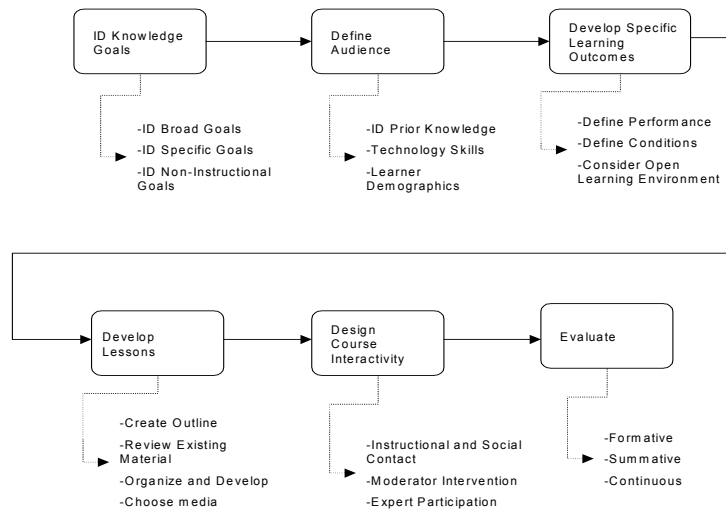
Bell also indicated that a specific instructional approach was a key to his success. In his study, he adopted a DL courseware design that emphasized peer

interaction and group collaboration. His effort drew from the best elements of instructional design developed from the traditional classroom, but took advantage of the communications and web-based interchange available in a DL program. He attributed his success to good design and the degree that the features of DL aided in creating a community that supported knowledge construction.

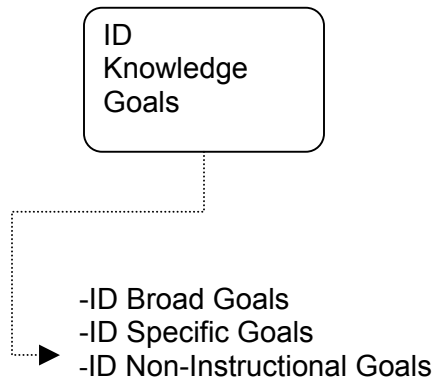
Development Model

The model below summarizes the major steps involved in developing a DKV program. It combines key tenets of ISD, but has been modified specifically for DKV and learning community development. As previously discussed, the model, while providing a series of signposts to follow, remains general in nature to allow flexibility.

Figure 1 Daily Knowledge Vitamin Developmental Model



Step 1 Identify your Knowledge Maintenance or Development Goals



Prior to developing or undertaking any instructional program, a goal or set of goals must be formulated. This first step is of paramount importance as your goals provide a continuing focus and reference point for every step of program development and conduct. The goals are also used during and after program implementation, as they are the basis upon which success is measured.

Instructional Design Considerations

Defining goals is the first step in most systematic instructional design models. Goals declare a desired end state or “what ought to be” (Smith and Ragan, p. 28). The end state or what ought to be should be lacking at the present, and it must also be determined that achieving this end state can best be accomplished through instruction. Dick and Carrey (1993) suggest a few basic guidelines when determining goals: they must be acceptable to those higher authorities that will authorize the effort, to the instructors that will develop and carry out the instruction, and to the learners or the target audience; and that good goals must include the outcome desired.

Determining broader, more generic goals first can help shape more specific goals. What do you wish your target audience to do?

- Maintain knowledge or skills
- Learn new knowledge or skills
- Stay abreast of field-specific developments

- Stay in contact with other professionals within their fields
- Meet statutory requirements or certifications

Broad goals may also address specific issues other than the instructional outcomes, but certainly relate to the desired end state. Such goals may be to save time, save money, avoid removing personnel from their jobs to attend training courses, or motivate learners to commit to something they would otherwise not be willing to undertake.

The broad goal identified in the example used here began simply as “maintain foreign language skills.” When considering the goal writing guidelines discussed above, and the non-instructional issues, the fidelity of the goal is increased:

“Maintain linguist foreign language skills with a low cost, non-intrusive, easily accessible maintenance program that promotes continued use.”

Once the goal or goals have been clearly identified, a needs analysis must be conducted. A needs analysis results in specific statements that identify the gap between the goal and present conditions. With the goal in mind, and a firm notion of how to achieve it, following are the needs of our foreign language maintenance effort:

- “Reduce or eliminate the atrophy of acquired foreign language reading and listening skills”
- “Provide materials that will enable linguists to develop and sustain a language maintenance program”
- “Motivate linguists to develop and sustain a language maintenance program that’s simple to use and requires minimal time”
- “Offer a program that linguists can participate in daily, from any duty or office location”

The sum of these needs will now serve as a guide to program development, providing more manageable and concrete direction.

Distance Learning Considerations

Instructional goals for an effort involving DL should clearly be no different than those not involving DL, and the needs that must be addressed to fulfill those goals should also be identical. The primary consideration, therefore, is whether DL can contribute to achieving the goals. This is a key concern as we wish to avoid to simply

jumping on the technology bandwagon because it is the current trend; the goal should not be to use technology for the sake of using technology. The goals should also not be to simply replicate something done in a traditional classroom; the advantages and disadvantages of DL must be taken into account.

Determining whether DL will support pursuit of our goals requires a look at what DL offers and why it is used. DL links learners and instruction across time and space; providing access is the primary reason for creating an online course. DL also:

- Incorporates a broader range of information, integrating course content with the informational resources of the worldwide web.
- Offers alternative course or learning choices when work schedules or other commitments preclude in-residence attendance.
- Offers alternative course or learning choices to those living in remote regions or those with unique learning requirements.
- Facilitates a more learner-centered approach than offered with traditional instruction (Fleischman, 1996)
- Promotes establishing community through interactivity, collaboration, and development of professional and social relationships.

For the goals listed in the foreign language maintenance program, clearly offering a program participants can access from any location is best achieved with a distance learning application. Here again, it must be emphasized that the goal drives the selection of this delivery platform. Avoid technical solutions in search of instructional problems.

Daily Knowledge Vitamin and Learning Community Considerations

When deciding to utilize DL as a means for achieving one's instructional goals, so it is the case with the DKV and learning community: goals should not be influenced by the means to achieve them. However, a DKV effort will certainly promote achieving certain types of goals.

The DKV program has shown to be successful in foreign language maintenance applications (Valentine, et. al., 2001). Research in this area indicates that distributed practice, and organization (or chunking) are conducive to language maintenance and

development (Tuckman, 1992), which DKVs clearly provide. Furthermore, numerous studies have shown that using the target language for authentic communication, as was done in the learning community, also facilitates language maintenance (Long, 1985). While there is a dearth of research specifically on methodologies which utilize brief, daily lessons, the underlying principles discussed above suggest DKV and learning communities would be most appropriate for:

- Maintaining knowledge that is needed or used infrequently. Military personnel often have requirements that are used infrequently. For example, Coast Guard personnel occasionally board ships or boats, and they must ensure that procedures and international laws are strictly followed. However, it could be days, weeks or months between boardings. Another example is having sufficient numbers of qualified linguists ready for an unexpected contingency.

- Learning new knowledge or skills that can readily be segmented into short, self contained components. Certainly one would not set out to learn automobile mechanics with 15-minute daily lessons. However, extending knowledge of new components or procedures required for different vehicle makes could be done with short lessons as well as on-line discussion with other mechanics.

- Sharing local expertise with a broader community. Again using the example of automobile mechanics, techniques that one particular repair shop uses may be quicker or more efficient than the “shop manual” solution. Sharing knowledge with a community of practice can result in making valuable knowledge explicit for the overall good of the community (Wenger, 1998).

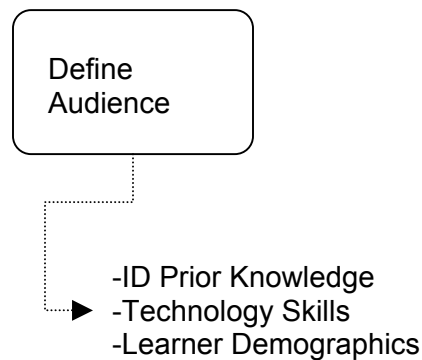
- The DKV has promising potential for just-in-time learning. Related job tasks which are undertaken for the first time and that can be learned in a brief period can be called up from a stored database of DKV lessons. For example, an automobile rental agent may call up a previous lesson on renting to drivers without credit cards at the time such a contract needs to be prepared.

- Finally, a DKV/learning community approach potentially fosters increased motivation to learn, in several ways. Providing a daily lesson facilitates and eases the effort required to learn, which serves to motivate the learner. Daily and short segments are palatable to learners that do not have the time to attend in-residence courses or

those requiring greater time commitments. Furthermore, motivation increases when learners are part of a community. Research has shown that on-line communities that attend to socialization reduce attrition and motivate students to actively participate. (Moller, 1998) Lastly, motivation increases when a community serves to develop or deepen networks of interpersonal relationships.

In summary, a firm understanding of what will result from an instructional program is the first step in designing a DKV program. In order to determine whether DL and DKV are the most appropriate to achieving those goals, it is necessary to understand what such programs are capable of achieving.

Step 2 – Define Your Audience



Distance learning efforts undertaken in recent years, to include those that have benefited from advances in web-based technology, are reputed to have high attrition rates. Certainly one reason for dropping out of a course is that the content offered is not what the target audience needs. Learners quickly become frustrated when the course is either way over their heads, they find that they already know almost everything the course purports to teach, or the course does not address their specific learning needs. When designing any type of instructional program, and most certainly with a DKV effort, determining what the learners already know and what their learning characteristics are, is a critical step in the process.

Instructional Design Considerations

What the target audience already knows relating to the subject of the instruction is the most important factor to consider prior to developing content and program methodology. (Smith & Ragan, 1993) Determining their prior knowledge can be done several ways:

- Testing, or obtaining scores from standardized tests
- Interviewing the target audience or the instructors that helped them learn their specific prior knowledge
- Using assessment surveys
- Observing their performance on the job
- Reviewing descriptions of knowledge and performance required for the positions they hold and the job functions they perform
- Using focus groups to describe knowledge needed (minimums) for a particular job or function

Any of the methods above will most certainly reveal that the levels of knowledge and/or skills members of the target audience possess will vary. As the instruction we create is for a group, not individual learners, this can be problematic. However, finding a target center upon which to aim instruction increases the range of learners that will both benefit from the instruction and remain in the program due to sufficient challenge and lack of frustration.

Another key element in defining your audience is analyzing learner characteristics. The list of characteristics that impact how instruction is developed is lengthy, but not all factors will be weighed every time. The primary factors to consider are shown in table 1 on page 17

Collecting data on learner characteristics can be done in much the same manner as gathering prior knowledge information, as discussed above. A variety of the data collection techniques should be used in order to avoid stereotyping (Smith & Ragan, 1993). Additionally, if learners will be at various locations, data should be collected from as many locations as possible to ensure likely variations will be considered.

The sum of prior knowledge and learner general characteristics form a profile of the typical learner (Dick & Carey, 1990). In addition to better targeting instruction,

understanding the learners will also facilitate developing more effective materials. Motivating learners with context and examples they find interesting and relevant, and providing sufficient structure to guide learners without inhibiting cognitive curiosity, are just two examples of how the profile will directly impact instructional content.

Table 1: Learner Characteristics

Age	Interests	Cultural Background
Past experiences	Motivation to learn	Ethnicity
General world knowledge	Attitude toward subject matter	Socioeconomic background
Job position	Sex	Race
Education level	Time available	Rank
Moral attitudes and values	Future use of knowledge gained	Prior subject knowledge

As mentioned above, failing to understand the audience greatly increases the risk that attrition will be high and that learners will fail to meet intended instructional goals. Another significant danger of not knowing your audience is that instructional programs are designed for conditions similar to those where the program designers are located. This may result in the “headquarters” syndrome, where those in the field feel that their needs or requirements are not being addressed, and that those at the “headquarters” are out of touch. Per Smith & Ragan (1993), “we must constantly examine the diversity and commonalities of the target audience so that we can design appropriate and effective instruction for them” (p. 43). Personalized attention will also show students that the designers are more than an anonymous presence linked only by electronic technology.

Once it has been established what the target audience already knows and a profile developed, the specific objectives of the instruction (the next step in this process) can be determined. This level of prior knowledge coupled with learner characteristics also serve to establish minimums required for entry into the course or program. For the foreign language acquisition example, the minimum was “scored a 1(listening)/1(reading) on the Defense Language Proficiency Test².” Other examples are

“successfully completed the intelligence officer basic course within the past five years” or “holds a valid state teaching certification.”

Distance Learning Considerations

With web-based DL, developing the learner profile must also consider access to and expertise with the technology required to participate. Despite significant recent advances in speed and bandwidth, learners will become frustrated with lengthy download times or the need to download or purchase specific types of browsers, media players, plug-ins, etc. The data collection methods mentioned above can be used to collect hardware profiles, and a “lowest common denominator” should be part of the learner profile (Baron, 1998).

Also requiring consideration is skill and experience levels of learners in remote locations in a variety of environments. If skill levels are too low either in general or for a specific software component of the instructional program, then appropriate adjustments must be made to either the program or to the learners themselves. Research has shown that those that are not competent or comfortable with technology are less likely to participate or continue with technology-based programs (Sioutas, Taknakis, Taknakis, & Vassiliadis, 1998). Once comfort level rises, participation and the likelihood of staying with the program increase proportionately.

Finally, motivation must be considered. As previously mentioned, attrition rates for DL programs have been high (Moore & Kearsley, 1996). Preventing attrition requires examining extrinsic motivators, such as a requirement to maintain a certification or skill, and intrinsic motivators, such as an internal desire to maintain knowledge that required great effort to acquire in the first place. Knowledge of motivational factors will clearly effect course development.

Daily Knowledge Vitamin and Learning Community Considerations

DKV considerations mirror those of any distance learning effort. Learners must have the technical know-how, resources, and motivation to effectively participate and reap the potential benefits. There are two issues, however, unique to the DKV program.

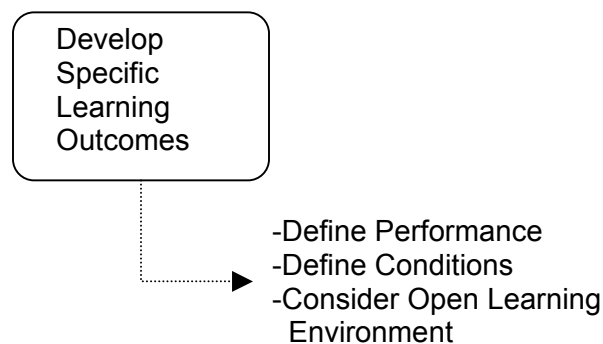
First, as the lessons are very short, they are specifically targeted at a specific knowledge level. It is therefore essential that the learners have the prerequisite knowledge required for the lesson. Lin, Bransford, et. al. (1994), state that in learning

communities not everyone is ready to learn the same thing, at the same time, and at the same rate. The variety found in the students at the beginning of the course will attest to that; different students know different things. While this can be an advantage to the community as the learners capitalize on this diversity of knowledge and skill to help accomplish their goals, it can also be a source of frustration (and hence attrition) as some will feel alienated or overwhelmed. Although the study by Valentine, et. al., revealed that learners were willing to contend with prerequisite knowledge shortfalls because of the short length of lessons, minimums are required or participation will wane.

The second issue is the requirement for daily participation. Learners should have the time and capability of participating on a daily basis. Although DKV lessons can be used independently, the learning community discussion revolves around the daily lesson. Should learners not be able to view a lesson on the day it is distributed, they will lose their opportunity for further discussion with community members and a key component of the DKV program.

Key to the success of any instructional endeavor is a thorough understanding of participating learners. Knowing their capabilities and limitations, social and economic environment, motivations and aptitudes, will help ensure instruction targets explicit educational requirements. Coupled with a firm grasp of what a DKV program is suited for should help the developer realize success.

Step 3 – Develop Specific Learning Objectives



The goals determined in step 1 are general statements that typically are not well enough defined for designing instruction. They must be made more specific by preparing performance objectives, which describe precise learner behaviors. Objectives are expressions of complex and verifiable knowledge and they help organize material, tell us what was learned, and help to evaluate courses.

Instructional Design Considerations

Objectives are used in the ISD process for two primary reasons. First, as mentioned above, the greater detail makes it possible to develop materials. Second, they aid in the in the development or choosing of media and instructional delivery systems. Smith and Regan (1993) identify three components of objectives:

- A description of performance, which specifically states what the learner can do, such as identify, translate, or repair.
- A description of the conditions of performance, which provides background information on the tools or information available. For example, accurately translate a paragraph from Russian to English with the aid of a dictionary.
- A description of the performance standards, such as translate a text from Russian to English with 95 percent accuracy.

Since objectives address very specific outcomes or describe precise behaviors, they are defined for the lesson level, or in this case, for each daily vitamin. Using the components cited above, examples of objectives are:

- Accurately identify the five general personality types, on video segments, that might be encountered during an at sea ship boarding, and state appropriate counter action.
- Identify and provide a written summary of the major components of an aircraft, in Russian, without the aid of a glossary.

In addition to providing the guidelines for lesson development, these objectives also provide the basis for evaluation. The Dick and Carey (1990) model of ISD recommends writing test questions following preparation of performance objectives and prior to developing the instructional units.

Distance Learning Considerations

The process for developing objectives for any type of instruction, to include that done at a distance, varies little. The fact that that a DKV program is always done at a distance, however, adds to the number of objectives required because of the technological component. The chances of all DKV participants beginning a program being fully knowledgeable of all aspects of the associated technology are slim. Therefore, objectives concerning the use of the worldwide web and access to on-line information and communication, email usage, basic software navigation, and electronic communication etiquette should be included as a minimum.

Daily Knowledge Vitamins and Learning Community Considerations

As with the distance learning considerations discussed above, constructing performance objectives for a DKV program is no different, except that the type of learning vitamins that can most benefit and the brevity of lessons must be kept in mind.

One final consideration regarding learning communities. The DKV program as conducted by the Valentine et. al. study was essentially an open learning environment. It had broad goals, and learners could enter or exit the program at any time, use only the lessons that were useful to them and they had time for, and they could expound on lessons or participate in the learning community as they saw fit. Bearing in mind the open learning environment, Hannafin's (1993) view of the ISD process is relevant:

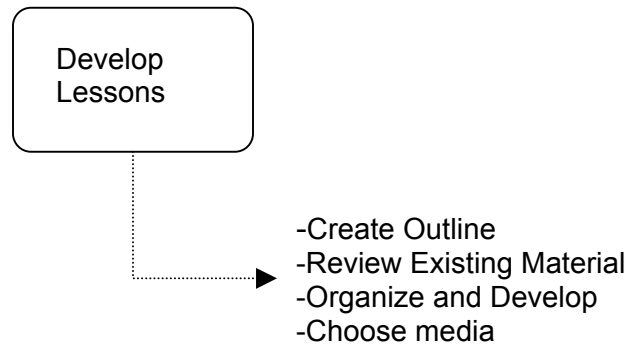
"The ISD process consists of deliberate methods of identifying specific desired outcomes, developing instruction to change learner behavior, and then measuring those behaviors to determine if the outcomes have been achieved. ISD methods, and instructional design products, are largely convergent and reductionistic in nature. They are perceived as focusing on the part rather than on the whole. They emphasize the systematic organization of to-be learned lesson information and the design of activities that support the acquisition of discretely defined knowledge and skills" (p. 53).

Hannafin also notes that while the ISD process has to shown to be effective for defined outcomes, it may not be so for broader learning goals, particularly the type of goals found in open learning environments. The DKV program described in this guide can be classified both as an open learning and a distributed learning environment. Information is made available for those that want it or need it by the course developer, or in the case of a distributed learning environment, by any of the participants in the

learning community. Although the goals of the program have been clearly stated, it is up to the individual learner to determine his or her specific learning needs and desires. These needs and motivation impact how often the learner uses the daily lessons, the frequency of participation in the learning community, frequency of use of other tools made available, and the amount of effort learners devote to building relationships with other members of the community. The overriding goal is to build understanding, not simply provide instruction.

As a result, the step of defining performance objectives, which is found in most ISD models, may be omitted at the macro level. However, when the DKV-type of environment is designed for very specific learning objectives, such as when the goal is incrementally increasing knowledge (see step 1, DKV considerations) then the step of defining objectives should be included.

Step 4 – Develop Lessons



Good instructional content motivates students and helps them learn efficiently; this holds true in the traditional classroom, but even more so when students are at a distance. Discourse on the theory and practice of developing content abounds, and discussion of all relevant factors is well beyond the scope of this paper. However, a few basic guidelines are provided, with particular attention given to issues that are specific to distance learning, DKV, and learning community development.

Instructional Design Considerations

Most ISD models recommend that instructional development include a detailed process for determining the type of learning that is being targeted,³ determining strategies, and then selecting materials. Discussed here is a more basic approach recommended by Willis (1993) that incorporates these processes and simplifies development.

The first step is to create a content outline. Based on the instructional goals, the target audience, performance objectives and an understanding of the desired course content, create an outline of the content to be covered. This step should include the number of lessons (or daily vitamins) that will be developed, the approximate length of the lessons, and the basic format or structure that will serve to organize the content consistently.

Step two is to review existing materials and determine whether you will use those materials, create new content, or use some combination of the two. Do not use materials solely because they are readily available or have been effective in a traditional classroom setting just to simplify the development process (Beare, 1989). Also to be considered when using pre-existing materials is whether they can be effectively used in an electronic format and whether they can be segmented into sections appropriate for the desired length of lesson.

The next step is to organize and develop the content. The development and/or selection of instructional materials, to include the software that will be required by the learners often requires integrating text, audio, video and communication technology. Assembling courseware in the correct sequence is best done in accordance with Gagne's events of instruction (Gagne, Briggs, Wager, 1993), as shown in Table 2. While every lesson will not include every event of instruction, the events provide guidance on how to structure instructional content/lessons.

Also to be considered is the provision of relevant examples. Willis (1993), indicates that examples in any type of instruction are crucial elements as they place the content into a context, thereby providing a framework, or scaffold, upon which learning can occur. Examples should also be relevant as motivation will increase to enhance

retention (as per Gagne's Step 9). See Appendix A for a sample of a DKV lesson used in the Valantine, et. al. (2001) study.

Table 2: Gagne's Events of Instruction

Event	Description
1. Gain attention	Focus the learner by appealing to his or her interests
2. Inform the learner of the objective	Stating the objective aids the learner in concentrating effort
3. Stimulate Recall of existing learning	New knowledge is more easily integrated when related to prior knowledge
4. Present the material	Present content in text, audio, video (or some combination of these)
5. Provide learning guidance	Suggest lines of thought to clarify content and simplify the learning process
6. Elicit performance	Demonstrate or show that the learning has occurred
7. Provide feedback/ correct performance	Make corrections as appropriate
8. Assess performance	Use valid and reliable methods to ensure learning has occurred
9. Enhance retention and transfer	Include meaningful context to support learning

Distance Learning Considerations

Good distance teaching practices are fundamentally identical to good traditional teaching practices and "those factors which influence good instruction may be generally universal across different environments and populations." (Wilkes & Burnham, 1991, p. 43). However, taking classroom instruction and simply transferring to DL is rarely feasible. A support structure must be provided to prevent feelings of isolation and consequent attrition, web specific pedagogy should be used, and care must be taken to ensure that the technology is essentially transparent or at least can be learned quickly and with minimal effort. While developing a distance learning course appears to be a daunting task, the accompanying reflection of teaching philosophy and goals often result in excellent instruction.

The key DL considerations are as follows:

- Make the technology easy to use and visually appealing. Design a user friendly environment with a simple and consistent interface that's easy to

- navigate (Cates, 1992). Use icons that are appealing and not distractive and include useful on-screen instructions.
- Integrate components of instruction that are delivered based on identified learner needs, content requirements, and technical constraints. Remember to ensure that the same delivery systems are available to all participants to avoid the need to create parallel learning experiences; relying on delivery technology that is unavailable to some reduces the opportunities for full participation.
 - Focus on content and learning activities, not technical frills. Highly technical features may be appealing, but are often used more for a novelty effect, and are most likely to experience technical difficulties. Student learning can be improved by increasing contact with content. Although this can be achieved by using additional media, it can also be done by appealing to the learners' motivations.
 - Take advantage of the vast resources of the world wide web. All content does not have to be developed from scratch by the program designer, and many on-line journals, web sites, and other site developers have liberal usage policies when their materials are used for educational purposes.
 - Finally, Ann Baron (1998) suggests some basic technological rules that make your electronic pages more efficient: consider visual guidelines; limit the scope of graphics files; differentiate among the hyperlinks; use descriptive words for links; limit page length; and minimize use of required plug-ins. Additionally, ensure all hardware and software is stable and reliable.

Daily Knowledge Vitamin and Learning Community Considerations

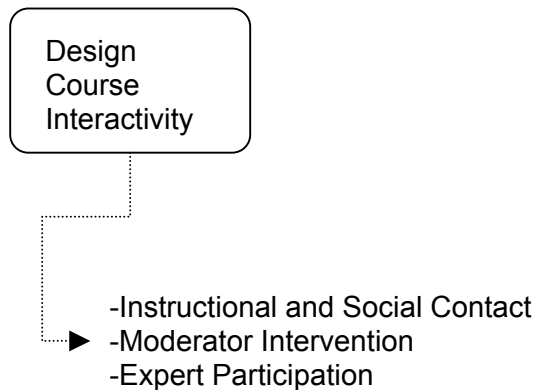
DKV considerations are encompassed in the DL issues discussed above, with a couple of exceptions. While most on-line courses have home pages, since the lessons are delivered to the learner each day, the purpose of a home page for this program is limited to information regarding technical parameters (system and software

requirements), contact data, and information on how to enroll in the DKV program. The home page could also be used to archive past lessons and discussions.

For a learning community, however, a conscious effort must be made to incorporate specific instructional components that encourage discussion. Students can interact and work together in ways that are not possible or practical in face-to-face education (Collison, Elbaum, Haavind, & Tinker, 2000). Details on development of learning community interaction are found in the next step, Designing Course Interactivity.

Cates (1992) summarizes the importance of content development: Content of instruction is the engine of education; concentrate on the content; make it solid; provide powerful tools to teach it well” (p. 10). Using the ISD process will help develop quality learner-specific content and choose appropriate methods of communicating that content; the combination of these forms the foundation of a quality DKV program or any educational endeavor.

Step 5 – Design Course Interactivity



Interactivity and collaboration are a key component of the DKV model, therefore warranting a separate heading and discussion. Weller (1998) defines interactivity in computer mediated instruction as “a learner actively adapting to information presented by technology, which in turn adapts to the learner.” Clearly, interactivity must be designed and planned for and the ISD process can help with taking advantage of the interactive nature of the web and electronic communication (Ryerson, 1999).

Instructional Design Considerations

Designing course interactions is not a specific component of most instructional design models, but is typically taken into account during the courseware development step. The key considerations to interactivity are that it should:

- Provide enough support to learners to keep them engaged in the learning task at hand, but not so much that it inhibits active engagement in the processing of information (Smith & Ragan, in Dempsey & Sales, 1993)
- Interactivity should be both social and instructional. Learners gain knowledge interacting with the instructional material, while social interactions between a course instructor (or in this case moderator) and learners, and between the learners themselves, provide additional points of view and can serve to establish a motivational learning environment. Blanton (1998) suggests considering five bases of interactions: peer support, sharing information, reflecting on a required field experience component; debating controversial issues, and discussing the course.
- Remember that activities are often best when ill-defined and open ended. Such activities make for better collaboration and ultimately foster a constructivist environment.

When undertaking any educational endeavor, interaction between students and instructors, other students, or the material “is the major factor in accounting for the cognitive learning of students, their interest in school subjects and learning, and their confidence in their own learning abilities” (Bloom, 1981, p. vi).

Distance Learning Considerations

Interaction in DL programs clearly leads to higher achievement and greater program retention rates (Lenning & Ebbers, 1999). While the role of interaction is identical to that in the classroom, thereby allowing incorporation of strategies and methods (and the types of interactions) used in the classroom, the nature of the DL environment also requires the interactions be conducted in different ways.

The type of DL used in a DKV program, being primarily email based (versus video based), precludes face to face interaction between participants. A greater effort, therefore, must be undertaken to make the questions posed to stimulate interaction are interesting and relevant. If interest wanes, on-line discussions tend to gravitate to a few dominating participants or to topics not related to the instructional content. Reduced interest may also cause "lurking," where participants read the discussions but never or rarely contribute. One key to increasing interest lies in the variety of topics and types of discussion. In the Valentine et. al., (2001) study, most of the discussion centered around technical aspects of the Russian language. However, the occasional discourse on political and military topics brought in a higher number of discussants. Bell's study(1999) showed that by using a broad variety of both information presentation and communication modes, such as chat, threaded discussions, public readings, and lecture notes, interest and participation was stimulated. Also to be considered is the notion that responses in an asynchronous environment tend to be more thoughtful. With no pressure (or not being put on the spot as can occur in a classroom), learners have the opportunity to ponder and revise responses prior to posting to their learning communities. Research has also shown that a relaxed atmosphere and occasional humor motivates students and encourages more open communication in electronic environments (Comeaux, 1995).

Also critical to comfortable interaction is ensuring technical issues do not interfere with communication. Conducting a test early in the program that requires the use of all necessary software and communication methods to determine if they are functioning properly will help ensure that the instructional aspects are paramount over technicalities. While learners should not feel compelled to use any particular communication tools, encouraging use of all available tools and the full features of those tools, broadens participant technical capabilities and puts them at ease. Finally, also ensure that rules of engagement are made known and agreed to at the outset of the course (Fisher, 2000). These rules should include defining levels of instructor control, learner control, group influence over the interactions, and if appropriate, limits to the intensity of debates should they arise.

Daily Knowledge Vitamin and Learning Community Considerations

Although DKV lessons are designed to be done individually, stimulating interaction and the development of a learning community are keys to a successful program. The primary ingredients to generating these interactions are an effective moderator and technically adequate email distribution software.

The moderator's role is multifaceted, to include:

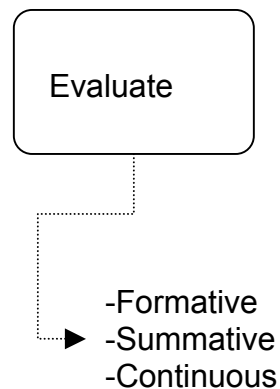
- Interacting enthusiastically in the discussions to keep interest active but also to interject appropriate knowledge and ideas. The Valentine et. al., (2001) study included an additional question with each lesson designed to provoke thought and encourage discussion.
- Bringing in experts or experienced professionals to share their knowledge and further stimulate discussion and increase motivation.
- Monitor learners carefully, and provide regular feedback. Learners should also be periodically queried on progress, successes and failures. This allows the moderator to provide help where needed, to keep the dialog more constructive and to provide adjustments where and when necessary.
- Encourage participants to enrich interpersonal networks and share information that is useful but not necessarily directly related to the instructional content (Cohill, 1997). Participants should be encouraged to communicate on and off the instructional content between each other off line as well.
- Schedule inter-learner debates on controversial, but relevant topics. The burden of communication should be put on students but tempered with moderator intervention
- Provide individual attention to learners; assurance of a single point of contact and a sense that the moderator knows each learner serves to increase motivation (Flottemesch, 2000).

Choosing the best software to meet program needs is also critical to interactivity. Software used should be easy to use for both moderator and program participants, and it must be capable of easily distributing both lessons (as attachments or links) and email

interactions. One feature necessary is the capability for the moderator to screen emails prior to distribution. Typical email discussions can result in too much mail, superficial opinion exchanges, and mail completely unrelated to the subject of instruction (Collison, Elbaum, Haavind, & Tinker, 2000).

A quality DKV program requires interactivity achieved with seamless, easy to use communication technology, and overall control by a moderator skilled in encouraging and aggressively fostering an environment conducive to learning. Sherry (1998) in a meta-analysis of learning communities indicated that rich conversations aid learners in understanding complex issues from a variety of viewpoints. When motivation is high and DKV lessons are interesting and relevant, a DKV program essentially proceeds on its own; however, a skilled moderator can enhance interactivity and substantially increase performance improvements.

Step 6 – Evaluate



Instructional designers and educational programmers need to know whether their programs achieve their objectives and meet their goals. Has learning occurred? Do the learners enjoy using the program you have developed? Have the participants continued their efforts or do the DKV lessons or emails remain unopened in user inboxes? Evaluation is normally the final step in most ISD models, but it is also a continuous process conducted throughout development as well as during and at the conclusion of a DKV program.

Instructional Design Considerations

The primary purpose of the ISD evaluation or assessment phase is to assess the worth of the educational enterprise at every level (Gagne, et. al, 1993). A basic, phased approach entails the following steps:

- **Continuously review goals and objectives** - Determine if the instructional methods and materials are achieving the stated goals and objectives. Implementation of instruction represents the first real test of what has been developed. Try to pre-test instruction on a small scale prior to implementation. If this is not possible, the first actual use will also serve as the "field test" for determining effectiveness.
- **Develop an evaluation strategy** - Plan how and when to evaluate the effectiveness of the instruction. Proactive, predetermined approaches to evaluation help ensure that no surprises occur after extensive development and can preclude wasted effort and resources. A variety of approaches, particularly those developed by Scriven (1974) and Stuffelbeam (1971), can be adapted.
- **Use formative evaluation** - Revise instruction as the course is being developed and implemented. Prior to completing each phase of development, trying out or testing the instruction with a sample or member of the target audience increases the chance that it will serve its intended purpose.
- **Use summative evaluation** – This type of evaluation is conducted after instruction is completed using surveys, interviews, performance examinations and other instruments. Information gleaned from summative evaluation is typically used to determine whether to continue a program and if so, to improve future iterations of the program.

For both types of evaluations, numerous quantitative or qualitative methods may be used. Quantitative methods rely on collecting and analyzing statistically relevant quantities of data, while qualitative methods use more subjective or anecdotal information. The approach most often used by instructional designers combines quantitative measurement of student performance with open-ended qualitative analyses

to measures attitudinal issues. Such an approach is recommended for distance learning and DKV programs. Once evaluation results are known, the information should be used to modify instruction appropriately.

Distance Learning Considerations

The primary distance learning consideration for the evaluative process is rooted in the fact that most, if not all, learners are at a distance. Evaluating whether students have learned material in a classroom is often done by observing body language and other non-verbal communication; an option obviously not available to a moderator or facilitator of a distance learning program. As a result, qualitative approaches may be particularly useful as the diversity and physical location of distant learners may preclude relevant statistical stratification and analysis.

Formative approaches are also particularly useful when in a distance mode. Participants should be encouraged to recommend suggestions at any time. The moderator is responsible for developing an atmosphere in which learners feel comfortable discussing the effectiveness of the course both in terms of the content and the mechanics of running it. Even with the most comfortable atmosphere, however, learners may be reluctant to make their real views known, particularly if those views will be posted or distributed for all to see. Therefore, periodic summative type evaluations that address all program aspects should be conducted with assured anonymity. In the Valentine, et. al., (2001) study, participants were encouraged to make suggestions at any time. A summative, confidential survey was conducted, but learners simultaneously participated in an open forum or brainstorming session on the effectiveness of the DKV program.

Daily Knowledge Vitamin and Learning Community Considerations

Assessment of a DKV program varies from a typical DL effort along with the differences in goals and objectives. When knowledge maintenance and professional community development are primary goals, continued participation and interactivity are key factors that require evaluation. Lin, et. al (1994) recommends that formative evaluation be a daily, continuous process to maintain the effectiveness of learning communities. The moderator should adjust content and discussion as required, and

monitor attrition and the amount and depth of participation should be evaluated. Rath (2001), recommends using frequent questionnaires, or “smile sheets” to measure motivation.

Content is difficult to assess in terms of its effect on achievement. With the brevity of DKV lessons and the use of an open learning environment (as discussed in Step 3), quantitative measures of performance improvement may not be feasible. Consequently, it is key that learners in a DKV program must learn to self assess and self regulate participation. Self regulation clearly increases the chances that participants will ascribe to the notion of lifelong learning.

As with the development processes discussed in step 4, tomes have been written about evaluating instructional programs, and this discussion only covers the basics. However, it must be noted that there is room for improvement in even the most carefully developed distance delivered courseware, and modifications should be made as required. Such modifications will likely improve courseware and methodology, and subsequently improve both learning and satisfaction gained from a DKV program.

Conclusion

Efficiency in the workplace and in education is more important now than ever before. We are expected to not only maintain our current knowledge, but also keep abreast of ever changing developments in virtually every field or occupation in which we are engaged. Providing bits of instruction to refresh and modify knowledge on a daily basis may be the best approach to meet these requirements.

The technology exists to create learning communities among individuals that are widely dispersed. Such learning communities support the sharing of profession specific knowledge and techniques, sharing the wealth of experience of community members, and making our thoughts visible to help dissect problem areas and more easily generate deeper understanding of complex issues.

An easy method of maintaining knowledge and forming learning communities can be particularly useful to the military. Today's environment with fewer personnel and increasing mission requirements demands individuals remain proficient in even the most esoteric aspects of their jobs, but also keep abreast of new developments. Furthermore, with smaller numbers of personnel within each profession, learning communities help in the sharing of local knowledge and more effectively use proven expertise. The concept of lifelong learning, and lifelong teaching, will be integral to effective organizations in the future.

A DKV program can efficiently provide for these needs, be relatively unobtrusive, and require only minutes a day. It can adapt itself to the needs of individual learners who self moderate the depth and length of his or her own participation. It also can adapt itself to the needs of the community by emphasizing topic areas requiring the greatest emphasis and generating the greatest motivational interests.

***Author's note:* This guide was developed based solely on the success of one research study. Although, at the time of this publication, the US Coast Guard is also conducting an effort to use and research an effective DKV program, more needs to be done. Research is needed with various size communities, a broader range of content areas, and with more structured efforts using a variety of technologies. Any future research, however, should benefit from the theory and development basics provided in this guide.**

Notes

1 – The term Daily Language Vitamin was initially coined by Lt Col Richard Sutherland of the United States Air Force Academy.

2 – The Defense Language Proficiency Test is a language reading and listening comprehension examination and rating used by the Department of Defense. The exam is an annual requirement for language qualified personnel who draw language proficiency pay. Scores range from 0 (low) to 3 (high). Further details on the ratings are available in the Valentine, et. al study (2001).

3 – Most ISD models recommend developing objectives and instruction based on the type of learning that is to occur. The basic types of learning are:

- Verbal Information – memorization of knowledge
- Intellectual skills - applying rules to previously unencountered examples. These skills include discrimination, understanding concepts and problem solving.
- Cognitive strategies – managing one’s own learning processes.
- Motor skills – activities which require physical action.
- Attitudes – a mental state that causes learners to make certain choices.

Further details on these types of learning are available in any of the ISD publications discussed in this guide: Dick & Cary (1990), Smith & Ragan (1993), or Gagne, Briggs & Wager (1992).

APPENDIX A

Screen Prints of Russian Daily Language Maintenance Program

Preparation

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Словарь:

предупреждение - warning	отсутствие - absence
РВСН = ракетные войска стратегического назначения - Strategic Rocket Forces	потеря - loss
намерена - is going to, intends	престиж - prestige
сравнять с землей - level to the ground	считать - to consider
сообщение - message	весьма - quite
отправленное - sent	беспокойство - concern
исходить - to come from	разделять - to share
ракетчики - missile troops personnel	сторона - side
недовольный - disgruntled	переподготовки - re-deploying
длительный - lengthy	правительство - government
задержка - delay	исследования - research
зарплата - payment, salary	отслеживать - to monitor
ФБР = федеральное бюро расследований - Federal Bureau of Investigation	появление - appearance
связываться - to contact	ядерный - nuclear
грозить - to threaten, to face	угроза - threat
исправительная колония - penal colony	передислоцировать - to move
ФСБ = федеральная служба безопасности - Federal Security Service	РЛС = радио-локационная станция - radar
шутка - joke, prank	предположительно - allegedly
опасность - threat	следить - to follow, to monitor
осуществление - implementation	пробный - test
	пуск - launch
	корабль - ship

Text

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Это было кошмарное предупреждение: "Козельская дивизия РВСН намерена сравнять с землей несколько европейских городов". Казалось, что сообщение, отправленное по Интернету, исходит от российских ракетчиков, недовольных длительными задержками зарплаты.

ФБР связалось с Кремлем и теперь двум студентам технического колледжа города Калуга, что к югу от Москвы, грозит год исправительной колонии. По словам ФСБ, понятно, что предупреждение было шуткой, однако опасность того, что российские войска могут пойти на осуществление терактов из-за отсутствия зарплаты и потери престижа, на Западе считают весьма реальной; это беспокойство разделяет и российская сторона.

На этой неделе во Владивостоке пройдет конференция, на которой будут обсуждаться вопросы переподготовки российских офицеров. Ее спонсорами являются британское правительство и Международный институт стратегических исследований. ФБР отслеживает появление ядерных угроз в Интернете, а Пентагон передислоцировал гигантскую РЛС из Калифорнии в Норвегию, предположительно, чтобы следить за пробными пусками ракет с российских кораблей.

Quiz

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Answer the following questions based on the text (each question may or may not have more than one answer):

Level 1

1. The gist of the article is:
 - a. disruptive Internet prank messages
 - b. possibility of terrorist attack
 - c. FBI and Pentagon
 - d. Federal Security Service
2. The message was sent by:
 - a. personnel of Kozelsk division
 - b. FBI
 - c. students
 - d. officers
3. Who is sponsoring the upcoming conference?
 - a. the British Government
 - b. the International Institute for Strategic Studies
 - c. the Kremlin
 - d. both a. and b.

Answers

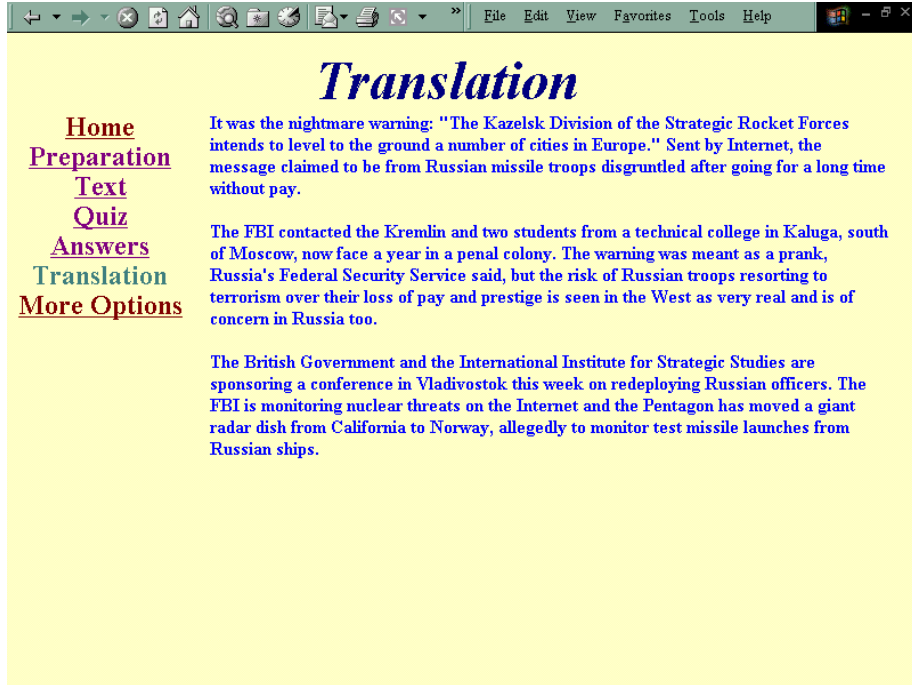
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Level 1

1 - B:
2 - C:
ФБР связалось с Кремлем и теперь двум студентам технического колледжа города Калуга, что к югу от Москвы, грозит год исправительной колонии.
3 - D:
... Ее спонсорами являются британское правительство и Международный институт стратегических исследований.

Level 2

1 - D:
Казалось, что сообщение, отправленное по Интернету, исходит от российских ракетчиков.
2 - B:
На этой неделе во Владивостоке пройдет конференция, на которой будут обсуждаться вопросы переподготовки российских офицеров.
3 - :
... двум студентам технического колледжа города Калуга, что к югу от Москвы, грозит год исправительной колонии.



The screenshot shows a web browser window with a yellow background. The title bar at the top reads "File Edit View Favorites Tools Help". The main heading is "Translation" in a large, bold, blue serif font. On the left side, there is a vertical list of navigation links: "Home", "Preparation", "Text", "Quiz", "Answers", "Translation", and "More Options", each underlined. The main content area contains three paragraphs of text. The first paragraph discusses a "nightmare warning" from the Kazelsk Division of the Strategic Rocket Forces. The second paragraph mentions the FBI contacting the Kremlin and two students from a technical college in Kaluga. The third paragraph talks about a conference in Vladivostok and a giant radar dish moved from California to Norway.

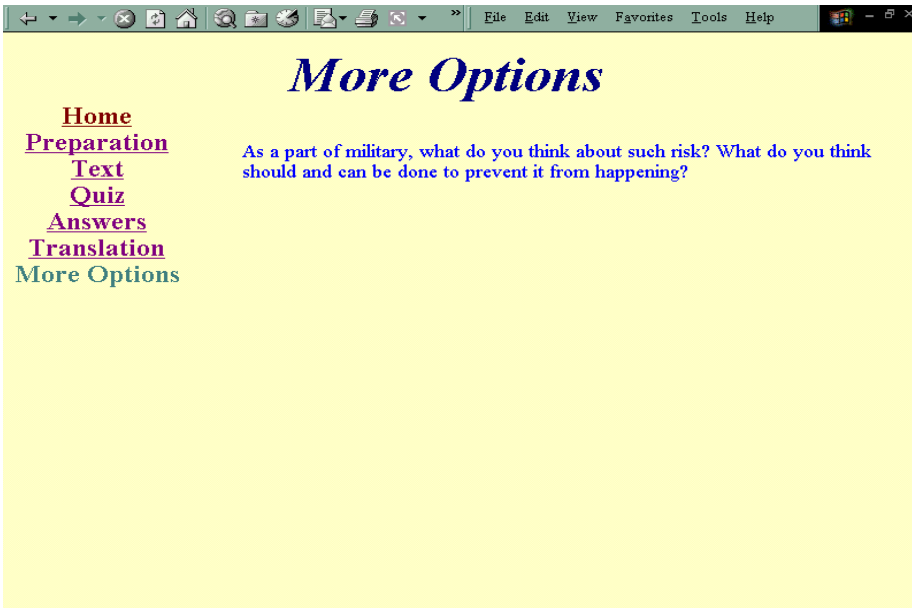
Translation

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It was the nightmare warning: "The Kazelsk Division of the Strategic Rocket Forces intends to level to the ground a number of cities in Europe." Sent by Internet, the message claimed to be from Russian missile troops disgruntled after going for a long time without pay.

The FBI contacted the Kremlin and two students from a technical college in Kaluga, south of Moscow, now face a year in a penal colony. The warning was meant as a prank, Russia's Federal Security Service said, but the risk of Russian troops resorting to terrorism over their loss of pay and prestige is seen in the West as very real and is of concern in Russia too.

The British Government and the International Institute for Strategic Studies are sponsoring a conference in Vladivostok this week on redeploying Russian officers. The FBI is monitoring nuclear threats on the Internet and the Pentagon has moved a giant radar dish from California to Norway, allegedly to monitor test missile launches from Russian ships.



The screenshot shows a web browser window with a yellow background. The title bar at the top reads "File Edit View Favorites Tools Help". The main heading is "More Options" in a large, bold, blue serif font. On the left side, there is a vertical list of navigation links: "Home", "Preparation", "Text", "Quiz", "Answers", "Translation", and "More Options", each underlined. The main content area contains a single paragraph of text asking for military perspectives on the risk and prevention measures.

More Options

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As a part of military, what do you think about such risk? What do you think should and can be done to prevent it from happening?

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