

# A Government Crossing the Digital Divide to Promote ICT for Adult Learners

Karen Neville  
University College Cork, Ireland.  
[Kneville@afis.ucc.ie](mailto:Kneville@afis.ucc.ie)

**Abstract:** The importance of information and communication technology (ICT) for modern business cannot be questioned and has led ICT professionals to design, develop, implement and support ICT infrastructures in both the public and private sectors. Organisations, universities and therefore governments face the enormous difficulty of trying to achieve successful training programmes in areas such as ICT and subsequently increased employee numbers and the acceptance of technology by mid-career employees. WBT systems do provide numerous benefits to both the trainer and the learner. Theoretically, the systems are limited only by the technology utilized by the participants involved. These systems can be customized to the requirements of the end-users providing both participative and didactic training. They foster collaboration and reduce the boundaries of the traditional training or education model. Conversely, as with the most profound examples of technological breakthroughs, there are issues or disadvantages that should be addressed before investing in another 'solution'. However this research conducts an analysis of a case organisation targeted by a government wishing to eliminate barriers to the acceptance of ICT by mid-career employees.

**Keywords:** Information Communication Technology (ICT), Web-based Training (WBT), Adult Learning, User Acceptance.

## 1. Introduction

Appropriate training and education are important in today's global market (Bocij et al, 1999). Many organisations make the mistake of not training their employees adequately in the utilization of ICT or in the use of internal information systems. This error in judgement is often due to the expense of providing training and the loss in productivity when employees are absent (McCormack, 1997). In some instances the wrong training is provided. Davis (1989) represents one of the original and most influential researchers in the area of user acceptance of technology and therefore ICT. He synthesises the findings of a range of diverse research streams to propose a number of constructs that are relevant to technology acceptance. These constructs fall into two broad categories, *ease of use (EOU)* and *perceived usefulness (PU)*. Davis suggests a chain of causality between these categories: greater ease of use leads to higher perceived usefulness which in turn leads to more usage of technology. However different approaches can be applied to training (Dickson et al, 1997) and *'on the job training'*, is the most common approach. The reasoning for this approach is that, having obtained the job an employee can train while doing the job. Argyle (1994) argues that research shows that it is an ineffective approach to training as an employee could be doing the same job for years and not acquire appropriate social skills. The perception that something will come with experience is fraught with misconceptions (Maguire, 1986), as the learner could develop survival tactics rather than work related skills (Dickson et al, 1997).

The second approach to training in organisations is *'model the master training'*. This approach follows a type of mentoring as the new employee is *'shown the ropes'*, by an experienced employee, for example postgraduate training programmes. However, Maguire et al., (1978) discovered limitations to the technique, *'experts can have bad habits'*. The final approach is referred to as directed training, which can be categorised as the *'thinking'*, *'feeling'* and *'doing'*, methods of training (Philips and Fraser, 1982; Laird, 1991; Irving, 1995). Thinking involves a didactic approach as the learners, are required to assimilate the content rather than to think (Philips and Fraser, 1982). The feeling based approach involved group discussions. The doing approach involves action learning such as *'role playing'*. An effective training system must combine different approaches to obtain the goal of the corporate training strategy, which is a skilled workforce. Technology is used in training to support the needs of the employees. Web-based technology can be didactic, support problem-solving activities and provide a collaborative environment. Therefore, training can be delivered directly to the learners and the learners can collaborate with one another through online discussion forums. Training can be successfully handled online (Mason, 1990) to support a combined training model to incorporate both online and offline training. WBT allows *"educators and students alike to perform learning related tasks"*, (McCormack et al, 1997). The development of a training system requires careful investigation into the requirements of

the problem situation (Checkland et al., 1990). The developer must consider factors such as the methods employed by employees to learn, incentives to ensure use, the identification of goals, objectives and the different roles that are needed to support this new approach to training (Driscoll, 1998). Models of factors that should be considered in the design of an instructional system are available (Rossi et al, 1993). For example, the developer must consider motivational factors, cognitive factors and instructional design principles prior to the development of the system.

## 2. Theoretical foundation

In *'lay terms'*, traditional training, is regarded as a training environment which encourages passive learning, does not develop problem-solving skills and ignores the individual needs of the learners, therefore it ignores the requirements of its End users. Traditional training has always incurred criticism, it is felt that despite huge advances in technology, the training room will always remain the same, that is, dysfunctional. It could be argued that advances in technology, such as multimedia and virtual simulations, have left the traditional classroom trailing behind with learners expecting more and more. The intensity of competition in the business market advances in technology, and a strong shift towards a knowledge-based economy have each contributed to the demand for virtual (electronic) learning environments. "*There is no knowledge that is not power*", and the organisation (public or private) that can utilise its knowledge resources more effectively than its competitor will persevere. An effective training support system can provide an organisation or a university with a strategic advantage in the market. Learning /training environments can help create and maintain skills and therefore the corporate knowledge base. They both alleviate the strain on corporate resources and facilitate students changing training needs. WBT systems can be described as learning delivery environments in which the WWW is its medium of delivery. The possibilities of which are limited only by constraints imposed by the organisation in question, such as technological or managerial support. Innovative companies and universities are using this implementation for a number of reasons, specifically to keep employees abreast of emerging technologies in their fields and to provide effective training to both staff and customers on new products and skills.

Designing a training system requires a thorough investigation into the use of the Web

as a medium for delivery. The designer must be aware of the attributes of the WWW and the principles of instructional design to create a meaningful learning environment. The Web-based training is viewed, as already stated, as an innovative approach to teaching. It, like the traditional method, requires careful planning to be both effective and beneficial. As stated by McCormack et al (1997) *a Web-based classroom must do more than just distribute information....* it should include resources such as discussion forums to support collaboration between learners and ultimately it should also support the needs of both the novice and advanced learner. A training environment is composed of a number of components that are integral to the effective operation of the environment, for example the development of content, the use of multimedia, Internet tools, hardware and software. A developer must understand the capabilities of these components (search engines, feedback pages and movie clips) as their use, will determine the success or the failure of the learning environment. Learning environments can help create and maintain skills and therefore the corporate knowledge base (Garvin, 1993). They both alleviate the strain on corporate resources and facilitate employees changing training needs (Driscoll, 1998).

This paper focuses on the design of a suitable training system to support mid-career employees and encourage collaboration among the employees and other organisations. The research outlines the factors necessary for the successful implementation and use of the system, through the investigation of current research and the analysis of the case environment. It also highlights the potential of the system to overcome the physical and pedagogical barriers of the traditional classroom. WBT environments can, when properly mediated and structured, facilitate co-operation (Entwistle, 1997), reduce conflict and avail of all of the benefits that technology can provide (Johnson and Johnson, 1990). The study concludes that training systems have the potential, when properly designed, to foster learning and collaboration.

## 3. Research objective

The organisation chosen for this study was Golden Vale plc, a multinational food co-operative. The case study organisation involved in this research implemented a number of ICT training programmes in the past, all of which had failed to increase the use of ICT in the organisation. Preliminary research integrated the construction and implementation

of an online system (Figure 3) with a training programme (Figure 2) for mid-career employees in Golden Vale. Davis (1989) identified two constructs as relevant to user acceptance of technology, namely *ease of use (EOU)* and *perceived usefulness (PU)*. These constructs were operationalised into a set of principles to underpin the training programme, which was delivered in two phases, each specifically addressing one of Davis' constructs. Additionally the study's external monitor (the Irish Government) sought to remove any barriers to the acceptance of ICT and subsequently increase employee skills in the target case.

#### 4. Research approach

The overall research orientation was qualitative and reflexive in nature. A grounded theory perspective was adopted, and in line with this, an initial framework incorporating Davis' (1989) constructs as preliminary 'seed categories' was created (see Figure 2). The novelty of this study was that the researchers went back to evaluate the ongoing success and value of the training system in Golden Vale. Thus, the research approach adopted for the study was based on a two-tier research design involving an in-depth investigation of the case study environment through an examination of the barriers to the use of ICT (which was primarily a fear of information technology (IT) and an evaluation of the training systems in terms of continued ICT usage.

#### 5. Case background

Since 1947, Golden Vale plc has been one of Ireland's largest food co-operatives. The company is a vibrant force not only in the Irish dairy industry, but it is also one of the top cheese processors in Europe, employing 2,100 people in Ireland and over 300 in its foreign subsidiaries. Golden Vale Plc. is based in the eponymous 'Golden Vale', a region noted for the quality of the agricultural land and its produce. The company is sited in one of the largest towns in the region, with a population of 2,667. Golden Vale is by far and away the largest employer in the area. Thus, any slump in the long-term viability of Golden Vale would clearly have a catastrophic social and economic effect on the region. The majority of their employees are local residents, and while the younger employees would have a high standard of education, many of the mid-career employees (aged 35 years and over) would have joined Golden Vale in their teens, without even finishing their second-level education in many instances. These employees learned on

the job, and have few, if any, educational or technical skills to equip them to work in other industry sectors. Given this, the Irish government, obviously mindful of a number of disastrous social catastrophes in other Irish towns, which had been dependent on a single large employer who failed to survive, funded a training initiative.

Four organisations (or consortia) were identified, by the Irish government as the core participants of this research, to monitor and evaluate the training initiative. The group provided valuable data regarding the needs of adult learners as well as participants for the target group. The IT and HR departments of Golden Vale were also key actors in the study as well as the group responsible for the creation of the training system, the ESRC (the Executive Systems Research Centre). The target group played a central role in the development of this research, as the group were at the center of the evaluation of the project. Key members of the consortia were and still are responsible for the coordination of the different activities in the training system. However the target or test group were both the end users and evaluators of the training system. The identification of the roles and responsibilities of each of the groups was vital to the success of the project and the acceptance of the training system devised as a result of the initiative. The training initiative was intended to provide a solid training in ICT for mid-career employees through technology itself. Thus, one of the primary objectives of the initiative was to provide a more skilled work group who would be able to find work more readily in other industry sectors should Golden Vale experience a catastrophe. Employees were also aware of the risk if they were to become unemployed and of the importance of ICT literacy in improving their career prospects within Golden Vale. The company had initiated several ICT training programmes, in the past, facilitated by their internal IT department who brought in training consultants to provide off-the-shelf training courses in standard ICT packages, such as word processing and spreadsheets. These training programmes, while having been applied in a textbook fashion, were acknowledged as having had little or no lasting effect in persuading employees to make ongoing use of technology in their work. The company decided to adopt a different approach for this initiative, and contacted the main university in the region to seek assistance. The author, with a number of colleagues, met with the IT and HR staff in the company and a name for the project was

coined, M.E.E.T (Mid-career Employees Embracing Technology). The approach taken in previous training programmes in the company was discussed, and some of the participants were interviewed. It quickly became apparent that the employee base was not homogeneous in relation to their skills with ICT; thus, standard training programmes which tried to achieve an average common denominator would be inappropriate, in that those who were more advanced would find the material boring and lose interest, while those who didn't understand the rudiments would be unable to engage with the material in the first place.

### 5.1 The target group

The target group was identified as a representation of the level of IT skills within the organisation. The data gathering techniques used, collected and examined information regarding the participant's current level of computer skills, usage and future training requirements. The researchers deemed it appropriate to focus the research strategy on identifying the levels of computer proficiency and training requirements among the

participants. The investigation strategy formulated to conduct the analysis stage of the research consisted of: interviewing a select number of the target group, group discussions and observation. The target group comprised of employees with varying roles within the organisation, senior management, administration, operators, supervisors and IT personnel. The group was interviewed to build a picture of the training system in operation and the system required. In total 16 interviews and 4 group discussions were conducted to ascertain the skills and the issues of the participants. The first objective of the data gathering techniques was to assess the participant's level of computer proficiency and to group the participants accordingly. To ascertain this, each interviewee was required to rate their level of skills between 1 and 4, 1 representing a basic understanding of ICT and 4 an advanced level. The results enabled the researchers to determine the structure of the training system based on the different levels of skills. The information collected resulted in the following (see Table 1) breakdown of the target group's level of computer proficiency:

**Table 1:** Levels of computer proficiency

Computer Proficiency Ratings		
Computer Proficiency	Rating	No.
Basic understanding	(1)	22
Good understanding	(2)	17
Very good understanding	(3)	4
Advanced understanding	(4)	2
	<b>Total</b>	<b>45</b>

The level of computer usage among the participants was in direct proportion to their proficiency level. The participants with a basic understanding of computers reported limited usage in their job descriptions. A high proportion of those interviewed, 62%, reported no use of computers in work related activities and 38% reported some but limited interaction. Those respondents with a good understanding of computers reported a varying level of usage. However, the opinion among the different groups was varied regarding the availability of computer resources within the organisation. Level 1 reported a mixed view with equal numbers rating the access as good, average and poor. However those with a good and very good understanding also rated access as good but the majority of the groups with a level two and three rating are required to use computers to do their jobs. Some of the respondents did however remark that *availability was good but finding the time to learn new things was difficult*. The majority of the members of groups 2 and 3 did recognise the importance of

increasing their ICT skills. It is also important to note that 50% of group three own a home PC. All of the participants recognised the need to develop skills in ICT. Each group attached the same benefits to the development of a new training system. The participants listed both personal and corporate benefits. The personal benefits ranged from an increased chance of promotion, increased efficiency, home accounts, accessing the Internet and the ability to teach their children the skills gained as a result of participating in the training program. Corporate benefits included increased communication, informed decision-making, greater communication and efficient record keeping. The participants from each of the groups provided detailed lists of their requirements for the new training system (see Figure 1). They suggested ways in which increased training and therefore computer usage would improve their job performance. The participants identified the importance of a structured training system that would increase their computer literacy, generate ideas for

improved efficiency through incorporating IT into their work activities and help the participants solve problems when they arise. Participants also identified or requested training in fundamental applications such as Word, Excel and the Internet. Figure 1 presents the findings of the interviews conducted with the target group. Each level of participants as well as their managers, from prior experience with training initiatives,

communicated a clear understanding of the factors needed for the system to be successful. Figure 1 also shows specifically the issues of each level. It therefore presents what they expect from the system. Each required customised training, small classes time to practice and a support system. However, due to the small number of employees level 3 and 4 were combined to form one level.

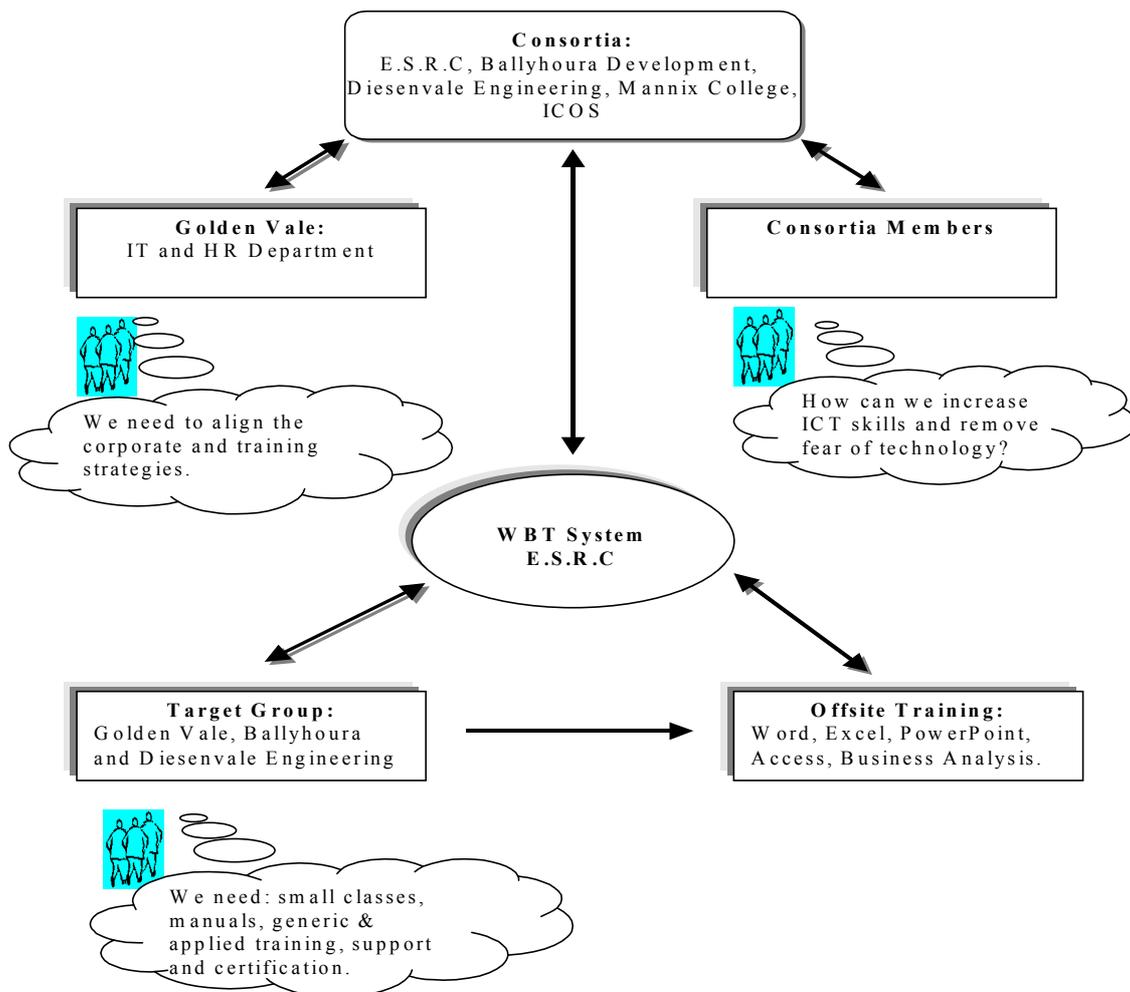


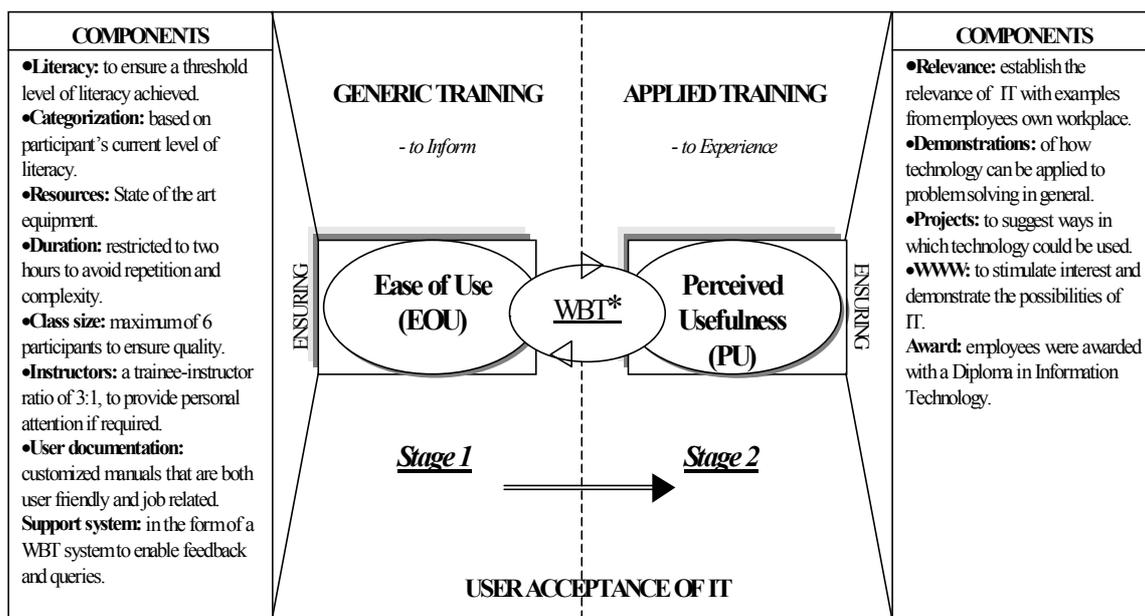
Figure 1: An analysis of the case environment

## 5.2 Training programme

### 5.2.1 Phase one – Generic training

The researchers decided to address each of Davis' two categories by adopting a two-phased training approach (see Figure 2). The first phase proposed was a generic training phase, during which the basic ICT concepts would be covered at a pace appropriate to each group, thus addressing the ease of use (EOU) construct. Following completion of this generic training, the second phase would involve applied training customised to address

the everyday work tasks faced by the participants, thus addressing the perceived usefulness (PU) construct. The chronological ordering of these phases is congruent with Davis' (1989) proposed chain of causality namely that greater ease of use would facilitate a higher perceived usefulness of ICT, thereby leading to greater usage. The items identified by Davis (1989) as being significantly correlated with ease of use include easy to learn controllable, clear and understandable, and easy to use.



**Figure 2:** Framework for operationalising the M.E.E.T programme

\*The WBT system was developed to support both phases of the training programme. It enabled the employees to participate in the customisation (EOU) of the system and to add to the system through the discussion forum (PU). The arrows used in the diagram highlight the complexity of the inter-relationship between the two constructs (EOU/PU), suggesting that not only does EOU lead to PU but that PU increases the level of EOU.

This phase of the study is concerned with operationalising these in practice in a real situation. The following facets of the programme indicate how this 'ease of use' construct was operationalised:

- An initial generic training phase was used to ensure that all participants achieved a reasonable level of literacy in ICT.
- Participants were allocated to one of three groups based on their current level of ICT capability. This ensured that the common denominator for training in each group was uniform, thus reducing the possibility that participants might be too self-conscious to reveal their lack of understanding of training material.
- All sessions were held in a very well equipped training laboratory, with state-of-the-art technology for the instructors and the participants.
- The training laboratory was in a 'neutral' venue, a short distance away from the factory floor where the participants worked every day. This helped participants to focus on the training and avoid distractions.
- The maximum duration of training sessions was restricted to two hours, thus ensuring that participants did not become overwhelmed with complex

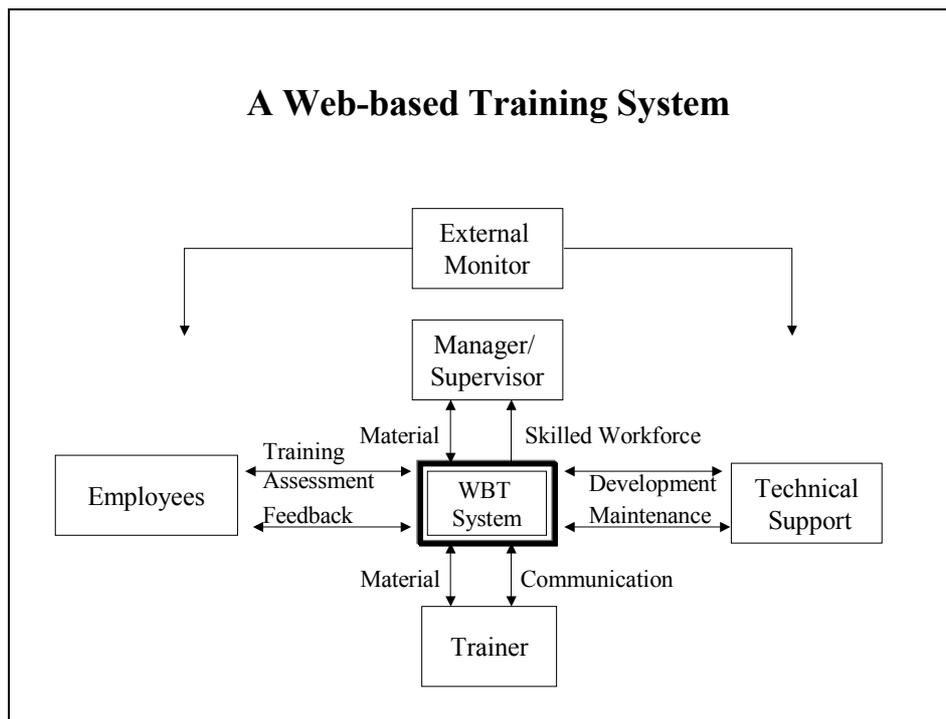
material, or bored with repetition of material already understood.

- The number of participants at each training session was kept low—a maximum of six participants at each session. This was intended to ensure that all participants' performance and progress could be monitored to ensure they understood the concepts.
- Two instructors were in attendance at each session, thus achieving a trainee-instructor ratio of 3:1. One generally led the instruction, while the other had a roving role, visiting each workstation to ensure that all participants understood the material. When difficulties were encountered, the instructor would provide one-on-one instruction in a discreet manner until the difficulty was fully resolved.
- All the instructors were selected following personal interviews by the company. Golden Vale is a rural location, and the participants had a rural background. The instructors selected had a rural background in the main. The company were of the opinion that one of the reasons previous training initiatives had failed to deliver was that instructors were perceived as dynamic 'city-types' who were more comfortable with Internet

chat sessions over decaffeinated *latte* in cyber-cafes rather than in discussing hogget prices in a small tea-room. One can debate the rights and wrongs of such social stereotyping, but the rapport built up between the participants and the instructors was very impressive. At the end of the training, the participants visited the university to receive a Diploma, and the camaraderie between the participants and the instructors was very noticeable.

- The training material was designed to be user-friendly. Different lessons were prepared for each element of the training. Exercises were chosen to reflect the participants' work place. All participants received a copy of the instruction booklets.
- The WBT system (see Figure 3) was also constructed to support and implement the training. The training material was available on-line, but in addition, a discussion forum was
- 

implemented. This enabled participants to provide feedback (anonymously, if desired) to the instructors. It also allowed them to pose queries, which other participants or the instructors could answer. All participants could see the initial queries and the discussion stream of answers from other participants and the instructors. This further extended the reach of the training as workers could log on to the system at home or at their work, during night-shift, for example, and pose questions for which answers would be available when they next logged on. The facility also allowed the employees to voice their satisfaction regarding the different elements of the training. This provided the participants with the opportunity to take part in the ongoing design of the hybrid training system, and therefore increase the likelihood of user acceptance (Whitten et al., 1994; Avison and Fitzgerald, 1995; Bocij et al., 1999).



**Figure 3:** The training system (both online & offline)

### 5.2.2 Evaluation of Phase one – Generic training

This section presents the findings gathered during an interim evaluation of the training system. A questionnaire was designed and posted to each of the 45 participants in the target group to determine their reaction to the training system devised to their specification.

Feedback through the Web facility (Figure 3) was also requested and collected by the researchers to aid in the ongoing design of the prototype system. The information collected and analysed by the ESRC researchers are presented in Table 2. The objective of this interim evaluation was to determine the satisfaction ratings of the participants in the study. Prior training models or systems had

failed to impact on either the employees or the organisation as a direct result of non-user participation. The obvious finding of this questionnaire as can be seen in Table 2 is that the satisfaction ratings were very high. The researchers could not detect any significant difference, statistically, between the groups of participants. The groups, as already described, were divided according to their current level of IT skills which were determined through interviews and observation to be novice, intermediate and advanced. The questionnaire was designed to determine the participant's evaluation of the training received in the first phase of the training. Participants were required to scale their agreement or disagreement between 1 and 5. The maximum score on the construct is 1, indicating a strong agreement. Therefore the closer the rating is to 1 the stronger the agreement and a score of 5 would reflect the participant's strongest disagreement. The instructors were also questioned regarding their evaluation of the lessons and therefore the training system designed to support their classes. The instructors were as optimistic as the participants regarding the predicted success of the project and the affect of the training system on the study. The instructors also reported an

improvement in their own skills through delivering the classes and in utilising the training system to support their learners.

### 5.2.3 Phase two – Applied training

The items identified by Davis (1989) as reflecting the 'perceived usefulness' (PU) construct included, working more quickly, increased productivity, improved effectiveness and job performance, making the job easier, and again the obvious item, useful. These were operationalised in the study in the following way:

- Again, as already mentioned, at a high level, the separation of the initial generic training phase from the subsequent applied training phase ensured that the usefulness of the technology could be demonstrated in the second training phase. Participants had achieved a base level of capability, and the researchers had made several visits to them in their work environment, inspecting work documents with a view to seeing how technology could be incorporated into their everyday work routines to solve problems.

**Table 2:** Summary of participant ratings for Phase 1 training

Phase One – Construct	Level 1	Level 2	Level 3	Avg. Rating
Instructors were well prepared	1.3	1.5	1	<b>1.3</b>
Course notes were useful and interesting	1.8	1.5	1	<b>1.4</b>
I felt free to ask questions during the course	1.9	1.3	1	<b>1.4</b>
Instructors provided clear explanations	2	1.5	1	<b>1.5</b>
It helped me develop my computer/technology skills	1.9	1.7	1	<b>1.5</b>
Overall I was satisfied with the course	1.9	1.7	1	<b>1.5</b>
Instructors ensured that I understood course material	2.3	1.7	1	<b>1.7</b>
Interesting and stimulating assignments were provided	2.3	2.1	1	<b>1.8</b>
Course challenged me to think	2.2	1.8	1.7	<b>1.9</b>
It stimulated ideas about how to apply IT to my work	2.5	1.9	2	<b>2.1</b>
<b>Overall Average</b>	<b>2</b>	<b>1.7</b>	<b>1.2</b>	<b>1.6</b>

(1 = mostly agree - 5=mostly disagree)

- Examples include the creation of templates to automate manual activities like creating time sheets and home accounts. Systems, already in existence, were also demonstrated to highlight the application of technology within the company. These exercises stimulated ideas in the application of the skills developed by the participants from the programme.
- In addition to the examples suggested by the instructors, participants were encouraged to identify ways in which the technology could be employed in their work. Potential projects were explored during the training sessions in the applied training phase.
- The participants were, like the general public worldwide, very interested in the Internet and World Wide Web, but felt their knowledge in the area was very limited. It was decided to leverage this to get participants to buy into the training process. Thus, the first introductory session for all groups of participants was a 'web surfing' session. This served to break the ice between instructors and participants in a friendly atmosphere. Participants were shown the rudimentary details and then began surfing the web

themselves using various search engines, and visiting sites recommended by the instructors. This session was also used to demonstrate the WBT system (see Figure 3), which had been constructed specially to support the training. As already mentioned, it had been decided as a matter of policy that sessions would not exceed two hours. However, this introductory session stretched this limit most as participants were so enthusiastic and wanted to continue. The enthusiasm of the first wave of participants ensured that all later groups were very keen to get started on the training themselves. The participants were all very satisfied with their knowledge of the web and saw it as a very useful skill to have achieved.

- Upon completion of the applied training phase, participants visited the university for a formal diploma presentation ceremony. The diploma parchments were accepted with pride, and many spoke of their satisfaction with their achievement, for many, the only educational certification they had ever received.

It was also intended that the training would be a dynamic and organic experience, capable of self-perpetuation. Thus, the advanced group were considered to have potential to play a considerable hands-on role in promoting the use of ICT throughout the company and in future training initiatives. This would be reflected in the job status of these individuals, thus, it would serve as a significant motivator.

#### 5.2.4 Evaluation of Phase two – Applied training

A postal survey was chosen to complement the personal interviews conducted in this stage of the study. The function of this survey, like the first, is to conduct an evaluation of both the second phase of the training and the WBT system used to support the MEET project. This survey addressed the following issues:

- - Determine the level of user satisfaction with the programme.
- Establish the effectiveness of the WBT system in supporting training within the selected environment.
- Establish whether the system was easy to use and therefore useful.
- Identify limitations, if any, that hinder the participants use of the system.

A total of 26 responses were received out of 45 participants, giving an overall response of 57 percent. For various reasons three of the responses were found to be unusable, for example some participants did not answer the majority of the questions asked. When the researchers analysed the responses, it was determined that they could be grouped according to the participant's level of computer proficiency. Each participant was asked to rate their current level between 1 and 5, 1 being novice and 5 being advanced. The responses collected were examined using basic statistical measures such as mean and medium. The researchers also presented various cross tabulations, to highlight the different groups responses to individual constructs as well as the overall average response to each question. Table 3 presents the findings of this postal survey; the main point to note is that the overall satisfaction with the hybrid training system was very high. As in the case of the first evaluation conducted the researchers could not find statistically significant differences between the groups or the different levels of participants. In terms of specific questions addressed, the construct with the highest rating of satisfaction is *The Material was well presented* which was encouraging, as the participants were very satisfied with the roles played by the instructors in both presenting the material and that of the roving role. The construct *I was able to get help whenever I needed it* was also high. One of the requirements determined during the analysis stage of the development was the creation of a support mechanism. This was facilitated through the WBT system, which provided 24-hour support to the participants. A high rating for the support obtained was very encouraging in determining the effectiveness of the system (see Figure 4). Constructs regarding the content of the site, *The material was well presented*, *The course level was too high* and *Material was easily viewed on the screen*, were also favourable regarding the effectiveness of the system. The training system was designed based on Davis' model to be easy to use (see Figure 3). However it is difficult to determine if a system is both easy to use and useful. The satisfaction ratings received regarding the ease of use was encouraging as the participants found the site easy to navigate and therefore of use.

The researchers also identified limitations to the use of the system and therefore the skills developed through the programme. Lack of resources was identified during the first evaluation as the most significant complaint.

However, during interviews, participants highlighted problems encountered in the use of the WBT system, which were as a direct result of the resources within the organisation. Lack of resources in the guise of inferior network connections was a serious problem. However the organisation is currently addressing the issue to facilitate their employee needs.

Another issue raised during the analysis stage of the study highlighted the need to provide time as well as resources for participants to practice the skills learned. The problem was identified prior to the commencement of the study but it is a slow process and the issue is still evident as some of the participants felt that they were still limited by lack of both time and resources. Finally, the training system, despite

the limitations of the environment addressed the requirements of the participants in the study. It provided facilities for the users to review the lessons interactively. The discussion forum provided 24-hour support, so that the participants were in constant contact with both primarily the researchers and the other instructors. For the first time the participants themselves were given the opportunity to help design the training system, on an ongoing basis through the feedback facility available through the WBT system. The system was an effective method of supporting the training project in Golden Vale plc and enabling group collaboration and evaluation by all of the parties (consortia) involved through feedback mechanisms.

**Table 3:** Summary of participant ratings for Phase 2 training

WBT System Construct (Golden Vale Plc.)	Level 1	Level 2	Level 3	Level 4	Avg. Rating
The objectives were clearly explained	3.8	4	3.8	4	<b>3.9</b>
I received enough training on the site	3.2	3.5	2.8	4	<b>3.4</b>
The material was well presented	4.2	4	5	4	<b>4.3</b>
The course level was too high	2.8	1.5	3	2	<b>2.3</b>
The course level was too low	2.3	2.3	3	2	<b>2.4</b>
There was too much material to cover	2.4	2.8	2.6	2	<b>2.5</b>
The classes were too fast	3	3	2.4	2	<b>2.6</b>
The classes were too slow	2.2	2.5	2.5	2	<b>2.3</b>
I was able to get help whenever I needed it	4.2	3.5	4.6	4	<b>4.1</b>
The site complemented the training	3.6	2	3.6	3	<b>3.1</b>
The site was easy to use	3.6	3.5	4.2	3	<b>3.6</b>
The site was reliable	4.3	2.5	3	4	<b>3.5</b>
Material was easily viewed on screen	3.7	2.5	4	4	<b>3.6</b>
The system was accessed without problems	3.6	3	2.8	3	<b>3.1</b>
It was easy to navigate through the site	3.6	2.3	3.8	4	<b>3.4</b>
The discussion forum was useful	3.3	3	3.2	4	<b>3.4</b>
Diagrams were clear and easy to understand	3.6	3.3	3.2	4	<b>3.5</b>
Labs were available when I needed them	3.5	3.3	3	4	<b>3.5</b>
I could use equipment when I needed to	4	3	3.2	4	<b>3.6</b>
Easy to access the Internet	2.9	2.8	3.4	4	<b>3.3</b>

(1 = mostly disagree - 5=mostly agree)

## 6. Conclusion

Golden Vale plc is still one of Ireland's largest food co-operatives. However, the majority of their employees have benefited, with managerial support, from a solid training in ICT and any fears they may have experienced prior to the M.E.E.T project are certainly reduced through the customised training and support received as a result.

Learning / training networks (see Figure 3), as discussed, provide many advantages in breaking down the communication barriers between educators and students or in this case between instructors and employees alike. Training is an important issue that requires an adequate support system to facilitate the

training of employees (Crossman and Adam, 1999). An effective training system is regarded as a strategic tool in this competitive information age (Nonaka, 1995). Therefore, it is vital that the issue of training and the development of an effective training system remain high on the list of priorities of management in multinational companies (Laudon, K.C and Laudon, J.P 1998). As discussed in section 3 the objective of the M.E.E.T project (see Figure 1) was to provide solid training in ICT and reduce any fears, the mid-career employees targeted by the project, would have. The governments objective was, through the funding of the initiative, to provide a more skilled work group who would be able to find work more readily in other industry sectors should Golden Vale close due to some

unforeseen catastrophe and thus reengineered the process of training within the target case to incorporate ICT as the tool to facilitate the training of ICT. The overall objective of the M.E.E.T project was to collaborate and share the WBT system and results with other organisations (the consortia). The researchers decided to evaluate the current status of the project through telephone interviews with key actors in the case environment. The responses were very favourable with regard to the success of the M.E.E.T project. Table 4 outlines the results of the interviews. The table lists the requirements of the project as the barriers to the development of the skills in and the use of ICT. Each interviewee agreed with and stated the methods employed to reduce the barriers, identified in the analysis stage of the project. The target group identified a number of barriers to the use of ICT. Previous training failed in the organisation because the employee's requirements were ignored. Off-the-shelf packages were utilised without ascertaining the level of computer proficiency within the organisation. Employees also lacked any support during or after the training. The most profound failure of prior training initiatives was the total lack of demonstrating to the employees the application of the skills (PU) gained as a result of the training. However, each interviewee as a result of the M.E.E.T project offered approving responses to the project in increasing their skills and reducing any fear they may have had to technology. The system was regarded as a key facilitator to the success of the programme in supporting the needs of the employees as outlined in table 4. However, as the system was not maintained periodically, it is today used as a revision course to the training delivered during the M.E.E.T project. Employees are, however, supported more by management in the provision of resources for the ongoing development of their ICT skills. The training initiative did accomplish the added requirement of self-perpetuation. The advanced group (level 3) currently plays a hands-on role in promoting the use of ICT throughout the company and in other training initiatives. The model (Figure 3), due to the success of the M.E.E.T project, has been utilized in the delivery of courses in two other case environments.

The case study organisation involved in this research implemented a number of ICT training programmes in the past, all of which had failed to increase the use of ICT in the organisation. Preliminary research integrated the construction and implementation of a WBT system (Figure 1) with a training programme (Figure 2) for mid-career employees in Golden Vale. Davis (1989) identified two constructs as relevant to user acceptance of technology, namely *ease of use (EOU)* and *perceived usefulness (PU)*. These constructs were operationalised into a set of principles to underpin the training programme, which was delivered in two phases, each specifically addressing one of Davis' constructs. The overall satisfaction with the WBT system was very high. One of the requirements determined during the analysis stage of the development was the creation of a support mechanism. This was facilitated through the WBT system, which provided 24-hour support to the participants. High ratings for the support obtained indicated the effectiveness of the WBT system. The training system was designed to be easy to use. However it is difficult to determine if a system is both easy to use and useful. The satisfaction ratings received regarding ease of use were encouraging as the participants found the site easy to navigate and therefore of use. Davis (1989) states that if a system (or skills learned as a result) is easy to use then the skills can be applied and therefore useful.

A number of important conclusions can be drawn from this research. The researcher identified factors necessary for the development of an effective training system, to support any environment. The training system must be customized, easy to use and demonstrate applications of the skills learned. Previous training in the organisation consisted of off-the-self ICT packages and CBT (Computer Based Training) courses. The objective of this research was therefore to operationalize both Davis's constructs and WBT into a training programme that could be used in any academic course. To be successful an education programme must increase the skill-set of the learners and to expand the learners understanding skills must be applied or regarded as useful.

**Table 4:** The barriers to ICT and the methods employed to reduce them

Web-Based Training (WBT) System		
No	Barriers to developing ICT skills	Reduced by:
1	Overcome inhibitions to the use of Information Communication Technology (ICT)	A user friendly (EOU) WBT system, interactive lessons and demonstrations (PU)
2	Expose employees to Information Communication Technology (ICT)	Introduce the WWW through the WBT system
3	Delivery of course material	Both in class and online
4	Establish a point of contact between the instructors and the target group	Through the Discussion Forum, Feedback Facility and in the lab
5	Participation by the target group in the design of the WBT system	Feedback page
6	Provide 24 hours support to employees	Online material and contact facility
7	Provide methods for employees to test their knowledge	Online exercises and examples with playback features
8	Supplement classes with online support	Discussion Forum/Email/Feedback
9	Easy to use WBT system	User friendly navigation system
10	Platform independence, (Windows, Macintosh and UNIX) for home use	Web-based system

## References

- Adams, D, Nelson, R. and Todd, P. (1992) Perceived usefulness, perceived ease of use and user acceptance of information technology: a replication, *MIS Quarterly*, (16, 2), July, 1992, pp. 227-247.
- Argyle, M., [1994] *The Psychology of Interpersonal Behaviour*, [5<sup>th</sup> Edition], Penguin, Harmondsworth.
- Avison, D.E and Fitzgerald, G (1995): *Information Systems Development: Methodologies, Techniques and Tools*, Second Edition, McGraw-Hill Companies.
- Bocij, P, Chaffey, D, Greasley, A, Hickie, S, (1999): *Business Information Systems, Technology, Development and Management*.
- Checkland, P. and Scholes. J, (1990): *Soft Systems Methodology in Action*. Wiley, Chichester.
- Crossan, G, and Adam, F., *Teleworking: Issues and Perspectives*, 1999.
- Davis, F. (1989) Perceived usefulness, perceived ease of use and user acceptance of information technology, *MIS Quarterly*, (13, 3), September, 1989, pp. 319-340.
- Davis, F., Bagozzi, R. and Warshaw, P. (1989) User acceptance of computer technology: comparison of two theoretical models, *Management Science*, (35, 6), August 1989, pp. 982-1003.
- Dickson, D, Hargie, O and Morrow, N., (1997), *Communication Skills Learning for Health Professionals*
- Driscoll, M, (1998): *Web – Based Training: Using Technology to Design Adult Learning Experiences*.
- Eisenberg, M.B., and Ely, D.P., (1993), *Plugging into the Net*.
- Entwistle, N., [1988], *Styles of Learning and Teaching: An Integrated Outline of Educational Psychology for Students, Teachers and Lecturers*.
- Garvin, D.A., [1993], *Building a Learning Organisation*, Harvard Business Review.
- Irving, P., (1995) *A Reconceptualisation of Rogerian Core Conditions of Facilitative Communication: Implications for Training*. Unpublished Dphil thesis, University of Ulster, Jordanstown.
- Johnson, D., and Johnson, R., [1990] *Cooperative Learning and Achievement*. In S. Sharon [Editor], *Cooperative Learning Theory and Research*, pp. 22-37. NY: Praeger.
- Laird, D., (1991) *Approaches to Training and Development*, Addison –Wesley, Reading, MA.
- Laudon, K.C and Laudon, J.P, (1998) *Management Information Systems, Organization and Technology in the Networked Enterprise* (6<sup>th</sup> Edition).
- Maguire, P., Roe, P., Goldberg, D. et al. (1978) *The Value of Feedback in Teaching Interviewing Skills to Medical Students*. *Psychological Medicine Journal*, 8, pp.695-704.
- McCormack, C and Jones, D, (1997): *Building A Web – Based Education System*
- Neumann, P.G (1995) *Computer Related Risks*, pp. 203-304.

- Neville, K. (2000) A Web-based training (WBT) system development framework: A Case Study – (Business Information Technology Management (BIT) 2000, 10<sup>th</sup> Annual Conference, Manchester, UK, 11 pages).
- Nonaka, I., (1995), The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation, Oxford UP, Oxford.

- Phillips, K. and Fraser, T.,(1982) The Management of Interpersonal Skills Training, Gower, Aldershot.
- Rossi, P.H and Freeman, H.E., (1993), Evaluation:-A Systematic Approach (5<sup>th</sup> Edition), Newbury Park, CA: Sage Publications.
- Whitten, J.L, Bentley, L.D, Barlow, V.M, (1994): Systems Analysis and Design Methods (Third Edition)

