FEET: e-Trainers Guide

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Learning Mobility of Individuals/Adult Education

The purpose of this document is to provide guidelines for designing and developing an e-learning course to training professionals who wish to acquire new knowledge and skills required to become effective online trainers (e-trainers) and transition from the traditional brick-and-mortar-based classroom into digital providers of E-training and blended learning.

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Overview

This guide addresses the design, development and delivery activities which are specific to e-learning.

The information in this document can be applied to e-learning in varied educational situations ranging from secondary school education to training for adult learners. The latter share some characteristics that are different from those of fulltime students, which influence the design of the online courses.

What is important to know when working with adult learners?

- they need to know the purpose of studying the specific topic and what are the benefits of learning it;

- they are more practically oriented – they are more motivated when they see the immediate application of the content;

- they like to learn by experience;

- they prefer to study at a time, place and pace most convenient for them.

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The benefits of e-learning

Despite the fact that developing e-learning courses requires specific skills to be and are more time-consuming to prepare compared to classroom the delivery costs for e-learning (including costs of IT infrastructure) are considerably lower than those for classroom facilities, teacher's time, participants' time spent on travel and time taken from of from work to attend classroom sessions.

Additionally, e-learning and specifically m-learning reaches much bigger number of trainees: learners who can't attend conventional classes because of limited time and/or resources to travel; are busy at the work place; have family commitments; have restricted mobility, etc.

E- and m-learning courses offer additional advantages compared to in-class instructional methods: instant feedback; easy collaboration with peers; self-paced study; personalized learning paths; interactive simulation and games.

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E-learning: self-paced and instructor-led

Choosing an e-learning approach depends on the type of the course and the target audience. Self-paced learners study independently, while instructor-led trainees receive support from tutors, teachers and other learners. It is possible to combine both depending on the training tasks.

Self-paced e-learning

The learners access the content via online learning platforms or on CD/DVD/Memory card. The learning pace and paths a based on the individual user needs and abilities. The e-learning providers generally do not schedule training activities, do not manage or track the learning process.

However when the content is offered through an Internet connection, it is possible to record and store learners' actions. Some support, e.g. via e-mail or online forums can also be offered.

Instructor-led e-learning

In this approach, a linear learning pathways are offered combining different resources and activities. The course elements are chronologically presented and are either instructor led or facilitated via the communication tools of the online learning platform. The learners study individually, attend instructor's lectures, work on individual and on collaborative assignments. The communication tools that can be used among learners, teachers and instructors include live chat, discussion forums, e-mails, audio and video conferencing, etc. In general at the end of a course there is exercise or assessment in order to evaluate learners' progress.

What composes a mobile e-learning course?

An e-learning course combines several main components:

- Learning resources - the content;

- Trainer's involvement - e-tutoring, e-coaching, e-mentoring;

- Peer's involvement - collaborative learning;

- The environment where all is housed – a virtual classroom.

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Trainer's involvement: e-tutoring, e-coaching, e-mentoring

The aim of the trainer's involvement is to provide individual support and feedback to learners through online tools and facilitation techniques during the course duration.

Peer's involvement: collaborative learning

Can be delivered via synchronous and asynchronous discussions aimed at facilitating knowledge-sharing among the users. Collaborative activities also include project work, assignments, role-plays, etc.

Virtual classroom

This is the IT- enabled environment where all training resources are located and where self-directed or instructor-led training takes place. It is accessed online and requires internet connection with sufficient speed.

Other similar terms are Virtual Learning Environment (VLE), Learning Management Systems (LMS), Online Learning Centre (OLC) or Learning Platform.

Types of e-learning depending on time

Synchronous

It unfolds in real time. It requires that all participants are present at a given time. Examples of synchronous activities:

- Chat and Instant Messaging
- Video and audio conference
- Live webcasting
- Application sharing

Asynchronous

Asynchronous events take place at different times. The learners do not have to be present at the same moment. time-independent. Examples of asynchronous activities:

- Discussion forum
- E-mail
- Wiki
- Blog
- Webcasting

What are the specific strengths of e-learning?

Learner-centered/tailored content:

The learning is focused on specific user's academic and professional needs and can be customized. It can be adapted to the learners' pace. The progress and performance are tracked individually.

Knowledge bits:

E-learning content can be divided into small chunks allowing flexible scheduling of time for learning and facilitate assimilation.
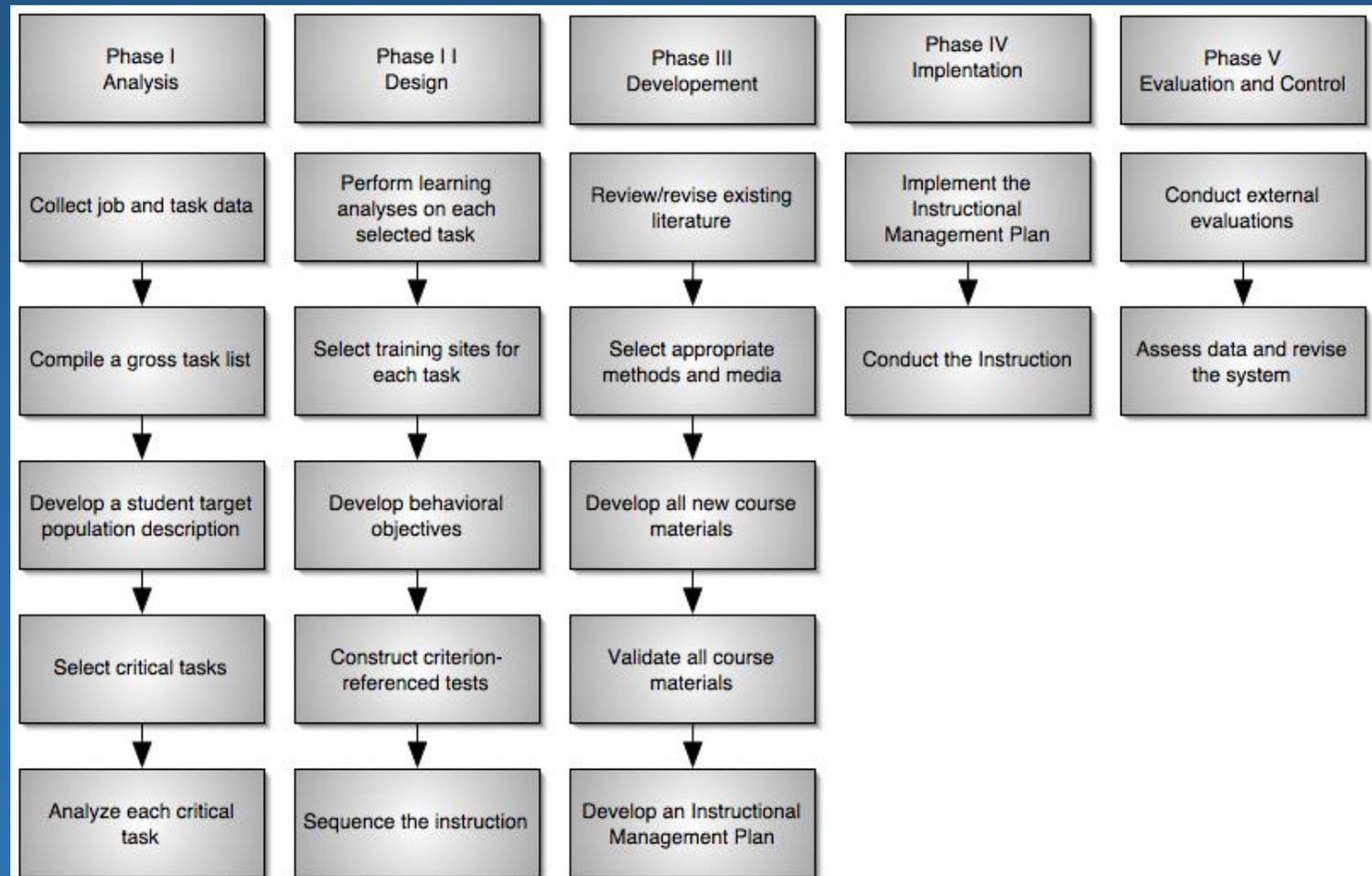
Engaging and interactive content:

The content should be engaging and interactive, keeping learners motivation throughout the process.

What are the prerequisites for a successful e-learning course?

One of the popular instructional design models for e-learning is called ADDIE.

Live training can be adapted on the go. Such adaptation is much more difficult for an e-learning course. That's why good design and planning is extremely important for e-learning projects.

Phase I Analysis	Phase II Design	Phase III Developement	Phase IV Implentation	Phase V Evaluation and Control
Collect job and task data	Perform learning analyses on each selected task	Review/revise existing literature	Implement the Instructional Management Plan	Conduct external evaluations
Compile a gross task list	Select training sites for each task	Select appropriate methods and media	Conduct the Instruction	Assess data and revise the system
Develop a student target population description	Develop behavioral objectives	Develop all new course materials		
Select critical tasks	Construct criterion-referenced tests	Validate all course materials		
Analyze each critical task	Sequence the instruction	Develop an Instructional Management Plan		

The five phases of ISD according to Russell Watson (1981)

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The tools to produce e-learning

Depending on the specific project different **content-generating tools** can be used. For simple, non-interactive content a text-editing and presentation programs may be sufficient. However, audio and video files may require complex editing software. The same applies to interactive and multimedia content.

Learners can access the learning resources via a interactive online services named **learning platforms** also named learning management system (LMS). There are different systems with different levels of complexity, and underlying technologies, however they all share some important features:

content management: creation, storage, access;

curriculum drafting and planning: lesson planning, personalized learning paths, assessment;

learner management: learner information, progress tracking;

tools and services: groups, forums, messaging systems, blogs.

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Producing an e-learning course: first steps

Choosing and organizing the content

Needs analysis

When starting to design an e-learning course, a needs analysis should be conducted to answer the following questions:

- Is the training required to fill a gap in professional knowledge and skills?

- Is the e-learning the best solution to deliver the training?

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Target audience analysis

Next step is to identify a learners-related factors that will influence the course design:

- Type of organization or institution in which learners work or study and their professional role(s).

- Learners' previous knowledge and expertise on the subject.

- Learners' computer skills and previous experience in e-learning.

- The time that can be allocated to e-learning.

- The physical location where e-learning will take place. Will the users will study at home, at work or at in an e-learning centre?

- Connection speed and computer and software capabilities.

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Identifying the content

Content analysis is a critical step in the instructional design process. The course designer should include accurate and relevant content. Without this even the best instructional methods and media will fail to transfer useful information to learners.

Content identification and analysis can use the following methods:

Task analysis:

identifies the job tasks that learners should learn or improve and the knowledge and skills that need to be developed or reinforced. Mainly useful when preparing courses for specific job related or interpersonal skills.

Topic analysis:

identifies and classifies the course content. Mainly suitable for broader educational objectives.

Defining learning objectives

The aim of any learning objective is acquisition of competences or capabilities by the learners. Objectives should be specified for the course as well as for the individual learning resources/activities.

Learning objectives combine two main elements:

- **the expected level of performance**

- **the learning content -** the type of knowledge and/or skills that should be learned).

According to the revised Bloom's taxonomy of the cognitive domain, learning objectives can imply six different types of cognitive performance, ranging from the lowest performance level (remember) to the highest (create).

Performance levels *(Based on Anderson and Krathwohl, 2001)*	
Remember	Learner recognizes and memorizes information
Understand	Learner can reformulate a concept
Apply	Learner can use the information in a new way
Analyze	Learner can decompose and discover relationships among components
Evaluate	Learner can justify a decision based on a criteria
Create	Learner can realize a new product or idea

Defining the course sequence

Prerequisites method

One of the ways to define a course sequence is to look at the prerequisites (the prerequisites method). This method is based on the hierarchy of the learning objectives and presents to the learners first the knowledge/skills that have to be understood/acquired in order to proceed with the next knowledge or skills.

Such hierarchy among the learning objectives is based on the analyses of tasks and topics.

Zoom method

This method suggests starting the course from a general overview of the topic before proceeding into detailed elaboration of specific topics. A conclusive end is often present.

Job-context method

This method is best suited to job-oriented training. The learning elements organization mimics that of the job-tasks and processes at the work place.

Such hierarchy among the learning objectives is based on the analyses of tasks and topics.

Spiral method

The learning process repeatedly visits certain knowledge blocks, constantly upgrading and building upon them.

Other methods:

Firstly presenting examples followed by their definitions. Starting with concrete examples and then proceeding with more general knowledge.

Instructional strategies

Instructional strategies can be based on several approaches:

Exposition approach – presentations, demonstrations, case studies

Application approach – role plays, supervised research, simulations and games

Collaborative approach – online discussions, peer support and tutoring, collaborative work to proceed with the next knowledge or skills.

These approaches can be applied via different communication tools, media and formats.

The exposition approach delivery formats can be:

Non-interactive: text, visual and audio-video content;

Interactive: hypertext, forms, exercises, multimedia

Recorded: lectures in audio or video format – presentations, demonstrations, Live: webinars, live chat, video-conferencing

The application approach can be delivered via:

Learning content: interactive lessons, simulations, games

Learning environment: virtual classrooms, control-sharing tools

The collaborative approach delivery is realised via:

Exchange tools: email, forums, chat, audio and video conferencing,

Collaborative work tools: document repositories, simultaneous editing tools, control-sharing tools

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Delivery strategies

When elaborating the delivery strategies there are several factors to be taken into account:

The learners – level of IT proficiency, time allocated to learning, suitability of delivery channels

The technology – available connections, bandwidth, hardware and software compatibility

Organizational – available support personnel, available time in general and concrete time-windows, allocated budget.

Knowing the number of students/groups is important in order to select optimal delivery strategies.

Evaluation strategies

Evaluation may apply to both learning and learners. A course can be evaluated before it starts to make sure all learning resources comply to certain quality levels; the information contained is relevant; the course is effective.

Learners' progress is another target for evaluation. Learners knowledge/skills can be evaluated before the course take place, at key points during the course and at the end of the course.

Assessment of the results should be synchronized with the learning objectives making sure it measures how the planned targets are achieved. This suggests that the optimal approach is that the assessment tools and the course content are developed simultaneously.

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Producing interactive learning resources

1st step: the content

Usually the course content is provided by experts in the training topic. They can provide already existing materials, adapt materials to a specific course or develop entirely new resources.

However, if the existing materials were designed for face-to-face training or paper they should be transferred and adapted for e-learning. Lessons and presentations designed for face-to-face courses should be re-worked to include all explanations that were delivered verbally.

Longer texts should be cut into separate short "chunks" that will allow them to be easily mixed with visual, audio-video and interactive content. Wherever a longer text is published, make sure it is available in downloadable form – this will allow the students to read it offline at most convenient time.

Planning lessons duration

An optimal lesson length is calculated on the basis of several factors – complexity of the matter, learners' level of knowledge, amount of new knowledge introduced, knowledge to be acquired for certain time period. Unless specific learning scenarios establish certain lengths it is safe to keep lessons duration within 20-40 minutes. It is important to keep in mind that different media require different times to process. A chart or illustration

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may take seconds to process, while a screen of complex text may require a few minutes. Simple radio-button/yes-no questionnaires are significantly quicker to answer compared to open-text questions. Don't forget to take into account the time of any audio or video clip included in the lesson.

Time allocated to activities like games and collaborative work may be very difficult to precisely estimate and better be left with more open time windows.

2nd step: the script

The script serves as a pathway to designing the lessons. It is developed by the instructional designer. During this phase the content is reviewed and optimal instructional approach to presenting it is selected. The sequence of the information "chunks" is made. Elements to be included in the text are selected and distributed across the screens. A typical e-lesson script includes:

Opening part: learning targets to be achieved; introduction

Main part: the content and/or practical activities; exercises

Concluding part: evaluation tests; summary

Content distribution

The next task is to divide the lesson into screens. The bulk of the screens should be reserved for the main part with a few assigned to the opening and closing parts. It is important to keep the screens from "overcrowding" making sure the presented information is easy to read and comprehend. It is also important to preserve a visual "weight" balance avoiding strong contrast between the screens unless such contrast is required by the content.

Content presentation

The way content is presented can vary depending on the topic, content, target group and not last – creativity of the instructional designer. Due to all these variables many different approaches exist. Let's have a look on those that are most popular.

3rd step: the mix

The next step is to integrate all media elements and "cook" all the compounds.

Text

Usually the text is the main carrier of information. All text parts should be easy to read, to achieve optimal readability the fonts and colours to be used should be carefully selected. Do some research on the most readable typefaces and font-background colour combinations. Other properties to check is the font size and the line spacing – too tight and too lose lines would be difficult to read. The length of the text line is also

important for good readability – most studies suggest optimal numbers of characters varying from 36 to 92. If the screen is too wide split the text into columns. Make sure the text is divided into paragraphs – long continuous text is difficult to read. Brake monotonous text with other elements – illustrations, graphs, tables, videos.

Graphics

You know the saying – "A picture is worth a thousand words". Indeed complex ideas requiring lots of text can be easily and conveniently explained when visualised. There are many different graphic elements: graphs, charts, tables, diagrams, pictograms, illustrations, photographs.

The graphic elements can serve different purposes. They can provide retrieve cues; represent the provided information; explain information provided in the text; contribute additional information, not provided in the text; bring in humor; contribute to the graphical layout visually and aesthetically.

Remember that the learning resources you are producing are non-fiction. Avoid adding graphical elements purely on aesthetical grounds. Each element should bear a usable information. Prepare easy to zoom versions of large complex illustrations not fitting in the screen.

Animations

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Use animations when they can save space and time – a simple 2 minutes animation may replace several pages of text and a sequence of illustrations. Make sure to provide user controls so students can stop and replay what they are viewing.

Carefully select the size and resolution of the video window. Too small it will be difficult to see. Too large it may take ages to download and the wait will disrupt the learning process.

Never animate text. Never animate graphical elements just to make them more appealing. Remember – each element has to carry information, if it doesn't – delete it.

Add sound whenever it helps to explain the represented idea(s) better. As with the animations avoid sounds that do not contribute to the learning. They can be distracting, irritating and add up to the download times.

Audio

Audio can decrease the load on the learners visual perception. For example audio can replace text in the text-animations combination. A voice narrative will save the students trouble reading text and watching animation at the same time.

Carefully selected sound(s) and voice(s) can add up to the overall quality of the lesson by bringing more realistic experience. As with the visual elements – avoid any audio which is not carrying information e.g. background sounds and music. Make sure that the quality of the audio allows for easy listening and understanding. Keep

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the quality just enough to be good for the job – multi-channel hi-fi is definitely an overkill.

Remember – keep audio short if its not combined with animations or video.

Video

Video excels when there is a need for realistic rendering of an ongoing process. In some cases a video due to its realism does better job than animation. However, in cases of abstract notions animation may be the better choice.

A recorded introduction or lesson parts may also bring the teacher closer to the students, removing the anonymous abstract lecturer and replacing him with a living and hopefully interesting person.

However, don't be tempted to present long static videos of the teacher speaking behind the desk. Such videos will not be much more interesting than a plain page of text. Check on some interesting documentaries and borrow ideas. Put you subject in an topic-related environment, add movement, edit the videos scenes to avoid boring sequences.

As with the animations, calculate carefully the size and the resolution to avoid long download times and bandwidth restrictions.

Interactive elements

Interactivity is the factor that transforms a linear lesson into interactive one. Instead of pushing the information

to the learner, interactivity provides the situation when he can pull the information he needs. Start by establishing what is really relevant to the learners, and how they will use the information. Design the lesson around the learner, not around the pre-defined content. The information you provide should help learners think and make decisions the same way they'll do in their real environment.

There are several types of physical interactions:

Point/Hover	**Tilt**
Click/Press	**Gestures**
Drag	**Voice**

It is a wise strategy to avoid getting too much into interactive tools that are fashionable at the moment. The resources may look too outdated only after a couple of years, when the fashion changes.

Which elements can be considered interactive from the technical point of view?

Active links in the text or areas in graphics

Buttons – links, user controls, selections

Text input fields

Selectable elements – menu items, drop-down choices, etc.

Non button **hot spots** – visible or hidden graphic elements

Interaction through **spatial movements of the device**

Interaction through **gesture control**

Interaction through **cameras** – such as augmented reality

Voice control

As with all other elements it is important to keep a balance when using interactivity. Cool-looking and up-to-date interactive "tricks" may look dated within a short time, thus undermining the credibility of the whole material.

Good usability principles also dictate that any unnecessary interactive elements should be avoided. For example if a certain task can be achieved with 2 or 3 clicks the simpler option should be selected. Remember that even the funniest and freshly looking interactivity at the start of a course if repeated throughout the whole course may be boring and tiresome at the end.

Less is more – if in doubt between several options – choose the simpler one. The chances are that it will work better. Even if not – it will be easier to fix.

This principle applies to all elements – avoid using more that two typefaces, mixing several illustration styles, keep one style for all tables and charts, avoid multi-colour combinations. Try to get a professional designer's advice – even a short consultation can make a big difference.

Tests

Assessment and practice exercises play an important role in memorizing the learned content. They help students stay involved and keep attention so it may be a good idea to distribute this exercises throughout the course and not position them entirely at the end.

Most often used types of questions are **closed** (predefined):

Multiple choice;

Multiple responses;

Matching;

Ordering;

Fill-in the gaps

and **Open**:

Short answer

Essay

You can select different feedback strategies:

Immediate feedback after each question

Delayed feedback after all questions are answered

No feedback – the answers are sent to the tutor

The text of the questions should be clear and unambiguous. When providing multiple answers to choose from make sure that the incorrect ones sound convincingly plausible. The feedback provided should explain why an answer is wrong and suggest part(s) of the lesson to be consulted.

Keep in mind the type of the delivery devices and avoid questionnaires and quizzes that are requiring long time to complete.

Further reading/additional resources

No course can exhaust a topic and this is not necessary. Make sure that at the end a list of additional information sources is provided. These links can include glossaries, bibliography, online publications, learners' online communities, downloadable toolkits, other available courses you or partner organizations provide.

They can be organized by title, by author, by type, by relevance/importance, complexity level. The safest way is to follow the established approach of the other courses provided by your organization.

Principles of Instructional design: overview

There are several universal instructional design principles which can be applied to any online training.

Immediate feedback

Students who receive immediate feedback during the knowledge acquisition phase are more focused, continue faster to the next step/stage of the learning process and are less likely to get uninterested and distracted. The feedback may be simple "right, wrong" of more detailed – in both situations it has positive impact on the learners.

Learning-by-doing

It is proven experimentally that students who practice immediately or in a short time frame what they have learned perform better than students whose training is only theoretical. The knowledge and skills acquired are understood faster and remembered better when this principle is applied.

Reflection principle

Learners are asked to pause and reflect on what they just learned. Some studies suggest that understanding and retention are higher when this principle is incorporated in the learning process.

Story-based agent principle

Agents are characters presented visually or verbally who "inhabit" the instructional resources. They might be realistic or fictitious or anything in between. Students tend to follow the materials better if such agent guides them through the learning process. Moreover, learning can be put within a story line which can organize the knowledge bits into a logical framework.

Personalization principle

Students make more efforts to understand the materials when they feel they are addressed to in a conversation-style rather than reading/listening to a formal text. This can be achieved by constantly addressing the students using words as "you", "your", "we", "I", "me".

Contiguity principle

The effectiveness of the training is influenced by the contiguous presentation of text and images. It is believed that combination of verbal and visual information lead to better knowledge acquisition compared to a separate presentation.

Conceptual–Procedural principle

According to this principle the conceptual and procedural knowledge influence one another and are mutually supportive. To develop a sound competence students have to understand both conceptual and procedural knowledge. To achieve best results the two types should be presented in alternating fashion.

How to measure learning

The task of any training is to help the learners to acquire new knowledge, retain the knowledge and put it into practice. The knowledge can be measured by evaluating how its acquired (knowledge acquisition), retained (knowledge retention) and applied (knowledge transfer).

Measuring knowledge acquisition

The knowledge acquisition is the process of extracting knowledge from the learning resources. It is measured by testing the acquired knowledge and skills immediately after the learning has taken place. The tests include verbal or written repeating or application of the learned knowledge/skills.

Measuring knowledge retention

The knowledge retention is the ability to reproduce learned knowledge and/or skills after a certain time distance from the training period. In order to test retention different time periods can be selected, the minimum being 24 hours after learning has taken place. Tests run after a shorter than 1 day period are considered testing the acquisition. Repetitive testing of knowledge retention is considered a way to help knowledge be moved to the long-term memory.

Measuring knowledge transfer

The knowledge transfer has taken place if learners can apply the new knowledge/skills into new and outside the

training situations. Research in the field shows that there are two general types of transfer - immediate and delayed. The knowledge transfer is measured by tests that present before the learners new tasks/questions which can be solved by applying already gained knowledge.

Conclusions

Training people is as much science as it is an art. It can be either option depending on the philosophy of education you adhere to - behavioral or humanistic. If behavioral, students can be conditioned to learn and there is a field to be explored – so it is science. If your philosophy is humanistic you regard the learner as an individual and the ability to connect to each and unique person is certainly an art. And despite (or probably because) of the great progress in such areas as psychology, pedagogy, androgogy, training methodologies and technology there is always an opportunity to be innovative, to apply, bend, change or entirely dismiss rules and approaches if it benefits your learners.

So, be open-minded, keep an eye on all new that is coming in the field, don't forget the old and tested, be creative and good luck!

Further reading

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Sage Advice: Art, or Science?
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Here's How to Convert Click & Read to Interactive E-Learning
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