An Examination of a Collaborative Learning Environment in the context of Web-based Business Education

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Abstract

The advancement of computer and networking technologies presents great opportunities for business education up to now. This research started from questioning the appropriate educational use of information and communications technologies in current business situations, where organisations and companies are in a period of great change. The knowledge required of professionals is increasingly dependent on learning abilities to confront innovative change. This dissertation is a study to examine the possibility of collaborative and resource-based learning environment in the context of web-based instruction in business education, which implement a 'constructivist' approach to learning.

A wide range of literature has been reviewed to establish a theoretical position for this research: instructivist and constructivist learning theories; Internet technologies in education; workplace learning; collaborative learning and resource-based learning.

The WBI environment "e-Test Leaders A" (developed by SDS "e-Campus") is reviewed in detail with the aim of finding the relation between theory and sample. Through textual analysis, it is found that "e-Test Leaders A" is instructivist-oriented, that is systematically designed for transmitting knowledge. There is a very limited interaction between the environment and the learner.

For dealing with the limitations found in "e-Test Leaders A", an alternative structure is suggested that promotes a constructivist perspective in the form of collaborative and

resource-based learning. I argue that this structure can be appropriate for open-ended tasks, and that learners can generalise their own knowledge through interaction with other participants in terms of discussion and negotiation. Besides, they can localise and apply the knowledge in their own work situations.

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1. INTRODUCTION

The revolutionary developments of information and communications technologies can be observed in all aspects of modern society all over the world, e.g. industry, economics, politics, and education. The emerging structure of this 'New World' requires people to formulate new ways of thinking. Quite a few researchers have argued that a restructuring of organisations is necessary to deal with the new digital environment (e.g., Argyris, 2000; Tapscott, 1995; Yoo; 1995). Evidently, new ways of thinking will be required in business education as well. Nevertheless, many changes which have been attempted, have not been successful enough to cause fundamental alteration in the training sectors of companies and organisations. My research begins from a question about the causes of this insufficient change in business education.

In business education, not only have business conditions and strategies been changed, but educational perspectives have been also mixed with new technologies (Tapscott, 1995). Networking technologies, especially Internet and World Wide Web (Web or WWW), are emerging as one of the most effective tools for business education. The potential of the Internet, e.g. interactivity, extensiveness, accessibility to worldwide information, learner-centred approach, has been reviewed by many researchers (e.g., Khan, 1997; Harasim; 1990; Shneiderman, 1998). Consequently, Internet technologies have been increasingly and actively adopted in business education for distance education and on-the-job training. Numerous existing training materials have been adapted into Internet-based versions (Khan, 1997). I will refer to this kind of learning

method, known as Web-based training or Web-based instruction, as WBL or WBI in this dissertation.

Although online education has the potential for improving the effective transmission of educational knowledge and interactivity amongst learners in business education (Khan, 1997; Harasim, 1990), the ways to design and deliver online learning materials to learners have not yet changed much from previous teacher-centred approaches. For example, WBL courses in Korean companies and organisations still follow these methodologies. I find two reasons for this phenomenon:

(a) *Historical aspect*: the extensive use of so called 'Instructional Systems Design Models' which emphasise systematically-structured learning based on behaviourist approaches, which were introduced into business education in the 1980s (e.g. Dick & Carey, 1988; Rosett, 1987)[1]

(b) *Social aspect*: the dominance of result-based, competitive, and individualised learning perspectives in Korean workplaces rather than collaborative, self-developmental, and organisation-based learning (Yoo, 1995; Um, 1999)

I want to argue that this conventional approach to is not appropriate in the current situation. If we consider the paradigm shifts in modern society, then learning environments must be flexible and accommodating to the development of 'learning and thinking skills'. In order to provide this flexibility, constructivist perspectives need to

[1] Instructional Systems Design Models (ISD models) were initially introduced to the Korean education field by Professor W. Huh at Hanyang University (http://www.hanyang.ac.kr) and have been extensively used in the training departments of various companies.

be introduced into instructional design. The basic notion of constructivism—that knowledge is structured and organized from individuals' experiences-has been broadly influential in current learning theories. Emerging theories for learning in organisations, e.g. action learning, learning organisation, communities of practices, focus on learner-centred, autonomous, flexible and experiential learning environments, and are constructivist approaches rather than behaviourist ones. In recent times, quite a few training companies and organisations in Korea claims the notion of 'learning organisation' which understands learning as a community rather than individual activity.[2]

If these perspectives become supported by many researchers and organisations, it will be necessary to rethink the Internet or Web based learning environments. I argue that constructivism has become the primary theoretical assumption for supporting the active use of computers in education (e.g. Forman & Pufall, 1988). Especially, the Internet/Web environment itself gives learners autonomy to navigate and explore cyber-space for their own experience.

The broad concern of this dissertation is to discuss the use of the Internet in business education. In order to answer the questions raised above, the research will be carried out by adopting the 'research mode of interrogation' suggested by Brown and Dowling (1998). I will start by reviewing a wide range of literature in order to establish the theoretical field of my research. According to Brown & Dowling (1998), a theoretical

[2] E.g., Samsung SDS "e-Campus", CreBiz Consulting, Aspect International Training Consulting, co., Korea General Electronic, Co.

field is a notional community of researchers (p.138) in a broad area of academic and professional knowledge and debate which contains the researcher's general area of interest (p.18). The literature will be reviewed in Chapter Two as follows:

(a) Learning theories, comparing instructivist and constructivist perspectives
(b) Workplace learning, focusing on organisational learning and action learning
(c) The potential of Internet technologies improve learning environments in business education, and in particular
(d) the premise of online collaborative and resource-based learning for realising constructivist learning perspectives

In Chapter Three, the methodological issues will be briefly addressed. The procedure and reason to choose the sample learning environment (which is "e-Test Leaders A") will be explained. The data analysis approach and its limitations will be illustrated in order to help the validation of the research.

In Chapter Four, my empirical work will be illustrated and analysed based on the literature review. According to Brown and Dowling (1998), an empirical setting is the local region of experiences in which the research relates for making the claims. For empirical setting, I selected an online training course. "e-Test Leaders A", which will be analysed mainly from an instructional design perspective, based on the learning theories of instructivism and constructivism.

After arguing about the limitations of the existing structure of “e-Test Leaders A”, an alternative platform will be suggested for a collaborative, resource-based learning environment. The structure, the mechanism of the course, and the expected effects of adopting this alternative structure will be discussed.

In the Conclusions, the research process and findings will be reviewed. The limitations of this research will be addressed, and possibilities for further research will be suggested.

2. LITERATURE REVIEW

Since computer and networking technologies have been enthusiastically used in education for many years, the literature on the educational potential of technologies for training in companies and organisations is extensive. I will start my literature review by considering the major theoretical approaches for the design of learning resources.

2.1 Theories of learning

When we design and develop a learning environment, whether it be classroom-based or computer-based, one or more learning theories must be implicit or explicit in it (Duffy & Jonassen, 1992). Firdyiwek (1999) introduces Resnick, Greeno, and Collins' categories of learning theories: 1) behaviourist/empiricist; 2) cognitive/rationalist; 3) situative/ pragmatist-sociohistoric perspectives. However, I will review them into two categories: instructivist and constructivist. Under constructivist, cognitive, situative, and sociohistorical types will be all included.

2.1.1 Instructivism

Instructivism derives from '*objectivism*' (as labelled by Lakoff-see Duffy & Jonassen, 1992). Objectivism is a broad term that includes 'behaviourism' and 'cognitivism' (Zakari, 1998). It supposes that knowledge exists independently of individual' minds and that knowing is the process for representing reality. Consequently, a learning goal should be to understand something that has been correctly established by logical and

scientific reasoning. Individual' learning processes or experiences should be avoided as they can trigger partial and inadequate understanding of the knowledge (see Duffy & Jonassen, 1992; Zakari, 1998; Bednar et al., 1992).

These assumptions about knowledge lead to '*instructivist*' approaches focusing on the efficient transmission of established knowledge and information by effective teaching strategies. Instructivist approaches for designing learning resources demonstrate a common process as follows. The knowledge which learners need to acquire is characterised by semantic and task analysis (e.g., Gagné & Briggs, 1979; Gagné & Driscoll, 1988; Dick & Carey; 1990; Merill; 1978, 1980). Learning objectives are clearly addressed in the form of performance 'verbs' such as 'do' or 'count' for the 'measurable' outcomes (e.g., Mager, 1984). Learning strategies are developed for mastering learning objectives by presenting stimulative events to repeatedly reinforce learners' mastery of knowledge (Firdyiwek, 1999). This approach stems from the Skinnerian notion that learning can be shaped by repetitive 'reinforcements' of the learner's behaviour (Fox, 1996; Zakari, 1997; Cunningham, 1992). Instructivist environments are teacher-centred perspectives: every learning activity is predefined, so that learners are passive receivers rather than taking an active approach towards learning (Bednar, et al. 1992).

There is no doubt that, until recently, instructional design has been mostly influenced by the instructivist perspective on learning, for example in computer-based learning (see Hannafin & Peck, 1988; Driscoll, 1998; Khan, 1997). In computer-based learning (sometimes known as computer-assisted instruction—CBL/CAI) programmes, learners

are generally constrained by pre-designed instructions that ask learners to master a given set of goals. The learning activities are systematically designed to achieve specified learning objectives. For instance, in tutorial or drill type software such as "Math Blaster Algebra",[3] learners are required to solve a sequence of similarly structured questions until learners achieve learning objectives.

Instruction based on instructivist perspectives has been shown to be effective in learning programmes which are for well-established, basic subject knowledge, e.g. basic arithmetic or basic skills in adult training (Rosen, 1999). In educational software based on the instructivist approach, individualised and self-pacing learning has been emphasised as a strong point for the achievement of mastery, since Skinner asserted that there is no individual difference in the achievement of learning goals except learning speed (Hanaffin & Peck, 1988, Kwon, 1990; Fox, 1996). Goal-oriented learning environments have been claimed to motivate learners' achievement (Gagné & Driscoll, 1988; Dick & Carey, 1990). The accountability of the learning is argued to be relatively high because learners are assessed by statistically-reliable tests consistent with learning goals (Bednar et al., 1992). By presenting various practical examples from schools in USA, Rosen (1999) claims the strong points of instructivism as follows:

> Clearly, instructivism works…instructivist schools have a clear understanding of what their pupils should learn and how they are expected to behave. They believe that the teacher's most

[3] 'Math Blaster Algebra [ages 12 to 14] from Davidson, provides a broadly appealing collection of problem-solving activities supported by a video tutorial collection that will intrigue the user and offer practice for beginning algebra skills.' (http://www.superkids.com/aweb/pages/reviews/math/algebra/1/sw_sum1.shtml)

> solemn job is to instruct the young in the knowledge, skills, and behaviours determined by adult society to be valuable.[4]

On the other hand, harsh criticisms about instructivist perspectives have been made by many researchers (e.g. Papert, 1980; Duffy & Jonassen, 1992; von Glasersfeld, 1998). Didactic learning environments are argued to hinder learners' autonomy in their learning experiences. As the teacher is the centre of the learning, and a prespecified learning material is delivered by the teacher, no individual differences in learners can be considered. Teachers may transmit a certain amount of knowledge but this does not promote flexible ways of thinking because no personal experience is considered in learning. Instructivists have argued about 'individualised learning' (e.g. Kwon, 1990) but I conclude that 'individualised learning' for instructivists mean solely the opportunity to learn at an individual learning pace in a programmed learning environment, rather than to acknowledge individual differences. Assessment is also a critical issue. Spiro et al. (1992) point out that assessment of learning objectives is limited in 'memory tests' that require learners to reproduce what they are taught. It is a major question whether learners can flexibly apply learnt knowledge into new environments or tasks, and this kind of flexibility is a strong claim of constructivist learning perspectives.

2.1.2 Constructivism

While constructivism has roots in philosophy, psychology, sociology, and education,

[4] Page numbers of references that are from web pages will be omitted throughout the dissertation.

my dissertation will focus on educational literature. Constructivism is a theory about how learners construct knowledge, whilst objectivism emphasises the object of the knowledge (Carr et al., 1988). Constructivist approaches have emerged from the work of researchers such as Piaget, Bruner, and Vygotsky. Recently, they have had considerable influence in instructional design (see Duffy & Jonassen, 1992; Fox, 1996; Larochelle et al., 1998). Currently, 'individual constructivism' and 'social constructivism' are the most dominant perspectives.

Individual constructivism

Individual or personal constructivism explains the process of the construction of knowledge in the context of individual cognition. Piaget, Dewey, and von Glasersfeld can be recognised as individual constructivists (Zakari, 1998). The theory of individual constructivism has been traced back to Piaget, who emphasised the active way in which the learner acquires or constructs an internal model of the world out of his/her experiences (Fox, 1996).

Individual constructivism's major assumptions are that learners actively construct their own views of knowledge, and negotiate meaning, by their experiences in the external world and by cognitive conflicts caused by these experiences (McConnell, 2000). The prior knowledge of the learner is regarded as essential in order to actively construct new knowledge because learners' established views, formed of prior experience, filter all experience and determines its interpretation (see Duffy & Jonassen, 1992; Zakari, 1998; Carr et al, 1998). This view of learning sharply contrasts with one in which

learning is the passive transmission of information from teacher to learner. As learning is a constructive process and a personal interpretation of knowledge, in a learning environment based on individual constructivism, there is a tendency to downplay the teachers' role, and focus on learner's active discovery and exploratory learning (e.g., Papert, 1980; Duffy & Jonassen, 1992)

Individual constructivism has had a broad influence in education. For example, Logo programming (Papert, 1980), Microworlds/Simulation, and Information Bank can be classed as examples of constructivism.[5] However, individual constructivism fails to look at the extent to which the human environment affects learning (Dougiamas, 1998), an issues which focused on in more detail by social constructivism.

Social constructivism

Social constructivism originates from Lev Vygotsky (e.g. 1978) who examined the critical roles of society for the development of individuals' cognition and behaviour.[6] Social constructivists assume that individual learning is socially-mediated. Knowledge is constructed by social activities and cultural practices. Therefore, learning is defined as collaborative activity and a process of acculturation into an established society (see Dougiamas, 1998; Wood & Wood; 1996; Wilson et al., 1996; Duffy & Cunningham,

[5] For more examples, see Chen's site (http://www.coe.uh.edu/ ~ichen/ebook/ET-IT/cover.htm.)

[6] Vygotsky is often compared with Piaget. "*The difference between Piaget and Vygotsky is about the primacy of individual psychogenesis versus sociogenesis of mind. To Piaget, children construct knowledge through their action with the world: to understand is to invent. By contrast, Vygotsky claims that understanding is social in origin…. It can be also said as 'individual constructivism versus social constructivism*" (Cole & Wertsch, online).

1996). That is, individuals participate in a social setting, interact and collaborate with others, mutually adapt to each other's actions, and go through an external or social stage of consciousness, and finally 'internalise' it. This development process can be defined as 'self-regulation' referring to the learners' increasing capacities to plan their actions, control their own behaviours, generalise skills to new situations and, in sum, learn how to communicate and think (Harvard, 1996).

The idea of Zone of Proximal development (ZPD) must be illustrated because it is the major mechanism which Vygotsky suggested for learning. Vygotsky (1978) says that when a learner interacts and cooperates with adults or more capable peers, learning arouses a variety of internal developmental process, such as cognitive, social, and communicative skills that enable them to function appropriately in their culture (Harvard, 1996; Heinrich, online). Consequently, a major role of education is to create a learning environment, in which participants can actively learn to use, apply, and organise tools, e.g. language or technology, and to make meaning. Tools are important factors in Vygotskian theory. Harvard (1996) argues that Vygotskian theory presents a strong, dialectic connection between external practical activity mediated by cultural tools, e.g. language, symbolic signs, physical tools such as technologies, and an individual's intellectual activity. The use of tools can affect learners' cognition by helping them to change their skills, perspectives, and ways of representing the world.

The role of teachers for guidance and collaboration is more important in social constructivism than in individual constructivism (Wood & Wood, 1996). In a social constructivist learning environment, it is about helping learners to know how to

analyse, organise, and apply knowledge for themselves (Harvard, 1996). Consequently, teachers become 'mediators' rather than 'instructors'. Teachers who focus on social constructivist approaches need to create a context for learning in which learners can become engaged in interesting activities that encourage and facilitate learning. They have to help learners move from assisted learning-which has been described as the 'scaffolding' method (Wilson et al., 1996).

Situated learning

Social constructivism comes under the broader theory of situated learning (Kerka, 1997; Wilson et al, 1993). Situated learning can be discussed with social constructivism, however, I will discuss it separately in order to illustrate its feature more fully. Situated learning researchers focus on the social aspects of knowledge and learning. The major argument is that knowledge is a product of the activity, context, and culture in which it is used and it should be learned in a meaningful context through active learning (see Brown et al., 1989; Lave & Wenger, 1991; Anderson, et al., online; Wenger, 1998). Therefore, the learning task cannot be isolated, but is rather part of a larger context. Learning must be situated in a relevant or 'authentic' context in order for knowledge to be applicable to real situations beyond the school or training classroom.

Brown et al. (1989) suggest cognitive apprenticeship as an example of situated learning; new comers become trained and skilful through the help of old-timers. This notion can be expanded into the 'community of practice' idea which Lave & Wenger (1991) and Wenger (1998) illustrated with various examples of apprenticeship. Lave

and Wenger (Ibid.) argue that situated learning provides a way of reconceptualising educational practice. Communities of practice have embedded knowledge about practice, and learning is the process of entry into that community in the form of 'participation' not just an internal process of individual minds (Brown, et al., 1989).

Seen from a situated learning perspective, the design of instruction is no longer about the prespecified, detailed lesson plans for what the learner should do. Instead, it is the creation of an environment where learners can explore, analyse, reflect, and practice the rules, skills, and patterns of community (Firdyiwek, 1999). In this environment, the teacher adopts the role of 'mediator' to effectively help and guide the learner to understand and apply knowledge in real settings by modelling, coaching, mentoring, and providing a cognitive 'scaffolding'. Collins et al. (1991) demonstrate that the basic methods of situated learning can be successfully implemented, and these have led learners to greater understanding, and flexible application of knowledge in new situations.

Educational implications of constructivism

There is no single constructivist approach to instruction (Zakari, 1998). But, they all share a learner-centred perspective, to motivate learners' activities and encourage them to create more lasting, transferable, meaningful knowledge (Carr et al. 1998). Cunningham (1992) argues that "[constructivist] instruction is to show learners how to construct plausible interpretations [of learning environments], using the tools that we have provided or developed in collaboration with them" (p.35).

Constructivism is concerned with learning environments, context-based decisions and resources. Contents or learning goals cannot be prespecified (Duffy & Jonassen, 1992). Rather, the learning goals are that learners must deal with complex problems through managing learning tasks (Perkins, 1992; Cunningham, 1992). Ideally, therefore, learning tasks should be authentic in a meaningful context rather than abstract instruction out of context (Cunningham, 1992). Presentations of multiple perspectives and tasks are necessary because every learner has his own perspective (Carr et al, 1998). In order to reflect multiple perspectives in a learning environment, Spiro et al. (1992) argue that information in a learning environment must be combined with information 'outside of the learning environment' in order to form a complete and adequate representation. Social interaction is crucial to share and develop multiple perspectives, and so, collaborative learning is encouraged (e.g. Bednar, et al., 1992; Carr et al., 1998; Wenger, 1998). Teachers' role in constructivist learning environment is to guide individuals, facilitating learning by encouraging active inquiry, guiding learners to question their tacit assumptions, and coaching them in the construction process (Kerka, 1997). Assessment based on constructivism should be directed toward the students' construction of plausible solutions to problems and process of finding solutions, for example, by asking learners to reflect on their learning and document the processes they went through (Bednar et al., 1992; Cunningham, 1992).

It is clear that constructivist learning perspectives are challenging to traditional notions of education. Carr et al. (1998) present various researches, which demonstrate the effective implementation of constructivist environments, e.g. computer-based

networking environments, for achieving higher-order thinking and understanding, high scores in assessment, or increased motivation. However, there are certainly limitations to constructivist perspectives. The low structure of instruction, ambiguity of contents, and absence of initial objectives have been argued to cause inefficiency in the learning process (Carr et al., 1999; Zakari, 1998). For those who are familiar only with objectivist perspectives, constructivist perspectives seem to be difficult to implement in educational settings (Wilson, et al., 1993). Assessment, especially, is a difficult issue in constructivist learning environments. Instructivists question the 'accountability' of constructivist learning. Merrill, Reigeluth, and Dick (Duffy & Jonassen, 1992; Kerka, 1997) express concern that constructivism might lead to a failure to define what will be taught and a failure to measure what has been learned. Time constraints and administrative procedures are additional factors which hinder the implementation of constructivist learning environments. It is the tasks of constructivists to answer these criticisms.

Nevertheless, I can see important possibilities for constructivist learning environments for the use of professionals in organisations, although constructivism has mostly been developed in relation to children, and only occasionally considered in the learning of adults (Fox, 1996). Learning environments for adults must be more flexible, especially when the current workplace is drastically changing (Tapscott, 1995; Driscoll, 1998). In the next section, the currently dominant perspectives on business education will be reviewed in the context of organisational learning and action learning.

2.2 Perspectives on workplace learning

Traditionally, in business sectors, 'learning' is regarded as acquiring certain skills for the workplace through designed training programmes. However, the radical changes of recent years are requiring organisations and companies to consider alternative forms of learning and training, because the skills and knowledge required in such a changing environment are unlikely to be achieved by existing business education programmes that generally focus on the delivery of content (McKenzie & Swords, 2000). There has been an increased demand on professionals to continuously renew their skills and capabilities, and to develop reflective ways of thinking to confront novel situations. Learning becomes a critical part of ongoing work activity (Sumner and Stolze, 1996).[7] Emerging ideas of workplace learning, e.g. organisational learning and action learning, can be argued to realise these learning objectives.

2.2.1 Organisational learning

'Organisational learning' or 'learning organisation' is an emerging learning perspective for organisations and companies.[8] As the amount of knowledge and information is growing in modern society, learning cultures become important. Issues about how to manage growing amounts of information, and how to create and use new knowledge

[7] The word 'training' suggest the passive aspects of learning for employees. As the nature of environments and ways of learning have changed, in my opinion, our terminology should change from 'training' to 'learning', because 'learning' represents more a learner-centred approach.

[8] Argyris (2000) suggests that 'learning organisation' is a practitioner's view and 'organisational learning' is an academic view. Yoo (1995) explains 'organisational learning' as a 'process' and 'learning organisation' as 'the result' of the process. In this dissertation, both terms may be used interchangeably, however, the process aspect view will be emphasised.

are critical for the improvement of organisations. Organisational learning has been proposed as an effective way to realise the 'learning culture' in an organisation (e.g., Senge, 1990; Yoo, 1995; Argyris, 2000).

Organisational learning can be defined as a continuous process effected by individual members. Thus, organisational learning is the accumulation of individuals' learning. All members of the organisation critically analyse emerging information, create or acquire skills and knowledge, and share them with others. Individual and group learning experiences become increasingly embedded in the 'organisational memory'. By doing this, it is argued that organisations are able to face turbulent changes, solve the internal and external problems they currently face, and optimise the capabilities for improvement (see Sumner and Stolze, 1996, Sumner et al., 1998; Roffe, 2000; Yoo, 1995).[9]

In organisational learning, social interactions become critical. In general, organisations consist of multiple communities that have specialised knowledge, skills, and technologies. Organisational learning promotes the creation and sharing of knowledge and skills amongst communities interdependently. Organisational learning emphasises informal learning from individuals' spontaneous activities and promotes every individual to become more expert in different aspects of work rather than limiting expertise to one or a few individuals (Yoo, 1995). Sumner et al.(1998) present various

[9] Organisational learning has two different learning aspects: adaptive learning and generative learning. Adaptive learning focuses on the present situation for facing change or solving problems, and generative learning focuses on the future, finding new opportunities for improving an organisation's ability (Senge, 1990).

positive case studies on the integration of individual and organisational learning in work practices (BAe, TecInno/JOLA, and DFKI/Saarbergwerke) and argue that individuals are empowered since they can contribute in a meaningful way to the improvement of working practices.

There are barriers to hinder organisational learning environments. Yoo (1995) introduces Marguardt and Reynolds's arguments. First, in order to implement organisational learning, a fundamental and radical change is necessary. Each individual has to reconstruct their ways of thinking and the systems of organisation have to be fundamentally changed. Secondly, strict hierarchical structures, competition on between groups or individuals, lack of communication, lack of leadership, and ineffective sharing of information hinder the implementation of organisational learning. Thirdly, the lack of individual learning ability in an organisation: e.g. lack of ability to critically interpret and reflect on the results of organisational activity, to directly apply learning, to create new knowledge, or practice or try out a new idea. In short, the fundamental process of change generates resistance from employees and organisation (Zuboff, 1988).

For an organisational learning environment, therefore, a supportive organisational culture is necessary. At a personal level, individuals need to think systematically about their working environment and need to learn continually in order to become more expert in their particular fields. Also, every individual has to be a member of the organisation and be aware of its common goals and visions. This can happen only through discussion and negotiation (see Senge, 1990; Yoo, 1995; Roffe, 2000). At an

organisational level, the organisation has to try to offer a learning environment which facilitates individuals' construction of knowledge through experiential, contextual, and social methods. They need to support individuals to diagnose potential problems or opportunities, and support the sharing of knowledge across workplace communities and across time (Sumner et al., 1998; Sumner & Stolze, 1996).

2.2.2 Action learning

Action learning is another developing learning perspective with powerful implications for business education.[10] The background of action learning is the same as organisational learning: to face up to changing working environments and to find relevant and reliable knowledge. According to McKenzie & Sword (2000), the conventional design approach based on 'needs analysis' (e.g. Rossett, 1987) in business training cannot match to the speed of the changes. Learners face the need of constant creativity and innovation through actions and experimentation, not only through books and lectures (Revans, 1982). Consequently, an improvisational and speedy learning methodology is required.

The basic assumption of action learning is the experiential and reflective nature of learning. Action learning is a pragmatic approach that builds on the notion of 'learning by doing'. It is not only about acquisition of knowledge or skills but about learning and implementing knowledge in real situations. Prestoungrange (2000) argues that action

[10] Action learning can be argued as a methodology for organisational learning. However, in this dissertation, I will discuss it separately in order to give more detailed explanation.

learning happens where the feedback from actions is continually used as the basis for updating the way we do around in organisations. In action learning, individuals of 'a group' or 'a team' continuously help each other, whether they are experts or not, to learn from their experiences and to solve problems.[11] Although each individual has different perspectives and different problems, through 'reflective processes' while they work with others as a team, learning happens for each participant differently. In this way, individuals can reach solutions to problems. However, for successful implementation, each learner's continuous and autonomous participation is essential (see Yoo, 1995; Dick, 1996; Hallowell & Hillman, online; Prestoungrange et al., 2000).

Research into the current practice of action learning shows that the major objectives of action learning have focused on the work of managers to solve real world problems where no solution already exists, and to learn and develop in the process (McKenzie & Swords, 2000; Dick, 1996). Consequently, traditional leadership tasks such as organising, directing, and controlling are no longer appropriate as it constrains the management process of organisation. The action learning process challenges managers to take accountability for creating real change in an organisation which is learning the core process of leading change in an organisation: analytical thinking, problem solving, and evaluation of the result (Hallowell & Hillman, online).

Action learning cannot be appropriate to every training program. Nevertheless, there is a bit to recommend it. First, action learning focuses on doing real work, problem

[11] Learning organisation generally explains the whole dynamics of learning in organisation. But, in action learning situations, a project team is generally constructed to solve problems (Yoo, 1995; Dick, 1996; Prestoungrange, et al., 2000).

solving activities leading to real solutions (Hallowell & Hillman, online). Learners can get to guidance from other team members in real-time by 'observing', 'listening' and 'discussing' as well as direct assistance from experts. Learners can experience intrinsic reinforcement in their work as they solve problems (Sandelands, 2000). Second, action learning is based on informal learning and on-the-job learning approaches. Learners spend less time away from work than they do in off-job training. It provides an opportunity to develop cost-effective learning environments compared to a traditional face-to-face learning environment. (see Sandelands, 2000; Bowerman, 2000; Billet, 1996).

Action learning is not a simple process and there are no guaranteed returns (Hallowell & Hillman, online). The ambiguity of the scope and purpose of action learning can cause confusion between learners. Individuals can be reluctant to participate in learning activity and they may not get enough assistance from other members. It is possible to have big gaps between participants, so that differences cannot be overcome team working fails. The competitive nature of organisation can limit the cooperation amongst participants. To facilitate team activities, team leaders or facilitators' roles can be important to coach the process (see Hasebrook, 1999; Watson, 2000; Hallowell & Hillman, online).

Action learning can be a resource- and time-consuming activity and can be difficult to implement in organisations in which evident and quick results are required. Therefore, a lack of organisational commitment to support and follow the results from action learning can hinder its the successful implementation, and result in a step back at

conventional methodologies. Management has to be more flexible about learning, and provide time and space for examples to learn (see Hasebrook, 1999; Watson, 2000; Billet, 1996).

Summner et al. (1998) argue that the convergence of telecommunications and computers technologies are promoting workplace and social-constructivist learning. In the next section, I will review the design issues of telecommunication and computer technologies in education in the context of the Internet.

2.3 The design of web-based learning environments

There is no doubt that computer and communication technologies have had a widespread influence on organisations and companies as tools for distance education. Especially, the advancement in networking systems in recent years, e.g. the Internet, has been afforded opportunities for innovative change in business education (e.g., Khan, 1997; Campbell, 2000; Caudron, 1996; Sumner et al., 1998).[12] Currently, many companies have constructed internal networking systems, Intranets, for work and learning activities. Online learning environments, in the form of a 'virtual campus' or 'virtual university', have also developed since companies discovered that the Internet can distribute information, resources, and learning courses to their employees worldwide (Prestoungrange, 2000; Caudron, 1996).

Zielinski (2000) emphasises that, for the effective development of the Internet- or web-based learning (hereafter, both referred to as WBL) environments, we have to consider three elements: the technology, course design, and the learning environment. In this section, I will discuss the potential of the Internet for constructivist learning approaches in business education, and constructivist strategies for the design of WBL environments.

[12] The Internet is a network of networks including the listservs, newgroups, and discussion forums along with electronic mail and electronic journals. In this dissertation, the terms Internet and web will both be used to represent the Internet in general.

2.3.1 The potential of the web in business education

WBL is an innovative approach to the delivery of instruction to a remote audience (Khan, 1997). It offers learners new opportunities to participate in the learning process via network-based activities. Trentin (2001) argues that this stimulates a need to provide new ways of learning that exploit that the potential of computer technologies, such as personalised courses or learning paths within the context of virtual communities pursuing collaborative learning.

Increased interactivity

The Internet can offer increased 'interactivity', that is engagement with knowledge resources as well as with other people (McKenzie & Swords, 2000).[13] Interactivity in social contexts can be provided by email, listserves, chat, online conferencing, and in instructional contexts by immediate feedback or questioning (Gilbert & Moore, 1998; Roffe, 2000). Interactivity in computer-based environments has been claimed to help the cognitive development of learners and their construction of knowledge (e.g. Pufall, 1988; Forman, 1985; Papert, 1980).

McCormack and Jones (1998) argue that communication or interactivity is an essential part of any learning experience. Internet technology is fundamentally about sharing

[13] Ravet and Layte (1997) prefer to use the term 'activity' rather than 'interactivity' since much computer software, and the internet included, has been described as 'interactive' when in fact it offers only a poor level of interaction between learner and software. However, I will use 'interactivity' to included their notion of 'activity'.

ideas and information between individuals rather than about the exchange of data between machines (Campbell, 2000). There is great value in connecting learners with other learners, which can lead to 'collaborative and interdependent learning' environments amongst learners in organisations or communities.

Access to resources

Raven and Layte (1997) assert that information should be made as widely available as possible in order to broaden everyone's understanding of what is happening in an organisation. Networking systems on the Internet give learners opportunities to access massive amount of materials worldwide as well as local knowledge and support. The hypertext or hypermedia nature of the Internet allows learners to move from one information site to another easily through unlimited chains of links.

Various perspectives are emerging as to what hypertext is and what it can do in education. Hypertext is simply a non-linear way of presenting information.[14] Unlike many previous computer-based learning technologies, hypertext is not constrained by the linear nature of programmed learning (Beven, 1999). Rather than reading or learning about information in the order that a designer sets out in advance, learners may follow their own paths and create their own order that is, create their own meaning out the material (Ravet & Layte, 1997; Amaral, 1995). This is accomplished by creating 'links' between information, provided so that readers may jump to further information

[14] Hypermedia is an extension of hypertext that incorporates other media – sound, video, animation – in addition to simple text (Lavet & Layte, 1997). In this dissertation, 'hypertext' will also imply the notion of hypermedia.

about a specific topic being discussed which may have more links again leading each learner off into potentially different directions.

There is a question as to what extent a hypermedia learning environment can provide learners with rich learning strategies. Many claims are made about the freedom of navigation of hypertext. For example, Beven (1999) argues that hypertext is a new form of information access which is highly attractive to the user because it gives them full and easy control over access to information. Liaw and Huang (2000) argue that hypertext uses the resources of the Internet to create a meaningful learning environment. Hypertext does have the potential to develop learning environments which are in line with constructivist learning perspectives. By exploring the Internet with greater autonomy, learners can construct their own meanings and knowledge. This can encourage learners to take more responsibility for their own learning and to develop lifelong learning skills (Campbell, 2000).

Flexibility

Internet technology overcomes the restrictions of time and geographical distance which conventional face-to-face learning environments have. Learners can learn at any time, anywhere, and at their own pace (Roffe, 2000; Hudson, 1999). That is, learners who prefer to study at distance or in workplace can participate in the learning activities conveniently (McConnell, 2000; Mason, 1994; Lewis et al., 1995). This has been discussed as a critical solution to many of the structural barriers that adult learners experience, especially in business education (McConnell, 2000; Laurillard, 1993).

Due to the time and space independence, learners' interactions are flexible and asynchronous rather than instantaneous. Learners communicate with other learners and the tutor by emails, message-lists, and may be real-time chat. They can contribute their work whenever without waiting their turn or interrupting others. It gives time for learners and tutors to think and reflect on their messages and prepare to contribute a message at a later point at learners' initiation (Mason, 1994, Wegerif, 1998).

Convenience

More and more employees in organisations and companies are trying to learn. Internet technology reduces the cost for implementing the educational courses: less money for trainers, trainees, and training places. There is no need to purchase a special technology platform because most Internet technology is based on web browsers and common HTML (HyperText Markup Language). Learners are in general familiar with the Internet environment. Additionally, course data can be easily modified, distributed, and updated. (see Ravet & Layte, 1997; Hasebrook, 1999; Watson & Rossett, 1999).

Some barriers

Although there is strong potential for Internet technology in business training, some barriers are present. There is an issue about access to resources: some organisations may have difficulty because of a lack of technological infrastructure. Access to information can be a time-consuming activity, and the cost of a using the Internet can

lead learners to anxiety about making extensive use. There is still some need for training on how to use the Internet technology (Driscoll, 1998; McCormack & Jones, 1998; Wagner, 1997). However, these limitations can be reduced in business education as more and more organisations construct the networking environments and the cost for network connection is dropping.

Another critical issue is about the design of learning resources. Unreliable hyperlinks can lead learners to 'misconstruction' of knowledge or to disorientation in cyberspace. WBL environments have to be designed to provide reliable resources to learners by carefully considering resource authentication and security.

2.3.2 Design strategies for WBL environments

The use of Internet technology in business education has up to now been mostly influenced by conventional approaches to learning: centralised, content-based and instructivist-based. Design of learning materials focuses on 'teaching' skills and knowledge which employees need to know. Peterson (2000) indicates some limitations of current distance education materials: a) there is no theoretical framework; b) no account of individual differences; c) insufficient use of digital libraries. However, the Internet can offer open, flexible, and constructivist learning environments (see Khan, 1997: Driscoll, 1998). In this part, I will review some design strategies to exploit this potential.

Firstly, the interactive and flexible features of the web must be fully reflected in a design process which is open, flexible, and independent. Designers must define the types of social and instructional interaction in the WBL environments. Besides, they must define the levels of instructors' control, learner control, and group influence desired over the interaction (Gilbert & Moore, 1998: Liaw & Huang, 2000; Hung, 2001). Learners must have the opportunity to be involved in direct learning activity.

Autonomy must be given to learners to control their own learning, not to ask them to follow prespecified instructions. In business education, I argue that the characteristics of adult learning must be understood. Driscoll (1998) says that adult learners are very different compared to children because they have more life and work experiences. Learners must have the freedom to study flexibly according to their own needs and their own learning pace. The learning environment must be a place in which learners can reflect their experience, various learning styles, and multiple perspectives.

Designers should not limit contents in prespecified areas and must extend the design concept to use various supporting resources on the Internet. It is impossible to assume that one expert or one designer can know everything about a subject. Designers must place resources online where they are easily accessible and searchable (McCormack & Jones, 1998). A variety of case studies or problem solving exercises can be incorporated into resources as well (Ravet & Layte, 1997). Beyond materials, human expertise is a great resources for learners, e.g. making expert's contribution more widely available (Hung, 2001). Inviting many experts to the course for advice or opening the course to the public can be the way to facilitate the contribution from human expertise.

Web usability is a very important design issue. The basic design requirements of a user interface are consistency, simplicity, and accuracy (Preece, 1998). Consistency of Web design is critical: designers should establish a consistent 'look and feel' for navigation and information. Appropriate guidance, e.g. maps and icons, is necessary for helping learners to develop correct mental models of how different parts of a web site relate to one another. The use of fonts, colours, and the length of contents must be simple rather then too various and complex for helping learners to focus. The presented information must be accurate, with outdated or unreliable information removed regularly (see Shneiderman, 1997; Nielsen, 1998; Preece, 2000).

Finally, the effective validation of learning in the WBL course must be examined throughout the design process (Ravet & Layte, 1997). The contents of the WBL must satisfy basic standards of competence for employees. Student assessment can be facilitated by embedded practice and assessment mechanisms such as observation of work performance after employees complete a WBL course (Ibid.).

2.4 Collaborative learning and resource-based learning

Collaborative and resource-based approaches are possible ways to facilitate the potential of the Internet. Quite a few researchers support 'collaboration' amongst learners and access to 'resources' as essential for learners' construction of knowledge (see Carr, et al., 1998; Bednar, et al., 1992; Wenger, 1998). Liaw and Huang (2000) argue that a WBL environment should include many resources which are not readily available in books or lectures, and which support collaboration.

2.4.1 Collaborative learning in a WBL environment

Collaborative learning is a learning process that emphasises group or collaborative efforts, active participation and interaction between learners and trainers, or even any type of collaboration between people working together (Kaye, 1992). The basic assumption of collaborative learning is that learners' achievement can be improved compared with learning alone (see Kaye, 1992; Mason, 1994; Gundry, 1992). This notion is inspired by Vygotsky's ZPD theory that collaboration with others is central to individual development.

The greatest educational importance of collaborative learning is that it makes use of intellectual interdependence to support individual learning (Bruffe, 1993; Kaye, 1992). Learners can achieve a higher result than individualised learning because their cognitive development can be supported by discussion and negotiation with peers or tutors (Johnson & Johnson, 1998). Quite a lot of researchers have argued that

collaboration with peers in learning situations can directly help to develop general problem-solving skills and strategies, through the development of the cognitive processes implicit in interaction and communication (see Slavin, 1990; Kaye; 1992; Mason, 1994). Johnson et al. (2000) also demonstrate that higher-level reasoning strategies are generally more active in collaborative situations than in competitive or individualistic ones.

Internet technologies can support collaborative learning and group processes in ways that may be difficult to achieve in face-to-face learning (McConnell, 2000). Berge and Collins (1995) argue that the goal of implementing online collaborative learning is to develop self-motivated learners and to help people learn how to find and share information through technologies. Currently, online collaborative learning has been mostly implemented in the forms of conference systems, e.g. computer mediated conferencing (CMC) or computer supported communication learning (CSCL, McConnell, 2000). However, I do not want to limit my discussion of online collaborative learning to conference systems, but rather to include any activity that learners have with other learners.[15]

The major advantage of online collaborative learning is that it develops greater 'interaction'. Unlike the limitations of conventional distance education technologies, e.g. print materials, audio and video tapes, and CBT programmes, networking technologies such as the Internet bring about the opportunity for individuals to

[15] Jackson (2001) reviews software for personal collaborative environments, an emerging category of software allowing individuals to interact one-to-one or in small groups, e.g. Finali, SoftArc-FirstClass, EZBoard, Lotus Quickplace, Yahoo E-groups.

communicate with others in various ways: synchronously and asynchronously via emails, chatting, or virtual communities (McConnell, 2000). Learners can share their ideas about learning materials or topics. They potentially have more access to tutors and supporting materials. They can receive rapid feedback about their work from peers or tutors (Petre et al., 1998). Tutors become more 'facilitators' than 'lecturers', helping and guiding learners according to their learning activities (see e.g. Kaye, 1992; McConnell, 2000).

Participants' motivation can benefit from online collaborative learning environments because they offer more interaction with others compared to non-collaborative and instructive online learning. The social dimension of online collaborative learning environments is important because it facilitates familiarity and personal openness between learners which are helpful for self-development (Mason, 1994). Learners do not feel as if they are isolated from others, and become emotionally satisfied and get a sense of belongings to community through participation (Søby, 1992; McConnell, 2000; Berge & Collins, 1995).

Collaborative learning encourages learners to take more responsibility for their own learning. Each individual's learning is depending on other learners rather than depending exclusively on the authority of the tutor (Bruffe, 1993). Learners are expected to participate in learning situations more actively and autonomously in order to fulfil their goals. They might plan and control their own learning process, or help others to share their ideas rather than waiting for help from a tutor (McConnell & Hammond, online; Mason, 1994). Access to enormous amount of data and learning

resources through network systems is one of the most significant Internet features to support learners' self-directed learning (Berge & Collins, 1995; Mason, 1994). However, this can be only a strong point for the learner who is highly self-motivated rather than for a learner who is passive and constrained by the instructivist learning experiences (Berge & Collins, 1995; Petre et al., 1998).

In spite of all these benefits from online collaborative learning environment, some features must be considered for successful implementation. First, technological infrastructure must be ready and available for every participant. Wegerif (1998) argues that, for forming a community and effective collaboration, it is important that learners have equal access to the learning situation. Proper human resources are critical for successful learning: the tutor as moderator must help learners' activities, and the technical administrator must assist them to become technically proficient with the environment (Kaye, 1992). Finally, and maybe most importantly, the learning context must be adequate for the online collaborative learning. Clearly, the nature of online collaborative learning is more conducive to seminar and syndicate style interactions than to more conventional teacher-centred learning (Ibid.). Learning for higher-level reasoning, such as thinking skills or problem-solving can be an appropriate learning context for online collaborative learning (Johnson et al., 2000; Slavin, 1995).

2.4.2 Resource-based Learning in a WBL environment

As an organisation changes its way of training employees from a conventional instructivist approach to a learner-centred approach, learners are required to take

control of their environment. The training must enable employees to know necessary information, to develop an ability to learn independently, to develop good communication skills and team working skills, and to develop an ability to adapt to changing circumstances. Resource-based learning (hereafter referred to as RBL) combines the strengths of educational institutions, experts, and resources to help learners and organisations to achieve this aim (Mapp, 1996). RBL can be defined as 'an integrated set of strategies to promote learner-centred learning…through a combination of specially designed learning resources and interactive media and technologies' (NCODE, online).

RBL is an open, flexible, and learner-centred learning environment. Compared to the limited resources in conventional libraries or resource centres, RBL can offer equal opportunities to learners to access resources wherever or whenever they need them. The best RBL allows learners to explore freely across subject boundaries, discovering and following their own areas of interest, setting their own goals and devising their own learning programmes. Learners can learn independently and flexibly by using resources which are constructed online with less direct help from tutors. They can develop learning skills which enable them to become lifelong learners. The efficient use of resources can avoid tutors' duplicative effort in the preparation of course material (See Rowntree, 1997; Brown & Smith, 1996; Ryan, et al., 2000). These are the same features which can be found in collaborative learning environments. The difference is if we understand 'collaborative learning' at a group level, RBL can be understood at a personal level. For the most successful RBL environments, feedback mechanisms must

be built-in because learners need feedback quickly to aid understanding and correct errors (Race, 1994).

The design of RBL

Resources on the network are generally designed for supporting a specific group of users in certain subjects. The resources have to include every information which learners may explore rather than to be limited to something designed by tutors for a specific purpose (Brown & Smith, 1996; Ryan, et al., 2000). However, there is a factor must be considered that the resource must be distributed with a purpose and not simply thrown every possible resource (McCormack & Jones, 1998). The design of an effective RBL environment is to allow learners to find information easily through clear and consistent navigation (Milheim & Harvey, 1998). For example, the placement of overview or summary screens must help learners to access easily to any location. Wilkinson et al. (1997) suggest some evaluation criteria for Internet resources when designers include resources for RBL:

(a) Site access and usability: It is necessary to locate and gain access to the server that houses the documents. It makes learners to ease of connecting, downloading, identifying the site.
(b) Resource identification: Information about resources, e.g. title, URL, and descriptive information in order to help learners to identify the basic properties of a resource.

(c) Author identification: It is necessary to ensure the authority any author by checking their name and professional background.

(d) Data validity: It is essential for an RBL environment to present relevant, accurate, and qualitative resources.

There is recognition that resources on the Internet have a relatively short period of validity. For a successful RBL environment, resources must be continuously maintained. For example, all hyperlinks must be regularly checked by administrators. At the same time, designers must search for new relevant resources on the Internet (Brown & Smith, 1996; Milheim & Harvey, 1998). Any feedback from learners about resources has to be fully used in the redesign and updating process.

Some disadvantages can be argued for RBL. High costs are to be expected for the initial development of materials. The costs for maintaining, revising, and updating resources are also considerable (Ryan et al., 2000). The production of resources has to be properly cost and designers or tutors should not to be forced to produce resources in their own time or in a hurry (Brown & Smith, 1996). The development of a 'community' for developing and sharing resources has been suggested as a solution to reduce cost and workload. Learners' study skills have to be developed because even well-designed RBL courses can fail if learners lack the information-handling skills for finding, synthesising, managing, and using information (Jackson, 2001). Therefore, designers or tutors should not provide learners too many resources too soon.

Gibbs (1996) argues that “learners need careful and thorough induction into new learning processes, explaining what is expected and how things will operate as well as developing new skills”. Designers should not expect that learners could learn and understand the information on the screen by themselves. Appropriate learning activities, such as writing, discussing, question and review, are necessary to engage with RBL environments. Learner support systems must be included, e.g. feedback mechanism from tutors or other learners. A lack of peer contact and interaction for learners can leave learners working alone. Interaction is crucial to maintain the motivation to learn (see Rowntree, 1997; Brown & Smith, 1996; Ryan, et al., 2000).

3. A REVIEW OF THE WEB-BASED INSTRUCTION "e-Test Leaders A"

3.1 Introduction

3.1.1 The Samsung SDS e-Campus

Samsung SDS (hereafter SDS) is one of the leading companies in Korea to develop and distribute online learning courses. Since 1996, SDS has been running an "e-Campus" on the Internet for the purpose of business education (http://www.e-campus.co.kr). The slogan of the "e-Campus" is to develop efficient workforces who are able to have creative and flexible thinking based on expert knowledge for preparing the 'digital society'.[16] The subjects of the e-Campus include IT, management and foreign languages, which are considered as important in the field of business education. At the time of this review (April 2001), two hundred and twenty online courses were available: 89 for IT, 44 for management, and 87 for foreign languages.

The e-Campus offers each user a basic platform with various functions. The term 'platform' may refer to either hardware architecture or a software environment (cf. TechEncyclopedia, http://www.techweb.com/ encyclopedia). For example, a groupware platform implies programming interfaces including e-mail, calendaring, and other client programs are written to communicate with the services provided by the server. At this

[16] The information about the "e-Campus" here is mainly from the web site (http://www.e-campus.co.kr), translated into English by the author.

point, it seems necessary to look at the basic structure in order to understand the learning environment of e-Campus.

Appendix A shows the first screen when an individual user logs on the e-Campus web site. The basic platform has six categorises: <Information>, <Course Information>, <Jobs Information>, <Books Information>, <Communities>, and <My Campus>. <Information> includes <Notices> and <Info.Desk>. <Notices> announces to learners new issues and information about courses. <Info.Desk> presents general information about e-Campus; e.g. history, design concepts, and customer services. <Course Information> provides comprehensive introduction to every course available at e-Campus. It gives the goal of each course, information for registration such as signup dates, the tutor, fee, etc, a course map, and a trial course. An individual learner may try a trial module. A learner may view the trial module before making up their mind to register for the course. A search engine is provided in order to help learners find particular courses. <Jobs Information> and <Books Information> are additional services for learners who are investigating new jobs or interesting books. <Communities> is BBS (Bulletin Board System) which is categorised by learning topic. The purpose of <Communities> is to share ideas and ask questions between learners. Twenty communities are currently active; 12 for IT, 4 for management, and 4 for foreign languages. Each community consists of <Discussion Boards>, <Q & A>, and <Resources>. <My campus> shows the courses which a learners is currently registered for or has already completed.

3.1.2 e-Test Leaders A

"e-Test Leaders A" is a web-based learning environment for learners who want to prepare for the qualifying examination of the Samsung SDS "e-Test".[17] The rationale and information about the course are given in the information page. According to this, "e-Test Leaders A" aims at '*developing individuals' ability for the purpose of leading the information society by acquiring the notions of KM (knowledge management) and IT, and to pass the qualifying examination'*. The target audience is mangers or directors of companies, military officers, and public officials. Another audience addressed is those who want to learn "*Hunmin Word Process 2000*" a word processing program developed by Samsung Electronics, Co. The audience is not required to have any prerequisite course or to take a follow-up course. The criterion of assessment is whether learners achieve more than seventy percent in the progress tests and examinations.

[17] "e-Test" is an Internet-based exam run by Samsung SDS. It evaluates computer and IT abilities and is officially recognised by the Korean government (http://www.sds.samsung.co.kr).

3.2 Methodological issues

In the previous chapter, several theories and methodologies were reviewed in the context of the design of network-based learning environments for business education. According to Brown and Dowling (1998), in order to justify claims, the empirical setting of the research must be explicit with the data gathered, that is, the move from the statement of a theoretical proposition to its empirical measurement has to be made. In this section, methodological issues for the empirical setting will be discussed: the sampling, the data collection process, and the approach.

3.2.1 Choice of the sample

The Samsung SDS "e-Campus" web site (http://www.e-campus.co.kr) was chosen as the sample learning environment. The procedure of sampling used can be described as 'opportunistic' (Brown & Dowling, 1998) as I had a contact who was one of the designers of the site. The main reason for choosing this site for my study is that it is typical of the online courses which are in current use in Korea. Before selecting the sample, a wide survey was carried out among companies in Korea implementing WBI courses, understanding types of WBI currently in use.[18] My personal experiences as an instructional designer also influenced the choice because I have developed WBI courses for several different companies.

[18] For example, the WBI courses from "e-Campus" of Samsung SDS, SK Academy, Credu, S1, and Campus 21 were reviewed.

3.2.2 Data collection techniques

Data collection has been generally carried out through personal contact with the designer, Jimin Choi.[19] Choi is an instructional designer who is working for the "e-Campus Team" at Samsung SDS. She is an experienced designer with five years' working experience, and is the designer and administrator of "e-Test Leaders A" which will be analysed in detail.

Permission was given to the author to access ten online courses: six about IT and four about management. The access was made from April to August 2001. Most data was collected from the site directly. Simultaneously, informal interviews have been carried out occasionally through emails and chatting. Through active interactions with Choi, supporting information has been collected, e.g. the maps, the synopses, and the design concepts of courses provided by SDS e-Campus.

3.2.3 Choice of approach to the analysis

According to Brown and Dowling (1998), every data collection and description inevitably involves a process of recontextualization. They argue that where the empirical setting is defined by an opportunity sample, the validity of generalisation relies on the researcher defining the continuity and discontinuity between empirical setting and theoretical background (Ibid).

[19] A pseudonym is used.

An attempt has been made to recontextualize the data by the qualitative approaches of 'audience research' and 'content analysis'. I have experienced the course as 'audience' by acting as a learner working in the system. While experiencing the course as audience, the content has been analysed as well. According to Silverman (2001), content analysis is an accepted method of textual investigation, particularly in the filed of mass communications. He suggests the advantages of textual data as follow:

- *Richness*: Close analysis of written texts reveals presentational subtitles and skills
- *Relevance and effect*: Texts influence how we see the world and the people in it and how we act
- *Naturally occurring*: Texts document what participants are actually doing in the world without being dependent on being asked by researchers
- *Availability*: Texts are usually readily accessible and not always dependent on access or ethical constraints. Because they may be quickly gathered, they encourage us to begin early data analysis (Ibid. p.122)

For the content analysis, categories were established based on the instructional design issues, e.g. user interface design, structure design, content delivery, and assessment. The theoretical frameworks reviewed in the previous chapter have been related to the categories. Examples, for each category, have been selected and reviewed.

3.2.4 Limitations of the analysis

At this point, a number of limitations that may restrict the evaluation of the next section need to be addressed. The sample course "e-Test Leaders A" does not represent the

whole range of WBI courses of the SDS e-Campus. Also, it may not represent the latest versions of the courses provided by e-Campus since the opportunity to access has been limited to a few of courses out of hundreds available. It is only intended to demonstrate some representative features of how the whole system works and how it can be analysed. Finally, since the language used in the sample is Korean, a significant difficulty is expected for the reader in order to understand my discussion of the site's contents as well as structure. With the intention of diminishing this, I will translate and illustrate the contents as much as possible with supporting figures.

3.3 The structure of "e-Test Leaders A"

3.3.1 Interface design and screen display

A user interface can be defined as the combination of menus, screen display, keyboard commands, command language and online help, which determines the way the user interacts with a computer or a piece of software. According to Kammersgarard (1990), a user interface is how to obtain a desired effect, and with the possibilities of controlling the computer application. It gives the user a 'more' immediate sense of the proposed system and thereby encourages them to think more carefully about the desirable characteristics of the system (Wasserman & Shewmake, 1990). In this section, I will discuss user interface design, focusing on navigation issues and screen design.

The user interface of "e-Test Leaders A" is designed in line with the general design concept of WBI courses in Korea including the e-Campus.[20] Figure 3.1 shows the basic platform for the user interface of "e-Test Leaders A".

When learners start the course, a new window pops up independent of the main Internet browser window. The size of the new window is approximately three quarters of the full screen. If necessary, however, the user can change the size according to his or her own preference.

[20] See Appendix B for more examples of the user interface design commonly found in WBI courses in Korea.

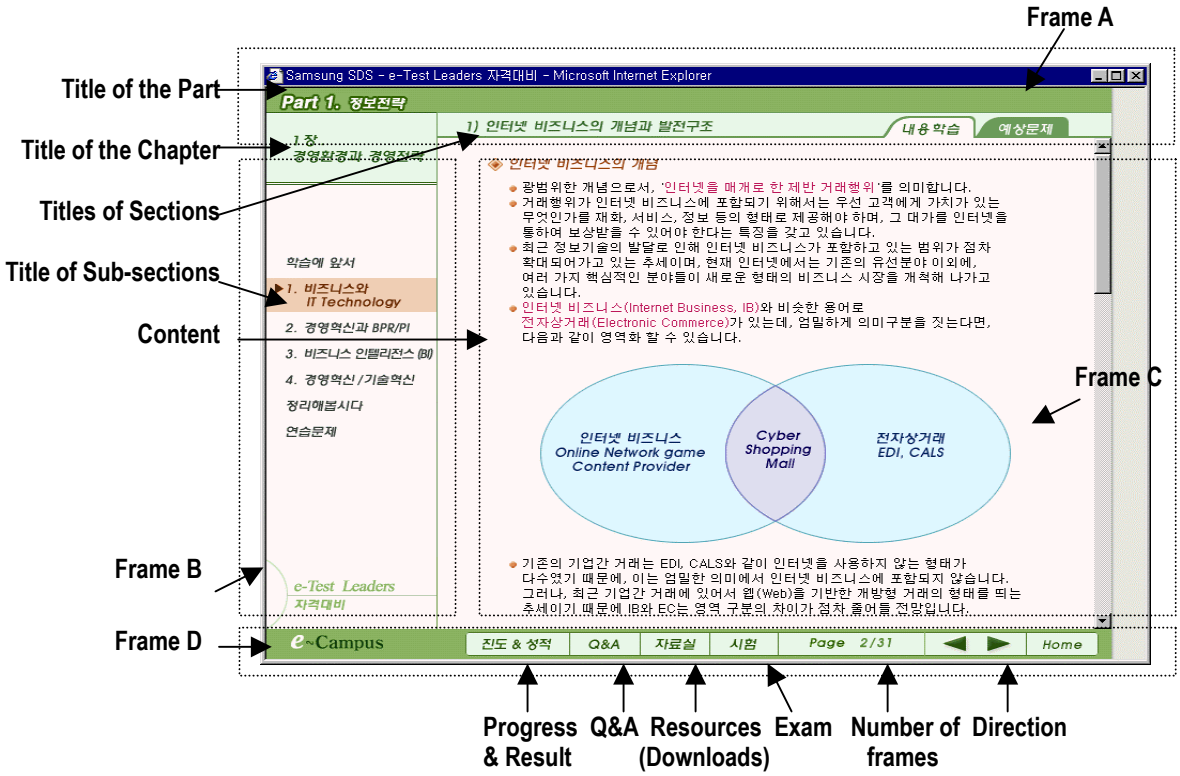


Figure 3.1 The basic user interface of “e-Test Leaders A”

It has been argued in the literature review that navigation must be clear and adequate. In “e-Test Leaders A”, the user interface pursues the basic principles of interface design which are generally recommended (e.g. Preece, 2000; Nielsen, 1999; Shneiderman, 1997). The interface is completely designed and controlled by the designer as there are no standard browser buttons (back, forwards, reload, etc). As shown above, the screen layout of “e-Test Leaders A” is generally simple and consistent. Only four or five soft colours in the same tone are used in order to present a harmonious feeling. The positions of title, icons, and contents are consistent throughout the course. Directions and information about the screen layout are more directly provided to the user by using ‘text buttons’ instead of pictorial icons, which can indicate the meanings and purposes immediately.

The user interface contains four frames. <Frame A> presents the title of each part and gives meaningful headings to orient learners to the topic (Nielsen, 1999). <Frame B> presents the table of contents. By highlighting the content of the page presented, learners can make sure where they are and what they should learn (see, Nielsen, 1999; Shneiderman, 1997; Hannafin & Peck, 1988). In <Frame C>, the main contents are presented, generally in the form of text and illustrations. The use of different sizes of fonts, colours, and bullet points for the different categories of the content helps learners to recognise the differences. The use of illustrations that are of good quality and interesting can be considered a strong point in the design of this screen display. On the other hand, one distracting feature is that too many words and information are presented in one page. Learners are expected to scroll the page to read information. According to Nielsen (1999), the volume of words should not be too much in one frame so that learners can scan information easily.

<Frame D> is the major navigation tool for the course, comprising seven different functions. By clicking <Progress & Result>, learners can check their current progress as well as examination results. <Q&A> is a bulletin board. It provides the opportunity for communication between the learners and the tutor, for questioning about the content or course procedures. <Resources> are provided for additional learning: materials from the tutor or plug-in programs (e.g. Active Tutor, NaNumi Player, Amov4ie.exe) from the system administrator. <Examination> is the final assessment after learners finish their studies. Learners can assess the volume of the contents using the page numbers in the bottom. Basic direction buttons are given to allow learners to move forward or

backward page by page. The <Home> button leads back to the table of contents for the course.

3.3.2 Structure of the content

In this subsection I illustrate how the learner might follow the structure of "e-Test Leaders A". I do not intend to present the whole, very huge structure of the content, but rather I will focus on the representative features of it. The description will be presented in a narrative way following the order of navigation. The basic flow structure of the course is illustrated in Figure 3.2.

Home

When the user logs on, a new window pops up and they can see notices from the tutor or the administrator. This is normally general information related to the process of the course (see, Appendix C). By clicking the start button at the bottom right hand side of the window, the user can start the main study by entering to the table of contents (see, Appendix D).

This table of contents is the 'Home' page of the course. Whenever the learner clicks the <Home> button, they jump into this page. This is a menu for choosing the contents which the learner wants to view. The distinguished feature here is that the learner can

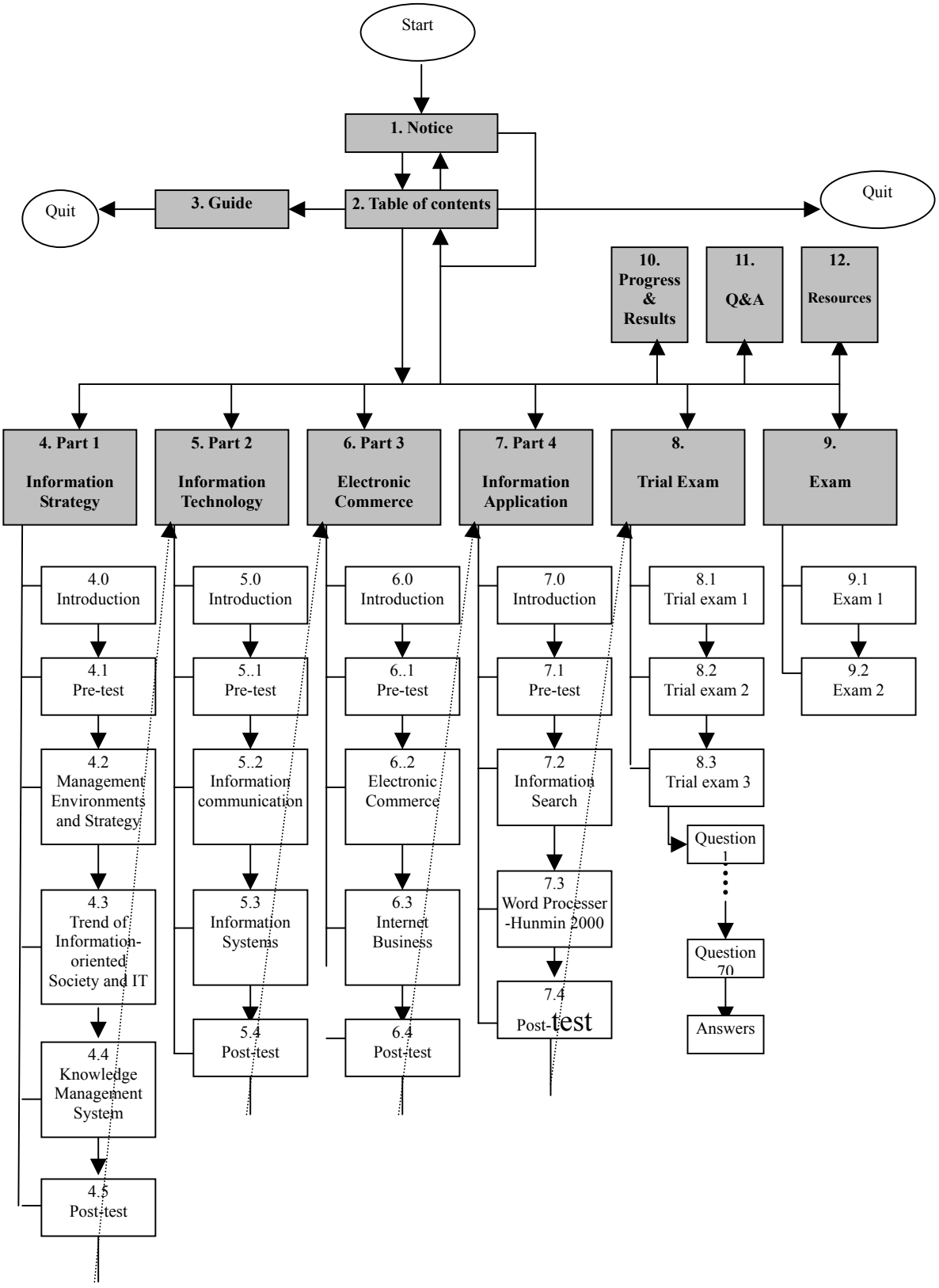


Figure 3.2 A flowchart of "e-Test Leaders A"

continue studying from the place where they finished last time as the system tracks the progress of the learner and remembers the last frame the learner visits.

"e-Test Leaders A" comprises four parts, nine chapters, thirty sections, and ninety five sub-sections. It also includes a <Pre-test> and a <Post-test> in each part. There are three different types of <Trial Exam>, and two instances of <Examination>. The expected learning time is given as twenty-five hours over the course of a month. Although the <Home> page allows learners to select the contents which they prefer, the assessment criteria demand that learners navigate a specified amount of contents. Consequently, learners must visit a great deal of pages.

Introduction

If the user decides to learn from the beginning, they are supposed to follow the directions designed in advance. Figure 3.3 illustrates the structure of the content if the user chooses, for example, <Part 1> on the table of contents. Under the assumption that the user starts from the beginning of <Part1>, the user will firstly see the <Introduction> page in which an animated tutor introduces the content of <Part 1> and the criteria of the examination (the <Post-test>) in order to prepare for it (see, Appendix E).[21]

[21] The <Introduction> frame uses "Macromedia Flash" and provides an 'animated tutor', although the animation is not so vivid.

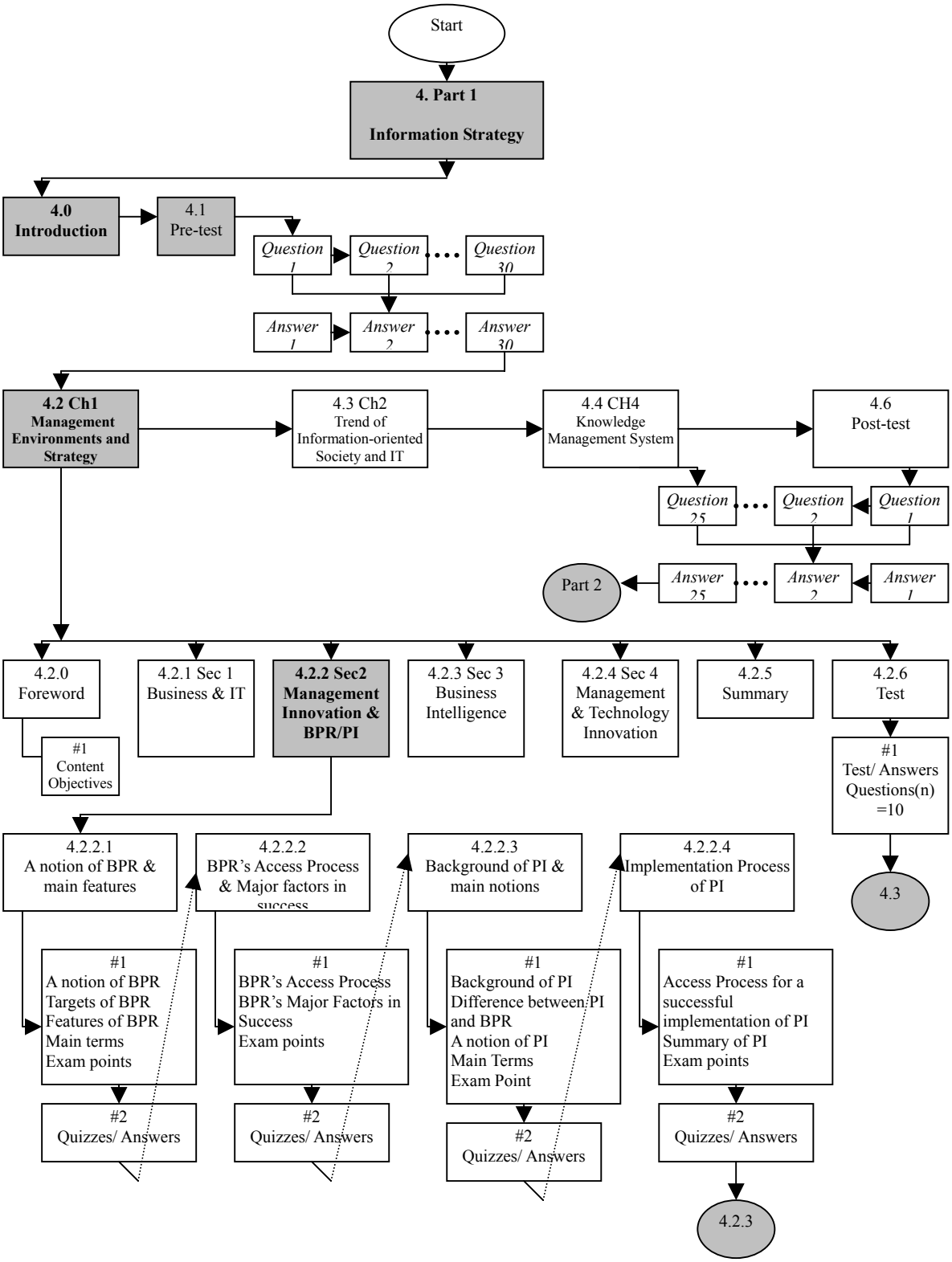


Figure 3.3 A flowchart of "e-Test Leaders A"

Pre-test

The <Next> button brings the user to the <Pre-test>. In each Part, a pre-test is presented for learners to check by themselves how much they know about the content which follows. The number of questions is thirty in each test and questions are displayed in a linear structure. However, if learners click the number buttons displayed on the left hand side, they can view the questions in any order (Figure 3.4).

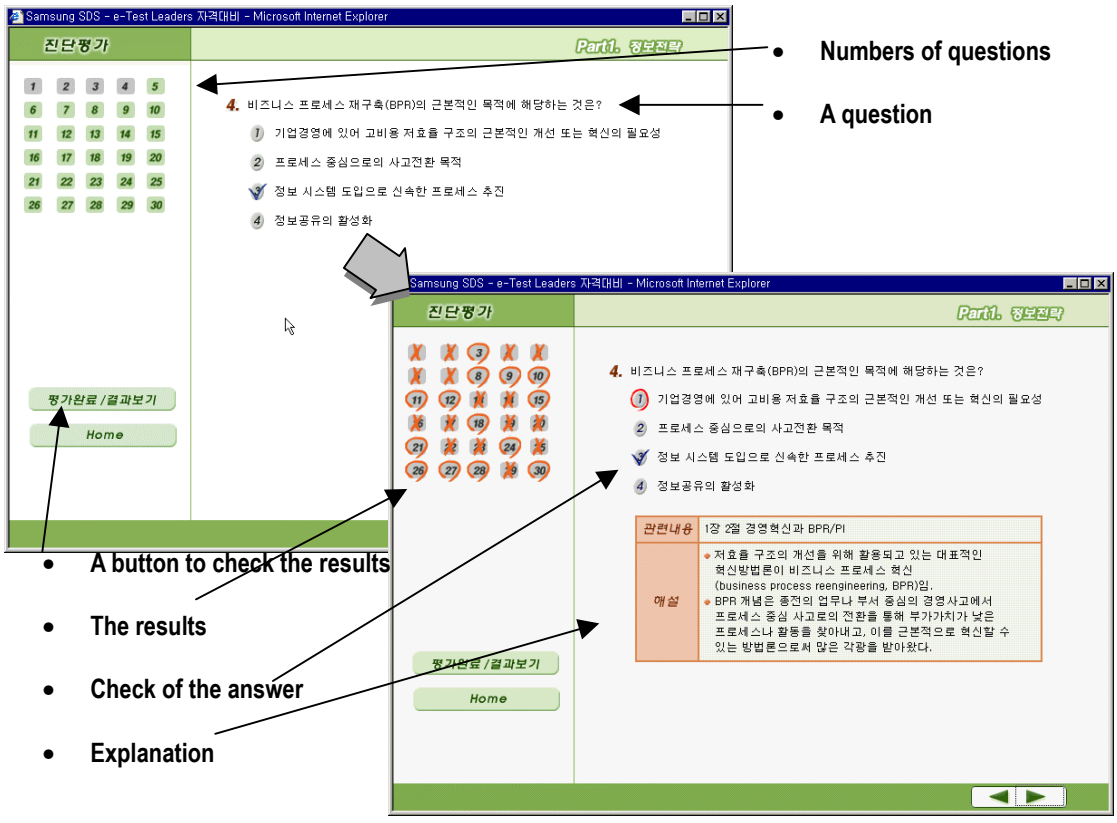


Figure 3.4 Pre-test: questions and results windows

The test is multiple choice, so learners simply choose the number that they think is the right answer. After answering as many questions as they want to, learners can see

answers and explanations by clicking the button at the left hand corner. In the result, windows are shown the outcomes of learners' answers, relevant contents in the course, and explanations about each question. The result of <Pre-test> is not recorded in the individual learner's database (either as the result of the assessment or the progress of the course). Rather this is offered as part of the contents, that is, information which the learner can acquire from the course, and a practice drill for the examination.

Foreword

After taking the <Pre-test>, learners can start the main study by moving into <Chapter 1> by clicking the <Next> button. Before starting the study, another 'Introduction' presents the outline of content and learning objectives of <Chapter 1>. I have called this part <Foreword> in order to distinguish from the <Introduction> discussed before. In the <Foreword>, the learning objectives of each chapter, in particular, are clearly defined and described. This feature will be discussed in more detail later.

Lesson

I will use the term 'lesson' for a page which presents information or knowledge to learners. Each <Lesson> is presented in the same form throughout the course and has a linear structure (Figure 3.5).

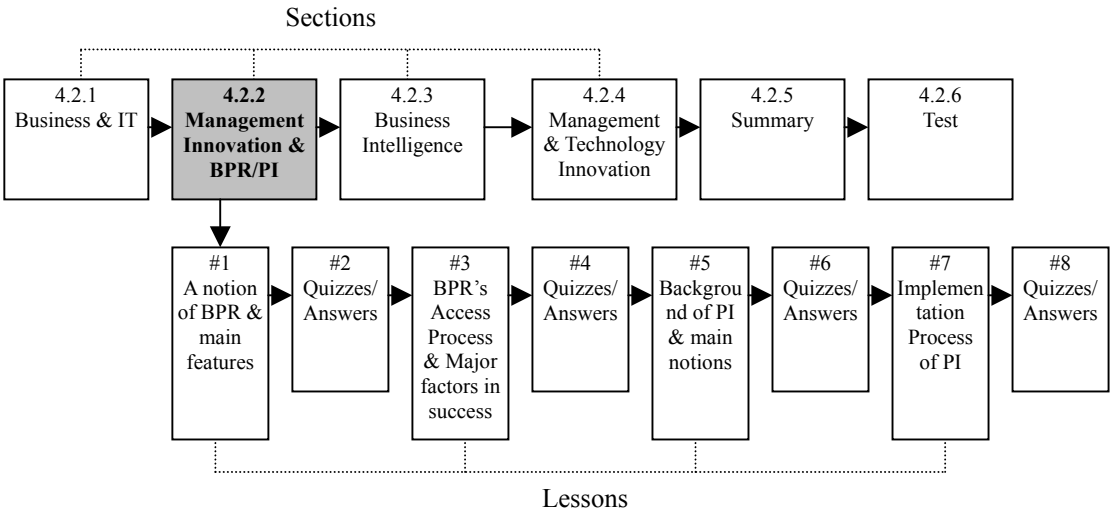


Figure 3.5 An example structure of a <Section> (<Section 2> of <Chapter 1>, <Part 1>)

Lesson is displayed in the form of text and illustrations in one page (see, Figure 3.1). After each page of lesson, <Quizzes> follow to check learners' understanding. The form of <Quizzes> is several multiple choice questions like the <Pre-test>. Learners can check their answers and get additional explanation.

Test

Learners can take the <Test> after they finish every chapter. The structure is like the <Quizzes> but the number of questions is ten.

Post-test

After studying the contents of each <Part>, learners can take a <Post-test>. The structure is exactly the same as the <Pre-test>, and twenty-five questions are presented in a linear format.

Trial-Exam

Learners are supposed to take the three different <Trial Exam>s after they have studied all the lessons, the purpose being to prepare for the final <Examination>. The structure is the same as <Pre-test> and <Post-test>. Seventy questions are presented in each <Trial Exam> covering the whole course.

Examination

The <Examination> is the final part of the course. The <Examination> has two parts, one taken after <Part 1>, <Part 2>, and one after <Part3>, <Part 4>. In each <Examination>, the number of questions is seventy and forty minutes are allowed (Appendix F). The results of the <Examination> are recorded and used as the main assessment of learning achievement.

Assessment of the user

In "e-Test Leaders A", the criteria of assessment follow the general method of "e-Campus". In order to pass the course, learners need to score more than seventy percent averaged across the two examinations. The <Pre-test>, <Post-test>, and <Trial Exam> are not counted at all. Also, there is a requirement that the learner has visited at least seventy percent of the content page called as 'Lesson'. This information is collected

automatically by the system. Note that this course has no assessed course work, but some other courses do.

3.4 Analysis of the content

The basic structure and features of "e-Test Leaders A" course has been reviewed. I now want to discuss how these features are related to the theoretical ideas introduced in the literature review.

3.4.1 From an instructivist perspective

According to the instructivist view, knowledge exists independently and learners are supposed to acquire it. Ravet and Layte (1997) define the features of programmed learning based on instructivist approach in terms of objectives, assessment, and practice. I will analyse "e-Test Learners" as to whether it supports instructivist learning based on this definition.

3.4.1.1 User interface, structure and hypertext issues

The interface of "e-Test Leaders A" presents a closed platform. An independent window demands learners to operate solely within this to complete the course. That is, learners are expected to perform their activities within a controlled, prespecified, and limited navigation. In this site, according to Nielsen (1999)'s distinction, only two types of links exist; structural navigation links, and associative links for the content of the page. Outbound links, that is links for additional references (Ibid.), are hardly found. Rather, the user has to go through set paths. Nielsen (1999) suggests that some web designers avoid links to external sites for the purpose of keeping users at their sites. In

this case, it seems that the course is claimed to contain all the necessary information for the intended learning purposes, therefore learners can achieve the learning goals just by navigating through the given platform.

In addition to the independent platform, other features, which are externally controlled by the designers, are found in the content structure of "e-Test Leaders A". From flowcharts presented above (Figures 3.2, 3.3, 3.5), "e-Test Leaders A" has a hierarchical and systematic structure, a goal-oriented, and a linear approach typical of conventional instructional design (e.g. Dick & Carey, 1990; Driscoll, 1998; Rave & Ravet, 1997). This structure is based on instructivist approaches, assuming the existence of established knowledge and focusing on the effective transmission of it. The noticeable features of the structure of "e-Test Leaders A" are that learners are expected to approach the contents step by step. Each learning activity is designed to fulfil intended learning objectives. To achieve learning goals, learning tasks are analysed by the designers in detail and arranged sequentially for learners. Each task is followed by tests to make sure that whether the learning objectives are achieved (see, Bloom, 1956; Gagné & Driscoll, 1988). This linear and hierarchical structure is found throughout the courses in e-Campus (e.g. see Appendix G, for the course "Introduction to Networks").

Hypertext in "e-Test Leaders A"

From the user interface design and structure, I would argue that "e-Test Leaders A" is designed with the intention to control learners' activities. Although the designers have suggested that the course offers learner-centred features, it seems hard to claim that "e-

Test Leaders A" is based on a learner-centred approach because the overall structure is prespecified by the designer. A question which emerges is that whether the design of "e-Test Leaders" is in fact appropriate to the Internet environment.

The hypertext nature of the Internet has been described in the literature review as its most distinguishing feature. According to Nielsen (1999), linear structure contradicts the basic nature of the Web because the user controls his or her own navigation through Web page. McCormack and Jones (1998) argue that hypertext presentation allows the learner to follow links that may lead to a multitude of pages and more freedom, so they can discover their own paths through the information and make connections that make sense of them. In a learning context, hypertext is seen as turning control over to the learner, and supporting a view of learning emphasising active and interpretative knowledge acquisition (Beven, 1999; Armaral, 1995).

The use of hypertext in "e-Test Leaders A" is limited to guidance and navigation support. Verhoven and Warendorf (1999) quote that Brusilovsky's categorisation of aspects as 'adaptive hypermedia systems', which guide users towards paths that are considered optimal for learning.

Advantages of a narrative structure

The structure of "e-Test Leaders A", which is an adaptive hypermedia system, can be claimed to offer a few strong points for web-based education. First, the structure of "e-Test Leaders A" enables 'mastery learning', which is emphasised by instructivists (e.g.

Gagné & Driscoll, 1988; Mager, 1984). In order to achieve mastery, according to Gagné (1988), the substance of the course should be divided into relatively small learning units, each with their own objectives and assessment. These features can be identified easily in the flowcharts shown in Figure 3.2 and Figure 3.3. The course explicitly contains every item of knowledge or information which the learner is to learn. Learners' activities are constrained by the contents which the tutor wants to teach. Through step by step learning activity, learners are supposed to achieve mastery.

Another advantage I want to point out is that a structure like "e-Test Leaders A" is convenient to develop and manage. The familiarity of the unified structure and interface design helps developers to design the course structure, the display of contents, and the mechanisms of assessment. It can save time, process, and expense, if they are experienced, when they design contents and platforms like this for a large number of users. The process and result of learners' activities are easy to control and monitor by the system, which can track down their activities frame by frame, checking whether they visit the content or not and checking whether they take tests or not.

Another advantage is that the familiarity of the structure which is hierarchical and linear helps to prevent learners' disorientation in the platform. Disorientation is argued as the downside of hypermedia presentation. It is the phenomenon in which the learner becomes lost in learning space; the learner cannot find necessary information, and cannot take appropriate actions (Armaral, 1995; McCormack & Jones, 1998).

McCormack and Jones (Ibid.) argue that this problem can be solved with an appropriate structure, e.g. hierarchical, and a page layout that always provides 'hints' to learners about their current location. In order to prevent disorientation, the interface design of "e-Test Leaders A" guides learners through a hypertext-based curriculum, applying a tutoring style that matches the personal learning pace and knowledge level of the learner by giving them the control of menu and pace. However, learners' activities are constrained by the content that the tutor wants to teach. There are very limited links between different parts of the content or outbound sites. Consequently, learners know where they are and what they are to learn.

The idea of 'narrative structure' can be introduced to support the advantageous features of a linear system such as "e-Test Leaders A". Plowman (1996) argues that 'narrative' is the linear structure which is connecting high-level issues, such as culturally formed expectations of the media, with low-level issues such as interface design. Quite a few researchers (e.g. Plowman, 1996; Laurillard et al, 1999; Weller, 2000) argue that lack of apparent structure can lead learners to unfocused navigation and perhaps superficial understanding. They argue that the use of narrative has the potential to help learners think, remember, communicate, and make sense of the world (Plowman, 1996). Experts in any field tend to embody their knowledge in the form of narrative (Weller, 2000); it acts as a lifeline which facilitate continuity as well as having a motivational impact (Plowman, 1996). If a learner is troubled by navigational problems, they can find it easier to re-orient themselves to the task or the content if the online course has a clear narrative structure.

In fact, the interactivity in technology-based learning seems not to entirely support narrative structure. The narrative flow can be disrupted by learners' activity (Plowman, 1996; Weller, 2000). Users can change direction, vary the pace, repeat sequences, and input responses like those shown in "e-Test Leaders A". In addition, the interactivity is not as in the classroom-based situation because the learner is not given the help they need at the points of interaction. Plowman (1996) has suggested conceptualising narrative as a 'multi-linear' structure, rather than non-linear which allows many narrative lines with various pathways for learners to navigate.

Drawbacks of the linear structure

The interface and the structure of "e-Test Leaders A" show some limitations. First, the interaction or activity occurs mainly between the course system and the users. Interaction between learners and the tutor or between learners and learners does not seem to occur easily. Second, although learners can choose their own pacing (how long to stay on a particular page), and can take their own paths through the course, given the structure and user interface it does make much sense to do anything other than follow the order of events suggested.

"e-Test Leaders A" only offers learners a limited free navigation around the content. It unifies learners' experience in prespecified hyperlinks between the parts of the course. Such a learning process can be tiresome, the repetitive presentation of information and testing, with no extra activity might lead learners to lose their motivation to learn.

3.4.1.2 Objective-oriented: explicit description of learning objectives

From an instructivist perspective, it was argued that a goal-oriented structure helps learners to master learning objectives. In "e-Test Leaders A", learning objectives are explicitly presented before the learner starts each section or unit. In this subsection, I will review the presentation of objectives.

Every chapter presents an introduction page, the <Foreword>, which explains the outline of the content and objectives. Figure 3.6 shows the introduction frame of <Chapter 1> in <Part 1>. The notable feature here is the presence of the 'tutor', and this feature is found throughout the courses on the SDS e-Campus (Appendix H). It can be understood that the presence of the tutor is intended to give learners a 'familiarity' by opening the session with a 'narrative' from the tutor such as is found in traditional classroom-settings (Laurillard et al., 1999).[22]

There are questions about the image of the tutor (Figure 3.6), whether it really characterises the tutor in terms of gender, age, and appearance. I understand that the designer intends to show a typical tutor as found in business education in Korea, where companies prefer to utilise employees as tutors after training, rather than to hire 'experts'. Therefore, the average age of the tutors is young, and a tutor is required to be 'tidy' corresponding to basic conceptions about teachers in Korea.[23]

[22] In some courses, audio files are included as well as text.
[23] This argument is based on the personal experience of conversations with staff in the HRD departments of several companies in Korea.

Figure 3.6 The <Foreword> frame of Chapter 1, Part 1.

Learning objectives, in particular, are clearly defined before learning contents are presented in this page. For example, the learning objectives of <Chapter 1> in <Part 1> are described as follows:

① ***Learn*** the notion of Internet business and the characteristics of various types.

② ***Understand*** the necessity of organisations' management innovation by ***knowing*** the notions and characteristics of information technology systems such as BPR/PI and Business Intelligence.

③ ***Understand*** the concepts, strategies, and successful factors of technology innovation which are essential factors for management innovation

(Translated from Figure 3.6 by the author)

The thing we can notice here is that verbs such as 'understand' and 'know' are used to describe the required outcomes of learning. This feature is found throughout the course.

Bloom (1956) classifies the level of 'understand' and 'know' as the first level of learning objectives, which normally focuses on the acquisition of 'knowledge'. Gagné & Driscoll (1988) also categorise this as 'verbal information' which is often referred to as declarative knowledge or 'knowing something'. In the learning objectives given above, the focus is on notions, concepts, and facts. In other words, the category of knowledge is limited to 'verbal information' and no consideration is given to 'higher-order thinking skills'. According to the analysis of the content to come later (subsection 4.3.3.3.), I argue that the objective of using the verb 'understand' does not actually differ from the verb 'know'. It does not represent the category of 'comprehension' addressed by Bloom (1956) since the course does not require learners to 'interpret', 'contrast', 'extend', or 'discuss' the knowledge.

However, there are some exceptions in that. Some objectives seem to expand their attention to the 'application' of knowledge (Bloom, 1956). For example, the third learning objective of Chapter 1 in Part 3 is given as follows: '***Apply'*** *as well as* ***understand*** *the notions of various technologies of e-commerce* (See, Appendix I for the whole description of learning objectives).

The clear description of learning objectives can be argued to follow Gagné's goal-oriented approach, and is traditionally a main trend in instructional design (e.g., Gagné, 1979; 1988). It has been argued that goal-oriented approach can orient and motivate learners to learn. Gagné & Driscoll (1988) argue the purpose of specifying goals to learners as follows:

> Learners need to know the aim of learning, in the sense of understanding what they will be able to do once learning has been accomplished. This knowledge establishes an expectancy that the learner will be able to acquire the new capability, and thus contributes to self-efficacy....In addition, the expectancy anticipates successful attainment of the performance being learned (1988, pp.118-119).

3.4.1.3 Lessons: didactical or interrogative?

Gagné and Driscoll (1988) emphasise that the instructional events designed to be carried out during an act of learning have the purpose of *'stimulating, activating, supporting, and facilitating the internal process of learning to achieve learning purposes'* (p.127). "e-Test Leaders A" faithfully carries this argument, especially 'stimulating'. The content design focuses on the achievement of learning objectives and thus the contents are systematically analysed, categorised, and presented by instructional designers or subject matter experts.

There is a question about the presentation: does it didactically explain to learners factual knowledge or does it ask learners to be inquisitive to look for answers themselves? I will review one 'sub-section' as an example of the presentation.[24] The goal of the section which includes this sub-section, is stated as '*to **know** the notions and characteristics of BPR (Business Process Reengineering) and to understand the necessity of innovation in organisation management'*. The title of this particular sub-section is "Notions and characteristics of BPR and its Main Features".

[24] I will discuss the <Sub-section 2: Notions of BPR & Main Features>; <Section 2: Management Innovation & BRP/PI>; <Chapter 1>; <Part 2>. The diagram is shown in Figure 3.5.

As detailed in Appendix J, it is evident that the notions and the characteristics of BPR are presented as factual knowledge. There is no ambiguity in the learning content, which is direct and explicit in a didactical manner. For example, in the text, the targets of BPR are stated as established facts: a) processes where work expenses exceed profits; b) ineffective work processes that cannot produce added value; c) processes which require re-operative and repetitive work for accomplishing the task: d) processes for inputting similar data repetitively. This way of presenting knowledge is close to 'declaration' and 'definition' rather than 'explanation'. The form of expression is nothing like 'narrative' or 'conversation' from (with) the tutor. It is more like a 'lecture note' or a 'summary' that is prepared by the tutor. The contents are even clearly categorised by using separate paragraphs, titles, and bulletins although some images used to help learners to understand the knowledge.

The only thing learners are expected to do here is to read the texts (or look at the illustrations) and 'know' or 'understand' the knowledge. To confirm whether learners have understood the content, every lesson has a test, entitled <Quizzes>, that checks for a basic understanding of the knowledge. A discussion about tests will be made later (subsection 3.4.1.4).

In conclusion, there is no doubt that the way to present the contents of "e-Test Leader A" is 'didactical'. No room for an 'interrogative' mode is made in the presentation. A didactical and pedagogical presentation can be helpful to acquire factual knowledge and skills. The nature of learning in this course is highly goal-oriented and content

based. The information is direct, descriptive, and clear. There is no confusion between concepts or explanations. This feature is common throughout the courses of e-Campus.[25] Learners are expected to acquire basic knowledge quickly and efficiently by remembering directly the contents provided. But, learning is a comfortable process as there is no interrogative requirement to search for learning resources, and analyse something in order to answer questions or problems.

However, there are limitations in this way of presentation. Above all, there are too many concepts and too much information in each page, and an enormous number of pages. The whole content of "e-Test Leaders A" is enormous to learn in a month. There are thirteen sections in <Part 1> and thirty sections in the whole course. Although individual differences in learning pace are considered, it is quite possible that a learner will spend more time on the course than is proposed in the information page (twenty-five hours over the course of a month).[26] In addition, the use of abstract terminology, and an excessive summarising of the content might also cause excessive workloads for learners in order to understand the knowledge.

The strong point of a 'linear' or 'narrative' structure is to reduce cognitive overload by providing structured and explanatory lessons rather than asking learners to search for answers or knowledge (Plowman, 1996; Laurillard et al, 1999; Weller, 2000). However,

[25] See, Appendix G. The course <Introduction to networks> shows a direct and explicit presentation of established knowledge about network systems such as LAN.
[26] See Appendix K: The course <Catch the flying time, Time Management> requires learners to spend, and the volume of content is much less, 287 pages, compared to 645 pages (215 contents pages and 430 question pages) of "e-Test Leaders A". In addition, the contents are comparatively easy to understand as it adopts a 'narrative' structure.

the presentation of the content in “e-Test Leaders A” does not appear to match this criterion. It seems hard to expect learners to understand knowledge presented only by brief definitions or declarations of knowledge, without detailed explanation or help from the tutor, and perhaps additional learning materials. From the interview with the instructional designer of “e-Test Leaders A”, Choi (see Appendix L), she has recognised the excessive content of the course compared to other courses. However, she ended up only giving an excuse about the limitations as the ‘inevitability’ of the course for learners having pass the qualifying examination for the SDS “e-Test” certificate.

The repetitive pattern of presentation and test can cause learners to lose their motivation to learn. For example, to finish <section 2: management innovation and BPR/PI> in <Chapter 1>, which is one of the simplest parts in the course, learners have to get through four pages of content and twelve questions. Too much information and questioning can lead the focus of assessment to ‘memory test’ rather than ‘understanding the meaning’ (Spiro et al., 1992).

Finally, there is strictly limited interaction amongst learners and the tutor although <Q&A> is offered for learners to ask questions about the course. It shows a lack of interaction because this tool is only used to about to offer plug-ins for WBI courses, to ask about technical flaws in the course. This feature is found throughout all the courses in e-Campus. According to the interview with Choi, the overall user opinion is good, but there are some strong complaints about the course are found in the user:

> I am really disappointed with this course. It is only text-based instruction. I should have bought a book. Books are easier to find and read the information.[27]

3.4.1.4 Assessment by multiple-choice

Assessment is concerned with ensuring that a learner has learnt the intended learning goals of "e-Test Leaders A". In order to master learning goals, according to Bloom (cited in Allen, 1998), each unit must be preceded by a brief diagnostic test. And, after each unit, formative tests must be taken. This argument is commonly found from instructivists (Gagné & Driscoll, 1988; Dick & Carey, 1990).

In "e-Test Leaders A", six types of assessment are found: <Pre-test>, <Quizzes>, <Test>, <Post-test>, <Trial exam>, and <Examination>. There is a <Pre-test< and <Post-test> for every part. <Quizzes> are supposed to be taken when the learner finishes every lesson. <Test> is a sort of formative assessment which the learner is supposed to take after each chapter. <Trial exam> is the preparation for the <Examination>, which is the final assessment taken in two parts (in the middle and at the end of the course). All assessments use the multiple-choice method.

How do these tests relate to the learning objectives and course contents, and what kind of knowledge do they assess? I will categorise questions into two kinds: literal

[27] Translated by the author from <IT OS Community>, BBS, 09/Feb/2001, <Do you think it's Web-based Instruction? It's a book.>
.

questions and interpretative questions. Note: <Examination> is not included in my analysis since my access to the system did not allow it.

Literal questions

Many of the questions are directly and literally driven by the learning objectives and the content. For example, question number seven in <Pre-test> of <Part 1> asks about definitions of terminology in business innovation.

7. What does the description in the box explain?

It means the notion, method, and process for facilitating the execution of business decisions by using various information.

1) BPR (Business Process Reengineering)
2) PI (Process Innovation)
3) BI (Business Intelligence)
4) Brainstorming

(Translation by the author, see Appendix M)

The answer to this question can be easily found in <Section 3> in <Chapter 1> as it given in exactly the same words:

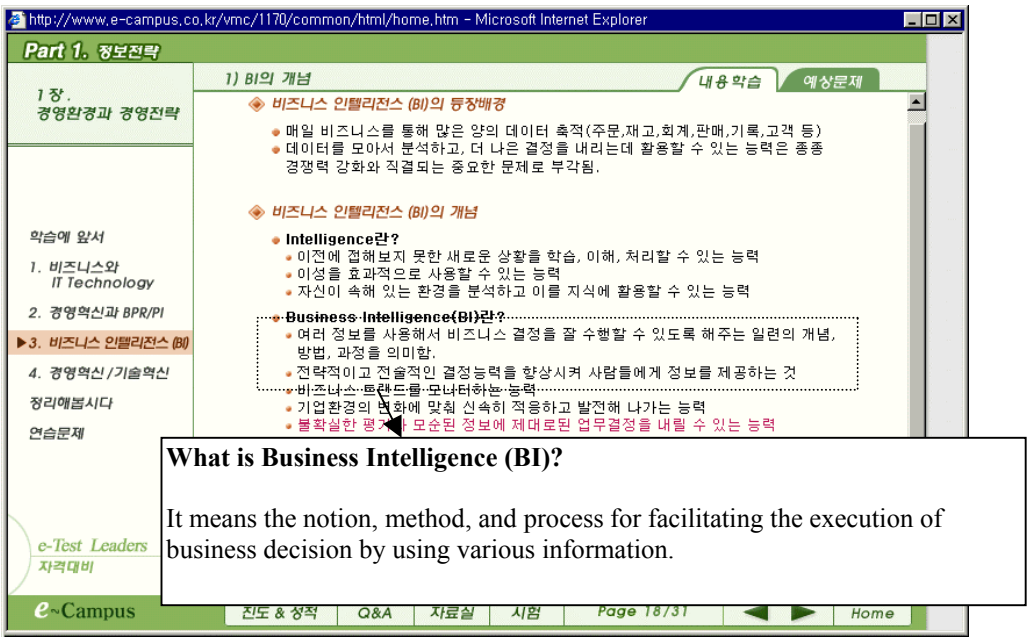


Figure 3.7 The notion of BI

Another distinct example can be given: question number 3 in <Quizzes> (see, Figure 3.8).[28] The question is asking about the types of DBMS.

Q3. DBMS is a system which efficiently manages an enormous amount of data.

In the following, which is not a type of DBMS?

1) Relational DBMS
2) Hierarchical DBMS
3) Independent DBMS
4) Network DBMS

The answer is directly found in a previous content page:

[28] In <Section 1: Trends of IT>, <Chapter 2: Trends of Information-oriented society and IT>, <Part 1: Information Strategy>.

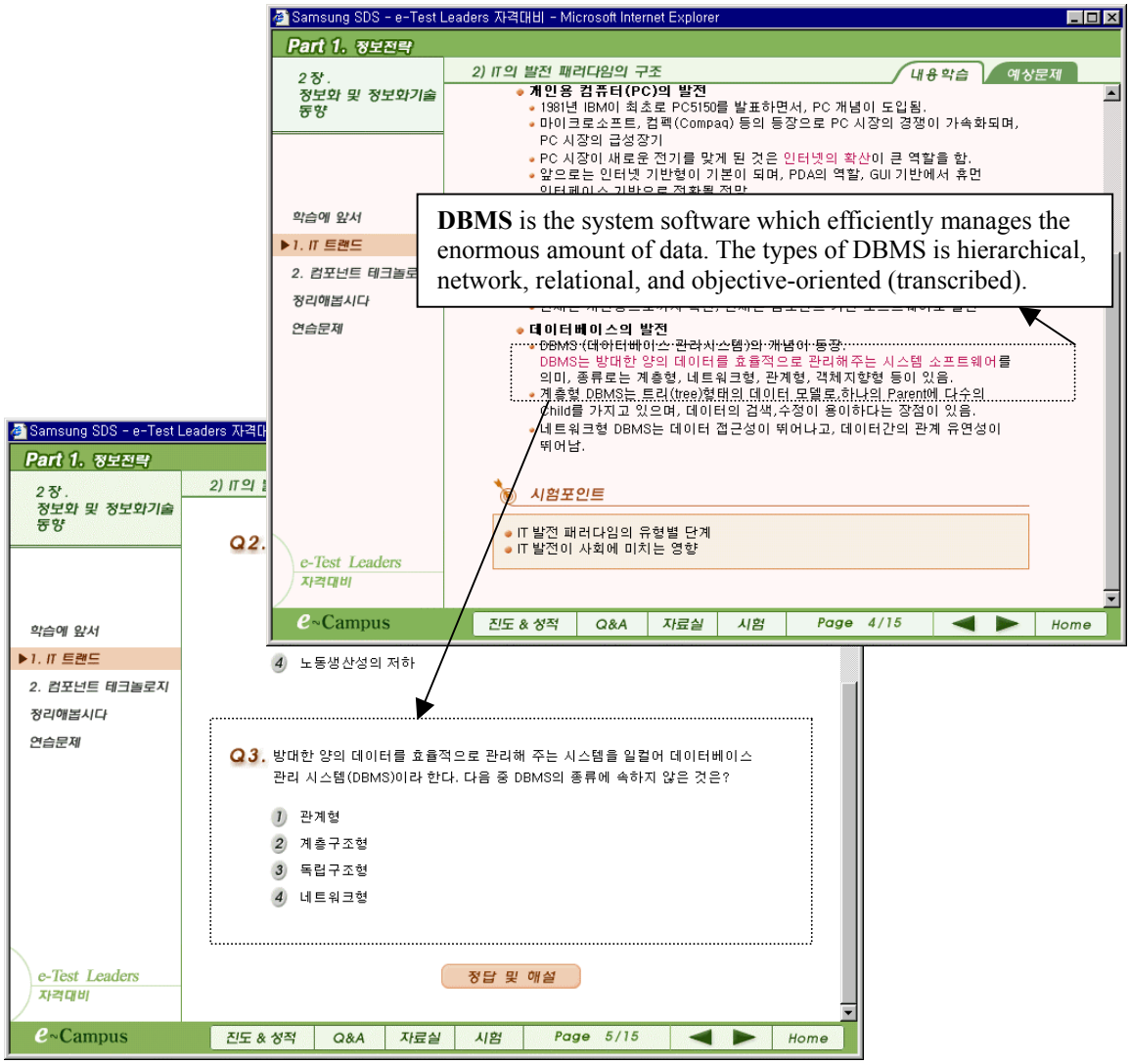


Figure 3.8 Question number 3 and the related content

Interpretative questions

In some questions, the learner needs to deduce the answer using the contents that have been presented, rather than directly choosing the answer. For example, question number 7 in <Trial Exam 1> asks about the role of Business Intelligence (see, Appendix N).

7. From the perspective of business strategy, what is expected to be empowered from the feature which follows?

The activity of sharing information can happen through bulletin boards or group discussion as well as email. In addition, it can happen systematically through the individual's Home page.

1) Relation with the customer
2) Emergence of a virtual community
3) The business cycle
4) Business responsibility between companies

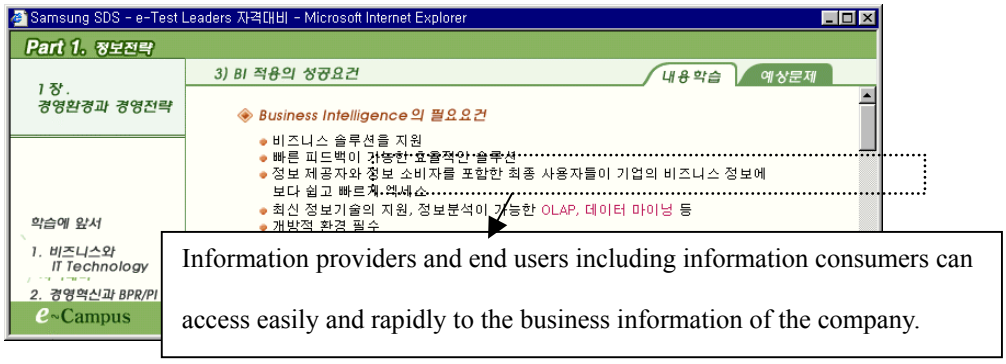


Figure 3.9 The requirements of BI

The question described in the box is not literally addressed in the content which explains 'Business Intelligence'. However, the learner can deduce the answer from the text shown in Figure 3.9.

Not many questions adopt the 'interpretative' style. The majority of questions ask about definitions, technical terms, and characteristics of the information. The description of knowledge as facts helps learner interpret the questions easily and find

the answers.

How do these tests help learners to accomplish learning objectives? I consider the direct and recurrent questions throughout <Pre-test>, <Quizzes>, <Test>, <Post-test>, and <Trial Exam>. For example, there is a learning goal to know the notions and characteristics of BPR, PI, and BI (the content for this objective is found in <Section 2> and <Section 3> of <Chapter 1>, <Part 1>). In sum, fifty-eight questions are asked about the notions and characteristics of BPR, PI, and BI.

Pre-test	**Quizzes**	**Test**	**Post-test**	**Trial Test 1**	**Trial Test 2**	**Trial Test 3**	**Total**
5/30	21/21	5/10	7/25	7/70	2/70	11/70	58/296

Table 3.1 The distribution of questions for a particular objective

Throughout the tests, a number of repeated questions are found although they do not use exactly the same words. I would argue that there are too many questions about one topic. Only the level of difficulty can be argued as the distinction of each test. The difficulty level in <Pre-test>, <Quizzes>, <Test>, and <Post-test> is relatively low as the questions and answers are literally driven from the content. Questions in <Trial Exam> are relatively harder, because interpretative questions are more often found. Nevertheless, I argue that the checking of whether learners achieve learning objectives is confined simply to ask them about the information.

Since the results of <Pre-test>, <Post-test>, <Test>, <Quizzes>, and <Trial Exam> are not counted towards the final assessment, their purposes can be argued to help learners diagnose their current understanding rather than to answer all questions correctly. Learners are free from the pressure to achieve high scores. From the <Pre-test>, learners can understand the content more easily as they are already oriented to it. <Post-test> and <Trial Exam> can help learners to check how much they understand the content and how much they achieved the learning objectives.

In spite of the advantages which these assessments can lead to, there are limitations. First, there is the possibility that these assessments restrict learners' flexibility in studying, as they direct them to a certain attitude towards learning activities, often guessing correct answers. Learners might only focus on finding and remembering certain information in order to answer questions correctly. Moreover, the feedback to learners' input is automated, and no individualised feedback is provided. At this point, some consideration must be given to the role of the tutor as well. No role of the tutor is evident in the assessment. There is a <Notices> page from the tutor and the administrator whenever the learner logs on, but this is limited to giving administrative information about the course. In addition, there is a <Q & A>, but this is restricted only to technical advice on the course system.

There is no doubt that the pattern of assessment is driven by objectivist principles. As they assume the independent existence of factual knowledge, the assessments are designed to check whether learners know this knowledge rather how to analyse or apply it. The multiple choice method enforces the objectivist perspective. There is no

opportunity for learners to raise and discuss their own ideas with the tutor or with other learners. This can lead learners to acquire fixed ideas without considering their own experiences or perspectives.

Last but not least, I argue that the assessments fail to address some of the learning objectives. Or to put it another way, certain learning objectives framed incorrectly. For example, one of learning goals in <Chapter 1> of <Part 3> is described as "***understand*** *and* ***apply*** the notions of various technologies of e-commerce" (See, Appendix I). Bloom (1956) categorised 'Application' at the third level in the cognitive domain, which is represented by verbs such as 'apply, employ, operate, practice, solve and use'. 'Apply' knowledge can be found in concrete situations, e.g. when a company decides to adopt a certain technology in electronic commerce. It cannot be found in answering test questions correctly. Another example might help to explain why this pattern of assessment is not appropriate. The learning objectives of <Chapter 2> in <Part 4> are addressed in order to use "Hunmin Word Process 2000" (see Appendix O). The verbs in used to the learning objective includes not only 'understand' but also 'use, draw, print, etc'. These objectives require learners to do something 'physical' rather than to read the text and take a test. Such objectives can be categorised as the "Psychomotor learning" of Bloom (1956). Gagné & Driscoll (1988) also categorise them as 'motor skills'. To know something does not necessarily imply being able to do something. It is impossible to assess 'motor skills' or 'application' by choosing correct answers in a test. Another approach is necessary in order to resolve the limitations in accomplishing these learning objectives.

3.4.1.5 The criteria of assessment

"e-Test Leaders A" is a 'result-oriented' WBI. From the learners' learning progress and the result of <Examination>, an assessment is made whether they have fulfilled the course requirements or not.

There is a question about the method of checking the progress through the course. "e-Test Leaders A" adopts the method of recording which pages the learner visits. However, there is no way to check whether the learner has read or understood the presented information on the page. Also, the results of assessments (<Quizzes>, <Test>, <Pre-test>, and <Post-test>) are not recorded. The user can avoid the tests if he or she wants to skip each page quickly. The focus of assessment is on the results of <Examination>, which learners are required to take at the middle and at the end of the course. It can be argued that this shows the prevalent feature of educational software that is 'result-oriented' rather than 'process-oriented'. With the intention of diminishing this limitation about tracking the progress (according to the interview with Choi), e-Campus is planning to adopt another way to check the progress which constrains the learners' activities more than before:

> At this moment, the learner is only expected to follow the order of content. However, this kind of simple navigation will no longer be recognised as the progress of learning. After each lesson, the learner will have to take <Quizzes> and answer correctly a certain number of questions. Alternatively, in management courses, they will have to input some opinions in order to proceed to the next page.

3.4.2 From a constructivist perspective

The most distinct assumption of constructivist perspectives is the way of looking at 'knowledge': knowledge does not independently exist, but rather it is constructed by the learner. I will discuss what aspects of "e-Test Leaders A" are consistent or inconsistent with the constructivist perspective in two categories: knowledge construction and interactivity.

Learning environments for knowledge construction

From an individual constructivist perspective, the learners' interpretation of the environment by cognitive conflict or discussion with others can lead them to construct their 'own' knowledge. Therefore, individual experiences are regarded as critical in the construction of knowledge. "e-Test Leaders A" is a learning environment and we might expect learners to experience this environment and to construct their own knowledge. However, I find that it is difficult to match "e-Test Leaders A" with the 'construction of knowledge'.

Firstly, according to Carr et al. (1998), constructivist instruction is context-based, and the contents and goals should not be prespecified. "e-Test Leaders A" fails this criterion. As discussed above, there are clearly-defined learning goals and tasks. Constructivist perspectives also require learning tasks to be 'authentic' and applied to real situations (e.g. Duffy & Jonassen, 1992). Considering the content of "e-Test Leaders A", it is difficult to argue that the tasks are authentic. Because, although some

learning objectives ask about authentic activity, the same methodology is found throughout the course: the abstract presentation of knowledge. Therefore, the learning environment fails to give learners the opportunity to apply knowledge in real situations.

Additionally, it fails to respect the basic notion of constructivism, that knowledge cannot be transmitted from one person to another. We must consider whether the course is based on a 'teacher-centred' approach or a 'learner-centred' approach. In fact, a dualistic feature can be found in "e-Test Leaders A". Superficially, learners can control the learning pace and the order of contents. No interference from the tutor is expected. (According to individualistic constructivist perspectives, the teacher's role is relatively downplayed although social constructivists argue that the role of the teacher is important to 'scaffold' learners' activities—see, Duffy & Jonassen, 1992; Cunningham, 1992, etc). In this respect, "e-Test Leaders A" can be understood as a 'learner-centred'.

However, the invisibility of the tutor does not mean that there is no control from the tutor. As discussed already, "e-Test Leaders A" is largely controlled by the tutor or the designer. The content is designed by an author or authors and they didactically 'teach' the learner in the form of text, illustrations, sometimes voice, and tests.

Finally, the automated assessments of "e-Test Leaders A" are the main factor to hinder the learner in construction of their own knowledge. The tests confine knowledge to that which 'correctly exists in the world'. Learners are required to acquire the correct knowledge rather than interpret the information which is presented. They are not asked to consider any alternative perspectives from other resources, peers or tutors.

Interactivity with the tutor, participants, and resources

From the viewpoint of social constructivist perspectives, the nature of the social context of knowledge acquisition is critical. Interaction and cooperation with the tutor and peers play a critical part in learning activities. “e-Test Leaders A” shows little evidence of a basis in social interaction with other participants and the tutor. Interaction only occurs asynchronously with the tutor in the form of <Q & A>. However, this interaction is limited to technical and administrative questions. Discussions or arguments about the content are hardly found.

Contrary to social constructivist perspectives, no collaboration or group work is required. Learners are expected to read the content and answer the questions—that is, the interaction is between the learner and the computer. They may ask questions to the tutor but not necessarily. These kinds of interaction are commonly found throughout the WBI courses of e-Campus. From the viewpoint of situated cognition, I find it difficult to regard e-Campus or “e-Test Leaders A” as “communities of practice”. In communities of practice, the learner learns by participation, by involvement in the context and culture of “community” through the help of old-timers. Therefore, the learning environment must be such that learners can practice the rules, rather than be taught (e.g., Lave & Wenger, 1991; Brown et al, 1989). Meaning must be negotiated in communities of practice (Wenger, 1998). In “e-Test Leaders A”, an on-going social situations might presumably be described as communities of practice. However, the interpretation of this environment as communities of practice is largely negated because of the lack of interactivity that is social. That is, in other words, no negotiation of meaning (Wenger, 1998).

In “e-Campus”, an attempt has been made to implement social constructivist learning perspectives. Learners can visit twenty different BBS that are entitled as the <Communities> (see Appendix P). Although the stated purpose of <Communities> is to help the user share information and experiences, the practical use seems not to meet this expectation.[29] I find the reasons as follows. First, communities are divided into too many sub-categories. The communities, on the top of the list hierarchy, are more actively used regardless of the category boundaries. On the other hand, some communities are not used at all. As discussed above, each community has three parts: <Discussion Boards>, <Q & A>, and <Resources>. However, there is no distinct difference between <Discussion boards> and <Q & A> in communities as the learner uses them for the same purposes, that is, general questions about courses, e.g. what is the content, how to register, review, cancel, or confirm. Discussion, arguments, and sharing information about the course between participants are hardly found, although there are a few comments about the quality of the courses. <Resources> for sharing additional materials are only used by a limited number of people, generally the tutors.

In conclusion, the attempt to implement collaborative and interactive learning environment in “e-Test Leaders A” seems to have failed. The site does not encourage the development of communities of practices in a situation where it might be possible.

[29] The purpose of <Communities> is to help the user share information and solve questions. Every member of “e-Campus” can freely use it and have the opportunity for broader learning experiences. After completing online distance learning, learners are invited to share continuously information and experiences through <Communities>.

4. FINDINGS AND DISCUSSION

4.1 Findings from "e-Test Leaders A"

As has been evidenced in previous chapters, the Internet is becoming a major source for educational materials delivered to learners who prefer (or are required) to learn in non-traditional ways. As the educational potential of the Internet is realised, its utilisation will certainly increase over time as larger numbers of educators and learners see the significant value in WBI. The SDS e-Campus can be taken as an exemplary case of the current utilisation of the Internet in business education.

While there is tremendous potential for WBI, Bannan and Wilheim (1997) argue that there is a significant need to describe WBI courses in terms of their overall instructional design characteristics (in order to critically review instructional strategies and tactics used for the delivery of the educational materials) rather than defining each course by the specific content it provides. In the previous chapter, "e-Test Leaders A" has been reviewed in terms of its overall design characteristics and instructional methodologies, relative to objectivism and constructivism.

There is a question about the appropriateness of the instructional strategies of "e-Test Leaders A" to deliver its contents. If we follow Welsh (1997), "e-Test Leaders A" is an 'event-oriented' design. It specifies performance objectives and determines instructional strategies for meeting these objectives. The course is conceptualised as a series of individual modules and each module is comprised of a series of instructional

events, each of which results in students meeting specific performance objectives (pp.160-161). This design approach is driven from an objectivist perspective, which assumes the existence of 'correct' knowledge.

I argue that "e-Test Leaders A" misrepresents the nature of the contents in the course. Rather I argue that the nature of knowledge presented in "e-Test Leaders A" is in fact open-ended and evolving. It seems impossible to define the purposes of implementing new technologies in organisations and the expected effects for the organisational innovation, as "facts". It is not definitive knowledge such as numerics or basic technical skills.[30]

There is another question concerning the subject matter. If we accept that the content which is presented in "e-Test Leaders A" is open-ended knowledge, then the automated forms of assessment cannot be appropriate to evaluate the subject matter as it confines learners' acquisition of knowledge only in particular material. It also seems inappropriate to assume that if the learner is able to choose the correct answer on the screen, he or she can apply knowledge in concrete situations. Because, there are always unknown variables requiring learners to implement knowledge in different ways (Zuboff, 1988).

> The computer mediation of an organisation's productive and administrative infrastructure places an even greater premium upon an organisations' interpretative capabilities…oral culture and the

[30] There is one exception, in the material on "Humin Word Process 2000", as this is intended to teach a particular piece of software.

> action-centred skills upon which that culture depends are gradually eroded, and perhaps finally displaced, by the incursions of explicit information and intellective skill (Ibid. pp.392-393).

I argue that different considerations must be given in order to design open-ended and ill-structured knowledge in business education. The purposes of learners to learn open-ended knowledge must be considered, and the purposes of organisations to carry out the training of their employees. In "e-Test Leaders A", learning is considered precisely as an 'individual' activity. However, in business education, learning activities must be considered not only in the individual context but also the organisational context. Because, for organisations, the collective and accumulative outcomes of each employee are expected to result in the improvement of the organisation (Argyris, 2000; Yoo, 1995).

The possibility must exist for each individual or each organisation to localise knowledge according to specific concrete problem-solving situations rather than force every individual and organisations to localise 'fixed' knowledge to everyday situations (Sumner & Stolze, 2000; Roffe, 2000; Yoo, 1995).

4.2 Suggestion: an alternative learning environment

In order to facilitate learners' activities to learn open-ended and ill-structured knowledge, it seems necessary to offer them a learning environment which allows the opportunity to localise as well as to generalise knowledge. The changing business environment currently requires learners to develop 'problem-solving abilities' rather than simple acquisition of information (e.g. McKenzie, J. & Swords, D. 2000; Sumner & Stolze, 2000; Yoo, 1995).

Bonk & Reynolds (1997) argue that learning is increasingly influenced by social interactions and environmental factors as more and more educators accept that learners learn in a social context. They argue that distance technologies such as the WWW offer ideal possibilities for placing learners at the centre of the learning environment and thus can transform traditional teaching practices and student learning opportunities. Some aspects of a web-based learning environment are particularly important for open and ill-structured knowledge. Driscoll (1997) argues that a virtual (a)synchronous learning environment is well suited to problems or topics which are ill-structured because it teaches learners to apply guidelines, theories, and concepts to problems that are complex and varied and for which there are no single answers. In addition, quite a few researchers emphasise the collaborative learning potential in Web-based learning environments (e.g., McConnell, 2000; McLellan, 1997; Wills & Dickinson, 1997; Slavin, 1990). McLellan (1997) asserts that the goal of the learning environment should create a shared experience which is participatory in the form of a dialogue or discussion rather than an experience that is shared.

Therefore, in this section, an attempt will be made to actualise the interactive and collaborative learning environment in order to facilitate learners' activity in open-ended tasks. Norman (1998) introduces Somekh and Davies's arguments about the pedagogic changes in the context of WBI. He argues that learning changes from individualised to communicative; the tutor's role changes from that of an organiser of learning activities to that of an enabler of quality learning experiences. The technology interacts in a variety of ways with learners, sometimes providing ideas, sometimes providing a resource, and sometimes supporting creativity. My alternative design will be based on these pedagogical assumptions.

4.2.1 Structure

I suggest an alternative structure of the "e-Test Leaders A" in order to facilitate collaboration. "e-Test Leaders A" is simply constructed in eight categories; <Notices>, <Menus>, <Guide>, <Contents> (including <Lesson> and various forms of assessments), <Q&A>, <Resources>, <Examination>, and <Progress & Results>. My proposed structure emphasises more collaborative aspects between participants and rich 'resources' to help learners' activities. According to the web site of "iCohere, Inc.", 'content, community, and commerce are three categorised pillars of any collaboration-focused web site' (www.icohere.com). They argue that content drives people to the site, community keeps them there, and commerce enables and sustains the site's viability (http://www.icohere.com/n_whitepapers.htm). (I do not intend to discuss the 'commercial' aspect here). I want to explain my alternative structure of "e-Test Leaders A" as influenced by the structural principles of the "iCohere" web site—see Figure 5.1.

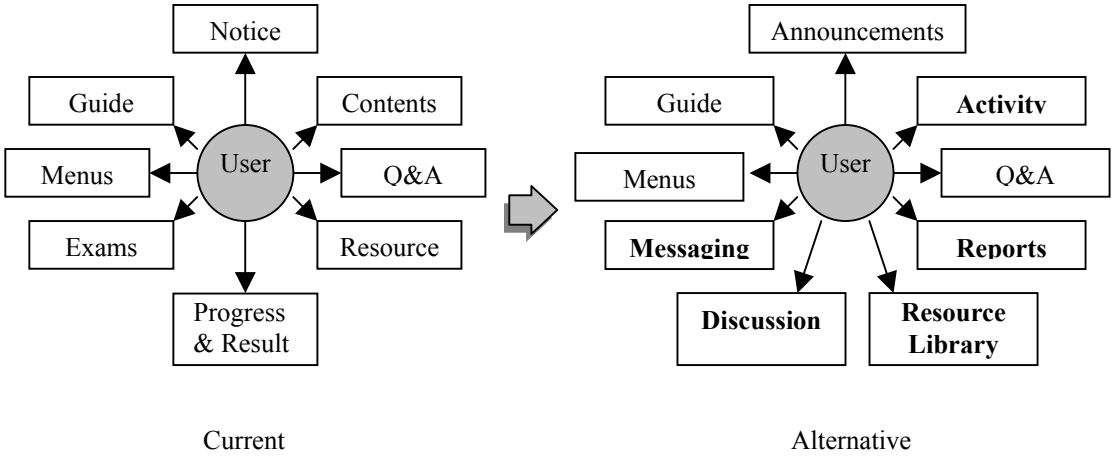


Figure 4.1 The current structure and an alternative structure of "e-Test Leaders A"

<Announcements> can be argued as the extended form of the <Notices> of "e-Test Leaders A". This is for news and information about the course. It can be sent to everyone or selected sub-groups (e.g. individual or group emails, BBS).

<Resource Library> is an extended form of <Resources> in "e-Test Leaders A". It contains three areas: <Contents>, <Site Links>, and <Downloads>. <Contents> can be configured as a simple listing of downloadable files, or as HTML files in the same format as the existing "e-Test Leaders A". This plays the informative role for learners, if necessary, to learn basic information about the topic. <Site Links> contains links for referencing other web sites listed with descriptions. <Downloads> contains a list of downloadable free shareware or to be used as 'helper' applications for the course. <Resource library> can include intuitive file management systems and search features in order to facilitate for learners to use its use.

<Activity> is where major activities take place. Learners can be assigned to smaller and special interest groups. Each group can gain access to restricted information and can collaborate privately. <Activity> could be configured as a BBS (bulletin board system), which is a text-based conferencing system. If necessary, additional technologies could be integrated to support more dynamic activities. For instance, video or audio conferencing might facilitate the synchronous discussion, or perhaps shared 'whiteboards' (Driscoll, 1998).

<Discussion> can be configured as a BBS as well. An online forum, note files, and threaded discussions could be used interchangeably (Driscoll, 1998). Appendix Q shows an example site which presents the features of <Discussion>. The range of discussion could be extended from simple questions about the course to the exchange of ideas and discussion about the emerging issues.

<Messaging> is an email system for both shared and private uses. It will contain a <User list> presenting each member's personal profile. Learners can gain access to other participants through internal "emails" which are asynchronous as well as real-time chatting which is synchronous.

<Q&A> is a BBS which facilitates learners activities through the interaction with the tutor and the administrator. Learners can ask about technical difficulties and the emerging questions about the course with the immediate feedback, although this does not work well in current version.

<Reports> is an administrative tool that manages every aspect happening on the site. It includes discussion in groups and between individuals. It also includes the final results of the collaborative group work. Detailed reports on individual and group activity are readily accessible by the tutor.

4.2.2 Mechanism of the structure

We can imagine the aim of the alternative course might be to learn 'the potential effects of information technologies for organisational innovation', and would be open to enrolment by individuals or organisations.

Grouping

The participants will be assigned to small groups. This can be implemented in an individual context as well as an organisational one. The tutor can assign individual participants to the sub-groups according to their individual profiles or sub-group can be established in advance when learners register for the course. The size of the learning groups cannot be specified in advance, however, the target should be four to five members per group, which is known to be effective (e.g. Kaye, 1992). The sub-groupings can be informed to each individual through <Announcements>. When the learner logs on, the system can automatically recognise which sub-group the learner belongs to.

Task assignment

The tasks undertaken by learners are a critical aspect in a WBI environment. The tutor can assign the collaborative task to each sub-group. This can be the same, or, if appropriate, it can be assigned differently according to the tutor's decision. Alternatively, each sub-group might decide their own task through discussion with other members and the tutor in their <Activity> area. At the same time, during discussion, they can appoint a moderator for each sub-group. Upon logging in, the system can recognise if the learner is the tutor, the administrator, a moderator, or simply a sub-group member.

The collaborative task, will be in the form of 'project-based learning'. This is a group learning style which involves learners working with one another on projects in order to fulfil a shared and understood goal (Bonk & Reynolds, 1997; McLellan, 1997). For example, the task might be to write a report about the expected effects in the organisation of applying specified new technologies, e.g. BPR/PI. The particular conditions of the organisation would be given in the form of scenario. The report would have to detail the basic principles and goals, process, and potential results, and implications, etc. Members of each group are encouraged to learn from one another as well as from the tutor, using collaborative strategies such as brainstorming, discussion, and problem-solving (Bonk & Reynolds, 1997; Driscoll, 1998). In the <Activity> area, learners could carry out the main interaction using chat, e-mail, and BBS discussion. They could use the <Resource Library> to find supporting information. They might use the <Discussion> area to share ideas with members of other sub-groups. Documents or

other files shared within the context of online discussions and other activities could be categorised and placed into the management system. Participants could easily retrieve them at their own convenience through searching by category, key word, etc.

Assessment

According to Riel and Harasim (cited in Hudspeth, 1997), assessment in a WBI, which focuses on social interactions must address the discourse analysis of messages, patterns of individual participants, and varying involvement by individuals and groups throughout stages of their collaborations. It must also take into account the learning outcomes for each individual—i.e. how the interactions that occurred in the WBI have changed the participants' skill and knowledge levels.

I want to propose an assessment structure quite different the current "e-Test Leaders A" which adopts automated assessment. The tutor's role will become critical. Wills & Dickinson (1997) claim that if the tutor is integrated into the assessment process, it will effect a major change in the traditional teach-test cycle. There is an attempt to implement a different type of assessment in the management courses of e-Campus, (see, Appendix R), where learners are required to type their ideas, comments to read for others. No active role from the tutor is expected here since the assessment is automated—the learner must submit a comment but the system does not look at the content.

In my proposed structure, the tutor becomes an assessor who guides the work on projects and negotiates the work with the participants. The process of the discourse and the participation of individuals or organisation will be assessed throughout the process by the tutor. The outcome of each group, which might be a report based on collaboration, will be examined by the tutor, or person, who is an expert in the subject matter. The tutor can evaluate how effectively each group or each individual participated in the project and how their abilities have changed. Detailed results on each individual and each group will be saved in <Reports> and be readily accessible to the tutor. What is more, the assessment of collaborative learning can be localised as well as generalised by the consensus between groups. They can share and discuss each group's outcome and negotiate the meaning of the result. Each individual and organisation can interpret the outcome differently and localise it to their own situations (Zuboff, 1988).

The role of the tutor

Overall the course, the tutor's role becomes more active than in the structure of the shown in current "e-Test Leaders A", since it adopts a collaborative learning method. The tutor is responsible for facilitating both group and individual learning, and creating a safe environment and this requires both technical and diplomatic skills (Driscoll, 1998; Laulsen, 1995). As an organiser, the tutor has to manage the overall learning process with strong leadership and encourage each learner to participate in the project work actively by giving appropriate advice. The tutor has to provide learners with relevant resources and access to related web sites or online articles, and evaluate the

outcomes and interactions as an expert. McConnell (1992) argues that the tutor and participants have to share the responsibility for ensuring that the course is operating to their mutual satisfaction.

4.3 Discussion

My proposed alternative structure is intended to facilitate a collaborative and resource-based learning environment. In this section, consideration will be given to the effects, which could follow from the implementation of the alternative structure.

The first point is the increased 'interactivity' between learners and the tutor. 'Interactivity' has been argued as the strongest feature which Internet technology can offer. By dynamic interaction (i.e. involving other learners, not just learner and system), learners' motivation can be increased compared to the repetitive patterns presented in the current "e-Test Leaders A". In addition, interactivity can help the cognitive development of learners. By sharing their ideas through discussion, debates, and negotiation of meanings, learners can 'construct' their knowledge (e.g. Duffy & Jonassen, 1992; Collins et al, 1996).

Access to extensive resources is another point of advantage. It is dangerous to assume that the tutor and the courseware should be the only resources for learners. In the proposed structure, learners acquire access to various other resources: downloadable files, relevant site links, and additional instruction from the tutor may offer learners the opportunity to establish their own learning goals and their own learning processes. It might even facilitate their becoming 'lifelong learners' (Rowntree, 1997; Ryan, et al., 2000).

Finally, I argue that the structure can offer an ‘alternative’ learning culture, which organisations increasingly require from their employees nowadays. As discussed in the literature review, the internal and external environment around organisations require employees to continuously learn, in order to confront turbulent changes flexibly and confidently. I have argued that the knowledge and skills required for this are likely to be ‘changing’, ‘open-ended’ and ‘ill-structured’. Therefore, a teaching method based on objectivist perspectives, as presented in “e-Test Leaders A”, is mostly inappropriate. The proposed alternative can potentially give learners the opportunity to practice their skills in ‘authentic’ situations. They can acquire ‘generalised’ knowledge through solving problems with other participants. On the basis of this, they could expand their knowledge, customise and apply it into their own concrete situations. In addition, it can be also expected that employees will have learning facilities in their work place involving communication with colleagues, and with other members of departments, etc (Wenger, 1998). Therefore, a learning culture, which can be described as ‘organisational learning’, may be actualised in their work place.

In the proposed structure, a disadvantage might be found in terms of the massive increase in costs associated with the need for live tutors. Also, the total number of participants for a course might need to be limited to allow active interaction between the tutor and participants and thus it might reduce the profits of the WBI if it is developed for commercial purposes. From the instructivist point of view, these features are against the purpose of WBI as it sees technological and educational innovation as a means to reduce costs while increasing student numbers (Campbell, 2000). In order to reduce these disadvantages of the proposed structure, I suggest the establishment of an

infrastructure in terms of human resources as well as technical resources for reducing the administrative workloads of the designer and the tutor and for facilitating learners' interaction with the course (Wegerif, 1998; Kaye, 1992). For example, the alternative structure can be used in different companies at the same time. They can share the documents, learning outcomes, etc. The infrastructure can be established amongst experts (or tutors) and they can share the workload. Also, the repeated use of the structure in different subjects and different groups will reduce the development costs.

5. CONCLUSIONS

This research started from a question about the appropriateness of the current educational uses of information and communications technologies in business situations. As discussed in the introduction and literature review, the environments around organisations and companies have been turbulently changing. Consequently, the required knowledge of professionals is changing to a learning ability to deal with innovative change, rather than having technical skills or knowledge (e.g., Yoo, 1995; Sumner et al., 1998). I argued that the instructivist approach is inappropriate for the learning of 'open-ended'. Consequently, I tried to develop the possibilities of collaborative and resource-learning environment in the context of the web-based business education.

A wide range of literature was reviewed for establishing my theoretical position: instructivist and constructivist learning theories; the general potential of Internet technologies in education; workplace learning. Collaborative learning and resource-based learning were reviewed as methodologies to actualise constructivist learning perspectives.

To assess the limitations of the instructivist approach, the "e-Test Leaders A" course from the "e-Campus" of Samsung SDS was reviewed as a sample. One aim of my review was to find the discursive gap between the theories, instructivist and constructivist, and the sample. "e-Test Leaders A" showed highly instructivist-oriented nature. It was didactic and systematically designed for transmitting 'fixed' knowledge.

Iterative assessment took the pattern of ‘drill and practice’, as commonly found in computer-based learning environments (e.g. Hannafin & Peck, 1998; Laurillard, 1993). No apprenticeship, no tutoring, and little interactivity amongst participants were found. These findings suggest that the course design will be effective only if the content knowledge is fixed and well structured.

My main argument was that the course in fact misrepresents the nature of the content knowledge it presents, because it is ‘open-ended’ knowledge, concerned with the changing information technologies for innovation in organisations. For dealing with the limitations found in “e-Test Leaders A”, I suggested an alternative structure which promoted the constructivist perspective by adopting collaborative and resource-based learning methods. I argued that this structure can be appropriate for open-ended learning, because learners can generalise their own knowledge through interaction with other participants in the form of discussion, exchange, and negotiation of meanings. Furthermore, they can localise and apply the knowledge in their own situations (e.g., Vygotsky, 1978; Lave & Wenger, 1991; McConnell: 2000). Finally, I suggested that my alternative structure might help to create the innovative learning culture which companies and organisations currently require their employees to participate in (e.g., Argyris, 2000; Yoo, 1995).

At this point, a critical limitation needs to be addressed concerning my argument. My claims should be generalised by empirical settings as well as theoretical reviews (this can be referred to as ‘validity’—Brown & Dowling, 1998). I found it very difficult to generalise my arguments for an alternative structure solely based on literature review

and text analysis. Due to lack of experimental data, i.e. a practical attempt to produce the alternative learning environment, it is inadequate to claim that ‘the alternative structure is appropriate and the conventional structure is not’ or that ‘the alternative can deal with the limitations found in conventional’.

In order to obtain more complete evidence for my claims, further research needs to be carried out. I suggest two approaches: experimental research and observation. Experimental research can be adopted for comparing the variables found in the existing structure and the alternative structure of “e-Test Leaders A” (Brown & Dowling, 1998). By setting up two groups as a ‘control group’ and an ‘experimental group’, differences in learning activities, outcomes, and effectiveness can be compared and analysed. I assume that this approach can strengthen the research by giving it more validity and reliability. However, observation, that is ethnographic research, is a more proper approach for my proposed structure. As the alternative structure involves the realisation of a new learning culture in organisations and companies, a sample ought to be chosen in the form of a company implementing the new approach for their training. An ethnographic approach makes possible the exploration of the learning processes in the context in which they naturally occur (Brown & Dowling, 1998, p.43). In the same way that Wenger (1998) made his observations about ‘the practice of community’, long-term observation might be necessary to assess their working patterns, collaboration patterns, and outcomes. By means of observation, I expect that actual differences can be found between the existing structure and the proposed one.

This dissertation was an effort to challenge the dominance of the instructivist design, by implementing ‘constructivist’ learning environment that focuses on “social and collaborative interaction”. I believe that a stereotyped learning approach hinder learners’ creative and flexible learning. The implementation of a technology-based learning environment cannot automatically guarantee significant outcomes for organisations unless it respects the nature of learning, or the particular contexts of organisations. What we have to make sure is that it is the people who determine the dynamics of social interaction, not technologies. I believe that a more flexible attitude towards ‘learning’ and ‘education’ are necessary in the field of business education in Korea.

REFERENCES

Bibliographies

Allen, T. (1998). *Tom Allen's Net place.* Teacher Preparation, Humboldt State University. Available at: http://www.humboldt.edu/~tha1/mastery.html. Last accessed: 03/August/01.

Amaral, K. (1995). *"The web" and the web of life.* University of Mass Dartmouth, Dissertation (Master's Degree). Available at: http://www.umassd.edu/Public/People/KAmaral/Thesis/Thesisexperiment.html. Last aceessed: 05/Aug/01.

Anderson, J. R., Reder, L. M., and Simon, H. A. (online). *Applications and misapplication of cognitive psychology to mathematics education*. Available at: http://ACT.PSY.CMU.EDU/personal/ja/misapplied.htm#fn0. Last accessed: 16/Jan/01.

Argyris, C. (2000). *On organisational learning*. (2nd ed.). Oxford: Blackwell.

Bannan, B. & Milheim, W. (1997). Existing web-based instruction courses and their design. In Khan, B. H. (ed.). *Web-based instruction*. Englewood Cliffs, NJ: Educational Technology Publication.

Bednar, A., Cunningham, D., Duffy, T., and Perry, J. (1992). Theory into practice: how do we link? In Duffy, T. M. and Jonassen, D. H. (eds.) (1992). *Constructivism and the technology of instruction: a conversation*. Hillside, NJ: Lawrence Erlbaum Associates.

Berge, Z. L. and Collins, M. P. (1995). Introduction. In Berge, Z. L. and Collins, M. P. (eds.) (1995). *Computer mediated communications and the online classroom. Volume 1, Overview and perspectives*. Cresskill, NJ: Hampton Press, INC.

Beven, F. (1999). *Hypermedia structures and the development of vocational knwoeldge*. Summary of presentation at the 3rd International Conference "Researching Vocational Education and training". July 14-16, 1999. Bolton Institute.

Billett, S. (1996). Towards a model of workplace learning: the Learning Curriculum. *Studies in Continuing Edcuation*. 18. 1. 43-58.

Bloom, B.S. (Ed.) (1956) Taxonomy of educational objectives: the classification of educational goals: Handbook I, cognitive domain. New York: Longmans, Green.

Bonk, C. J. & Reynolds, T.H. (1997). Learner-centred web instruction for higher-order thinking, teamwork, and apprenticeship. In Khan, B. H. (ed.). *Web-based instruction*. Englewood Cliffs, NJ: Educational Technology Publication.

Bowerman, J. (2000). Strategizing at work: practitioner perspectives on doctoral Set working. In Prestoungrange, G., Sandelands, E., & Teare, R. (eds.) (2000). *The virtual learning organisation: learning at the workplace campus*. London: Continuum.

Brown, A. and Dowling, P. (1998). *Doing research/reading research: a mode of interrogation for education.* London: FalmerPress.

Brown, J. S., Collins, A., and Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*. 18. 32-42.

Brown, S. and Smith, B. (1996). Introducing resources for learning. In Brown, S., and Smith, B. (eds.) *Resource-based Learning*. London: Kogan Page.

Bruffe, K. A. (1993). Collaborative Learning: Higher Education, Interdependence, and the Authority of Knowledge. Baltimore; London: The Johns Hopkins University Press

Campbell, J. A. (2000). Using Internet technology to support flexible learning in business education. *Information Technology and Management*. 1. 351-362.

Carr, A, Jonassen, D., Litzinger, M., and Marr, R. (1998). Good ideas to foment educational revolution: the role of systemic change in advancing situated learning, constructivism, and feminist pedagogy. *Educational Technology*. 38. 1. 5-15.

Caudron, S. (1996). Wake up to new learning technologies. *Training and Development*. 50. 5. 30-35.

Chen, I. (online). An electronic textbook on instructional technology. Available at: http://www.coe.uh.edu/~ichen/ebook/ET-IT/cover.htm. Last accessed: 22/August/01.

Cole, M. & Wertsch, J. V. (online). *Beyond the individual-social antimony in discussions of Piaget and Vygotsky.* Available at: http://www.massey.ac.nz/~Alock/virtual/colevyg.htm. Last accessed 29/01/01.

Collins, A., Brown, J. S., and Holum, A. (1991). Cognitive apprenticeship: making thinking visible. *American Educator*. 6. 11. 38-46. Available at: http://carbon.cudenver.edu/public/education/edschool/cog/bibs/daniel3.html. Last accessed: 17/May/01

Cunningham, D. (1992). Assessing constructions and constructing assessments: a dialogue. In Duffy, T. M. and Jonassen, D. H. (eds.) (1992). *Constructivism and the technology of instruction: A conversation*. Hillside, NJ: Lawrence Erlbaum Associates.

Dick, B. (1997). *Action learning and action research*. Available at: http://www.scu.edu.au/schools/gcm/ar/arp/actlearn.html. Last accessed: 6/July/01.

Dick, W., and Carey, L. (1990). *The systematic design of instruction* (3rd ed.). Glenview, IL: Scott, Foresman.

Dougiamas, M. (1998). *Journey into constructivism*. Available at: http://dougiamas.com/writing/constructivism.html. Last accessed: 19/Dec/00.

Driscoll, M. (1998). *Web-based training: using technology to design adult learning experiences*. San Francisco, CA: Jossey-Bass.

Duffy, T. and Cunningham, D. (1996). Constructivism: implications for the design and delivery of instruction. In Jonaseen, D. (ed.). *Handbook of research for Educational Communications and Technology.* NY: Simon & Schster Macmillan.

Duffy, T. M. and Jonassen, D. H. (1992). Constructivism: new implications for instructional technology. In Duffy, T. M. and Jonassen, D. H. (eds.). *Constructivism and the technology of instruction: a conversation*. Hillside, NJ: Lawrence Erlbaum Associates.

Duffy, T. M. and Jonassen, D. H. (eds.) (1992). *Constructivism and the technology of instruction: a conversation*. Hillside, NJ: Lawrence Erlbaum Associates.

Firdyiwek, Y. (1999). Web-based courseware tools: Where is the pedagogy?. *Educational Technology*. 39. 1. 29-34.

Forman, G. (1985). The value of kinetic print: digital symbols with analogical properties. In Klein, E. New directions for child development. Vol.28. *Computers and Children*. San Franciso, CA: Jossey-Bass.

Fox, R. (1996). Constructivist View of Learning. In Fox, R. (ed.). *Perspective on constructivism (Perspectives 56)*. Exeter: School of Education. University of Exeter.

Gagné, R. M., and Brigss, L.J. (1979). *Principles of instructional design*. NY: Holt, Rinjehart & Winston.

Gagné, R. M., and Driscoll, M. P. (1988). *Essentials of learning for instruction*. Englewood Cliffs, NJ: Prentice Hall.

Gibbs, G. (1996). Institutional strategies for implementing resource-based learning. In Brown, S., and Smith, B. (eds.) *Resource-based Learning*. London: Kogan Page.

Gilbert, L. & Moore, D. R. (1998). Building interactivity into web courses: tools for social and instructional interaction. *Educational Technology*. 38. 3. 29-35.

Gundry, J. (1992). Understanding collaborative learning in networked organisations. Kaye, A. R. (ed.) (1992). *Collaborative learning through computer conferencing: the Najaden papers*. Berlin: London: Springer-Verlag in cooperation with NATO Scientific Affairs Division.

Hallowell, K. & Hillman, H. (online). *The power of action learning*. Available at: http://www.hallowell2.com/PowerofAction.htm. Last accessed: 6/July/01.

Hannafin, M. J. and Peck, K. L. (1988). *The design, development, and evaluation of instructional software*. NY: Macmillan Publishing Company.

Harasim, L. M. (ed.) (1990). *Online education: perspectives on a new environment.* New York; London: Praeger.

Harvard, G. (1996). The key ideas of Vygotsky and their implications for teaching and schooling. In Fox, R. (ed.). *Perspective on constructivism (Perspectives 56)*. Exeter: School of Education. University of Exeter.

Hasebrook, J. (1999). Web-based training, performance and controlling. *Journal of Network and Computer Applications*. 22. 51-64.

Heinrich, S. (online). *Lev Vygotsky*. Available at: http//coehp.idbsu.edu/FACHTMILS/cohort3/Vygotsky.htm. Last accessed: 19/Dec/00.

Hudson, L. (1999). *Organisation, support and interaction for adult students in Web Courses*. 14p. ED441154.

Hudspeth, D. (1997). Testing learner outcomes in web-based instruction. In Khan, B. H. (ed.). *Web-based instruction*. Englewood Cliffs, NJ: Educational Technology Publication.

Hung, D. (2001). Design principles for web-based learning: implications from Vygotskian thought. *Educational Technology*. 41. 3. 33-41.

Jackson, R. H. (2001). *Web Based Learning Resources Library.* Available at: http://www.outreach.utk.edu/weblearning/. Last accessed: 23/August/01.

Johnson, D. W. and Johnson, R. T. (1998). Cooperative learning and social interdependence theory. *Social Psychological Applications to Social Issues.* Available at: http://www.clcrc.com/pages/SIT.html. Last accessed: 23/Feb/01.

Johnson, D.W., Johnson, R. T., and Stanne, M. B. (2000). *Cooperative learning methods: a meta-analysis*. Available at: http://www.clcrc.com/pages/cl-methods.html. Last accessed: 23/February/01.

Kammersgarard, J. (1990). Four different perspectives on human-computer interaction, In Preece, J. & Keller, L. (eds.) *Human-computer Interaction*. Hertfordshire: Prentice Hall International (UK) Ltd.

Kaye, A. R. (1992). Learning together apart. In Kaye, A. R. (ed.). *Collaborative learning through computer conferencing: the Najaden papers*. Berlin: London: Springer-Verlag in cooperation with NATO Scientific Affairs Division

Kerka, S. (1997). *Constructivism, workplace learning, and vocational education*. Eric Digest No. 181.

Khan, B. H. (ed.) (1997). *Web-based instruction*. Englewood Cliffs, NJ: Educational Technology Publication.

Kwon, S. H. (1990). Educational Technology. Seoul: YangSuhWon. (Published in Korean)

Larochelle, M., Bednarz, N., & Garrison, J. (eds.) (1998). *Constructivism and education*. Cambridge: Cambridge University Press.

Laulsen, M.F. (1995). Moderating educational computer conferences. In Berge, Z. L. and Collins, M. P. (eds.). *Computer mediated communications and the online classroom*. *Volume 3, Distance learning.* Cresskill, NJ: Hampton Press, INC.

Laurillard, D. (1993). *Rethinking university teaching: A framework for the effective use of educational technology*. London, NY: Routledge.

Laurillard, D., Stratfold, M., Luckin, R., Plowman, L., and Taylor, J. (1999). Affordances for learning in a non-narrative medium. *Journal of Interactive Media in Education*. 2000 (2). Available at: http://www-jime.open.ac.uk/00/2/laurillard-00-2.pdf. Last accessed: 18/Aug/01.

Lave, J. & Wenger, E. (1991). *Situated learning: legitimate peripheral participation*. Cambridge: Cambridge University Press.

Lewis, J., Whitaker, J. Julian, J. (1995). Distance Education for the 21st Century: The Future of National and International Telecomputing Networks I Distance

Education. In Berge, Z. L. and Collins, M. P. (eds.) (1995). Computer mediated communications and the online classroom. Volume 3, Higher Education. Cresskill, NJ: Hampton Press, INC.

Liaw, S. & Huang, H. (2000). Enhancing interactivity in web-based instruction: a review of the literature. *Educational Technology*. 40. 3. 41-45.

Mager, R. F. (1984). *Preparing instructional objectives* (2nd ed.). Belmont, CA: Pitman Leanring.

Mapp, L. (1996). Implementing computer-supported RBL. In Brown, S., and Smith, B. (eds.) *Resource-based Learning*. London: Kogan Page.

Mason, R. (1994). *Using communications media in open and flexible learning*. London: Kogan Page in association with the Institute of Educational Technology, Open University.

McConnell, D. (1992). Computer Mediated Communication for Management Learning. In Kaye, A. R. (ed.) (1992). *Collaborative learning through computer conferencing: the Najaden papers.* Berlin: London: Springer-Verlag in cooperation with NATO Scientific Affairs Division.

McConnell, D. (2000). *Implementing computer supported cooperative learning*. (2nd ed.). London: Kogan Page.

McConnell, D., and Hammond, M. (online). Just in Time Open Learning: Issues and possibilities. Available at: http://www.leeds.ac.uk/educol/documents/000000140.htm. Last accessed: 15/Jan/01.

McCormack, C. & Jones, D. (1998). *Building a web-based education system*. NY: John Wiley & Sons.

McKenzie, J. & Swords, D. (2000). Maintaining relevance in business education: A framework for exploring alternative teaching paradigms. *International Journal of Value-Based Management*. 13. 273-295.

McLellan, H. (1997). Creating virtual communities via the web. In Khan, B. H. (ed.). *Web-based instruction*. Englewood Cliffs, NJ: Educational Technology Publication.

Merill, P. F. (1978). Hierarchical and information processing tasks analysis: a comparison. *Journal of Instructional Development*. 1. 35-40.

Merill, P. F. (1980). Analysis of a procedural task. *NSPI Journal*. Vol.19. 2. 11-15.

Milheim, W. D. & Harvey, D. M. (1998). Design and development of a world wide web resource site. *Educational Technology*. 38. 1. 53-56.

National Council for Open and Distance Education (NCODE). *Quality guidelines for resource based learning.* Report to NCODE 11. Available at: http://cedir.uow.edu.au/NCODE/info/definitions.html. Last accessed: 23/May/01.

Nielsen, J. (1999). *Designing web usability: the practice of simplicity.* Indianapolis, IN: New Riders Publishing.

Norman, N. (1998). Communication technologies and education: lessons in the potential and innovation. *ALT-J.* Vol.5. No.3. Also available at: http://www.leeds.ac.uk/educol/documents/000000462.htm. Last accessed: 7/May/01.

Papert, S. (1980). *Mindstorms: children, computers, and powerful ideas*. NY: Basic Books.

Perkins, D. (1992). What constructivist demand of the learner. In Duffy, T. M. and Jonassen, D. H. (eds.). *Constructivism and the technology of instruction: a conversation*. Hillside, NJ: Lawrence Erlbaum Associates.

Peterson, M. (2000). *Electronic Delivery of Career Development University Courses*. 18p. ED442058.

Petre, M., Carswell, L., Price, B., and Thomas, P. (1998). Innovations in large-scale supported distance teaching: transformation for the Internet, not just translation. In Eisenstadt, M. & Vincent, T. (eds.). *The knowledge web: learning and collaborating on the Net*. London: Kogan Page.

Piaget, J. (1972). *To understand is to invent*. NY: The Viking Press, Inc.

Plowman, L. (1996). Narrative, interactivity and the secret world of multimedia. *The English & Media Magazine.* 35. Autumn. 44-48.

Preece, J. (2000). *Online communities: designing usability, supporting sociability*. Chichester: John Wiley & Sons, Ltd.

Prestoungrange, G. (2000). Sustaining learning capture in unstable workplaces. In Prestoungrange, G., Sandelands, E., and Teare, R. (eds.) (2000). *The virtual learning organisation: learning at the workplace campus*. London: Continuum.

Prestoungrange, G., Sandelands, E., and Teare, R. (eds.) (2000). *The virtual learning organisation: learning at the workplace campus*. London: Continuum.

Pufall, P. B. (1988). Function in Piaget's system: Some notes for constructors of microworlds. Forman, G. and Pufall, P. B. (1988) (eds.). *Constructivism in the computer age*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Race, P. (1994). *The open learning handbook* (2nd ed.). London: Kogan Page.

Ravet, S. & Layte, M. (1997). *Technology-based training: a comprehensive guide to choosing, implementing, managing and developing new technologies in training*. London: Kogan Page.

Revans, R. W. (1982). What is action learning. *The Journal of Management Development*. 15. 3. 64-75.

Roffe, I. (2000). Online learning, innovation, and knowledge management: tools for organisational and professional development. *Industry & Higher Education*. 14. 5. 327-339.

Rosen, J. (1999). *Instructivism vs. progressivism: Escalante, Barclay, Lott, other miracle makers.* K-16: Instructivism, and history of U.S. education A project of: The Thomas B. Fordham Foundation in collaboration with Hundson Institute. Available at: http://westview.tdsb.on.ca/Mathematics/articles/article.instructivism.html. Last accessed: 22/August/01.

Rossett, A. (1987). *Training needs assessment*. Englewood Cliffs, NJ: Educational Technology Publications.

Rowntree, D. (1997). *Making material-based learning work*. London, Stirling: Kogan Page.

Ryan, S., Scott, B., Freeman, H., and Patel, D. (2000). *The Virtual university: the Internet and resource-based learning*. London: Kogan Page.

Sandelands, E. (2000). Cyber tutoring and learning. In Prestoungrange, G., Sandelands, E., & Teare, R. (eds.) (2000). *The virtual learning organisation: learning at the workplace campus*. London: Continuum.

Senge, P. M. (1990). *The fifth discipline: the art and practice of building learning organisation.* NY: Boubleday.

Shneiderman, B. (1997). *Designing the user interface: Strategies for Effective Human-Computer Interaction* (3rd ed.). Addison-Wesley Pub Co.

Silverman, D. (2001). *Interpreting qualitative data: methods for analysing talk, text and interaction.* London: SAGE Publications.

Slavin, R. E. (1990). *Cooperative learning: theory, research and practice*. Englewood Cliffs, NJ: Prentice Hall.

Søby, M. (1992). Waiting for Electropolis. In Kaye, A. R. (ed.) (1992). Collaborative learning through computer conferencing: the Najaden papers. Berlin: London: Springer-Verlag in cooperation with NATO Scientific Affairs Division.

Spiro, R. J., feltovich, P. J., Jacobson, M. J., and Coulson, R. L. (1992). Cognitive flexibility, constructivism, and hypertext: random access instruction for advanced knowledge acquisition in ill-structured domain. In Duffy, T. M. and Jonassen, D. H. (eds.). *Constructivism and the technology of instruction: a conversation*. Hillside, NJ: Lawrence Erlbaum Associates.

Sumner, T. and Stolze, M. (1996). Integrating working and learning: two models of computer support. *AI & Society*. Vol. 10. Special Issue on Hypermedia and Workplace Learning. 70-78. 1996

Sumner, T., Domingue, J., & Zdrahal, Z. (1998). Enriching representations of work to support organisational learning. Available at: http://www2.kmi.open.ac.uk/tr/kmi-tr-60.pdf. Last accessed: 06/July/01.

Tapscott, D. (1995). *The digital economy: promise and peril in the age of networked intelligence.* NY: McGraw-Hill.

Trentin, G. (2001). From formal training to communities of practice via network-based learning. *Educational Technology*. 41. 2. 5-14.

Um, W. Y. (1999). A case study of instruction system design models for domestic business training. *The Korean Society for Training and Development*. Vol.6. December, 1999. 121-140. (Published in Korean).

Verhoeven, A. & Warendorf, K. (1999). External navigation control and guidance for learning with spatial hypermedia. *Journal of Interactive Media in Education*. 99(1).

von Glasersfeld, E. (1998). Why constructivism must be radical. In Larochelle, M., Bednarz, N., & Garrison, J. (eds.). *Constructivism and education*. Cambridge: Cambridge University Press.

Vygotsky, L. (1978). *Mind in Society: the development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Wagner, J. O. (1997). *The World Wide Web and vocational education*. ERIC Digest No.186.

Wasserman, A. I. and Shewmake, D. T. (1990). The role of prototypes in the user software engineering (USE) methodology. In Preece, J. & Keller, L. (eds.) *Human-computer Interaction*. Hertfordshire: Prentice Hall International (UK) Ltd.

Watson, J. B. & Rossett, A. (1999). Guiding the independent learner in web-based training. *Educational Technology*. 39. 3. 27-36.

Watson, P. (2000). Barriers to entry: implications for private finance initiatives in university position. In Prestoungrange, G., Sandelands, E., & Teare, R. (eds.) (2000). *The virtual learning organisation: learning at the workplace campus*. London: Continuum.

Wegerif, R. (1998). The social dimension of asynchronous learning networks. *JALN*. Vol.2. 1. March, 1998. Available at: http://www.aln.org/alnweb/journal/vol2_issue1/wegerif.htm. Last accessed 15/January/01.

Weller, M. (2000). The use of narrative to provide a cohesive structure for a web based computing course. *Journal of Interactive Media in Education*. 2000 (1).

Welsh, T. M. (1997). An event-oriented model for web-based instruction. In Khan, B. H. (ed.). *Web-based instruction*. Englewood Cliffs, NJ: Educational Technology Publication.

Wenger, E. (1998). *Communities of practice*. Cambridge: Cambridge University Press.

Wilkinson, G., Bennett, L., Oliver, K. (1997). Evaluation criteria and indicators of quality for Internet resources. *Educational Technology*. 37. 3. 52-59.

Wills, B. & Dickinson, J. (1997). Distance education and the world wide web. In Khan, B. H. (ed.). *Web-based instruction*. Englewood Cliffs, NJ: Educational Technology Publication.

Wilson, B. G., Teslow, J. L. and Taylor, L. (1993). Instructional design perspectives on mathematics education with reference to Vygotsky's theory of social cognition. *Focus on Learning Problems in Mathematics.* 15. 2 & 3. 65-86.

Wood, D. and Wood, H. (1996). Vygotsky, tutoring and learning. *Oxford Review of Education*. 22. 1. 5-16.

Yoo, Y. M. (1995). *Learning organisation in the age of knowledge economy*. Seoul, Korea: Godo Consulting (published in Korean).

Zakari, M. (1998). *Constructivism: is it the last paradigm shift "war?"*. Available at: http://www2.educ.ksu.edu/faculty/McGrathD/Spring98/StudentCogProjects/constructivism.htm. Last accessed: 27/Mar/01.

Zielinski, D. (2000). Can you keep learners online?. *Training*. 37. 3. 64-75.

Zuboff, S. (1988). *In the age of the smart machine: the future of work and power.* Oxford: Basic Books.

Web Sites

Allaire Corp. http://www.allaire.com

Aspect International Training Consulting, Co. http://www.bestpractice.co.kr

Campus21, Inc. http://www.campus21.co.kr

CreBiz Consulting, Co. http://www.i-crebiz.co.kr

Credu.com. http://www.credu.com

ICohere Inc. http://www.icohere.com

Korea General Electronic, Co. http://www.ge.com/korea

S1 Corporation. http://www.s1campus.co.kr

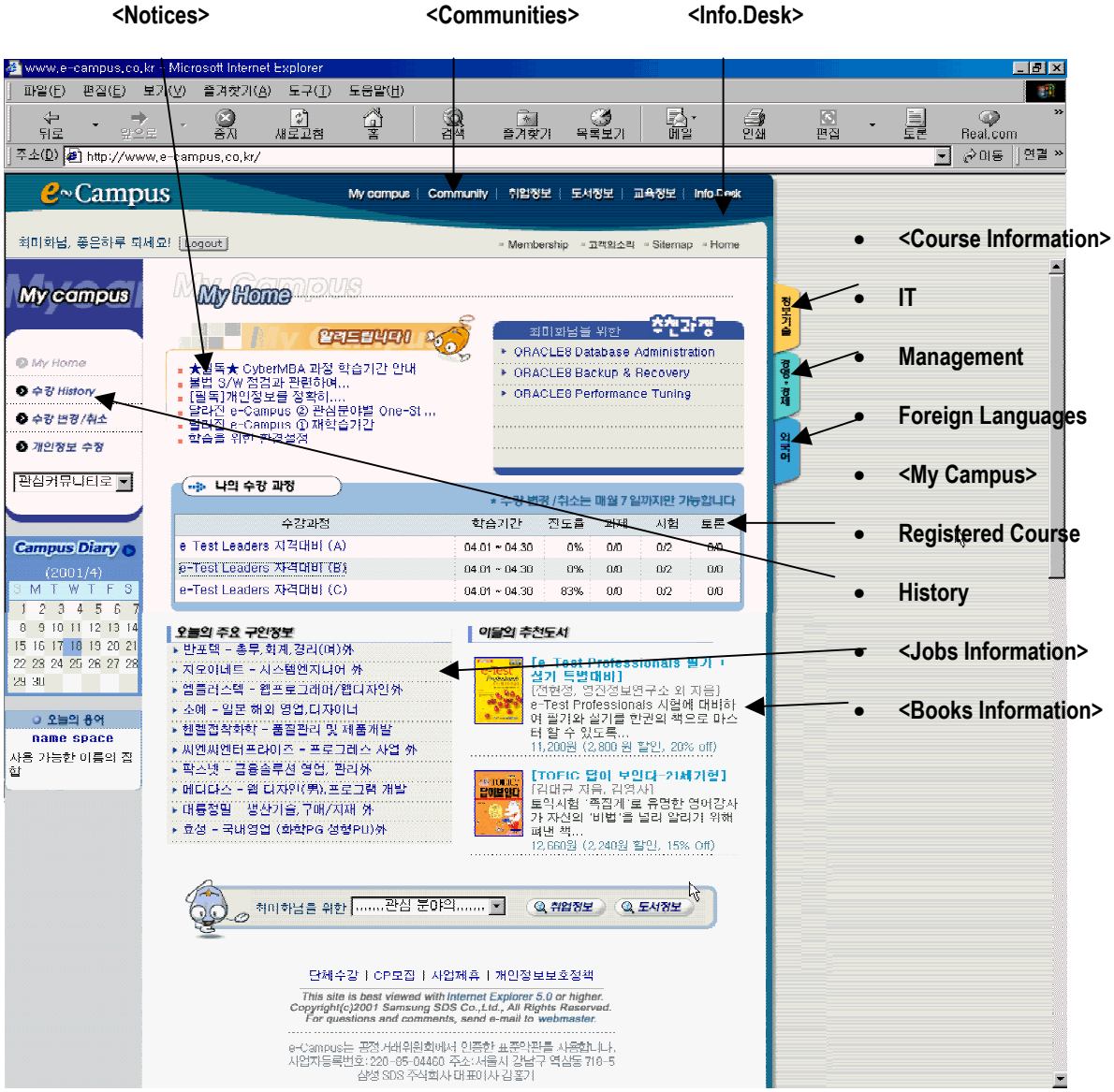
Samsung SDS. http://www.sds.samsung.co.kr

Samsung SDS e-Campus, Co. http://www.e-campus.co.kr

SK Academy, Co. http://www.ray.co.kr/example/sk_eapplication/0_0_0_1.htm

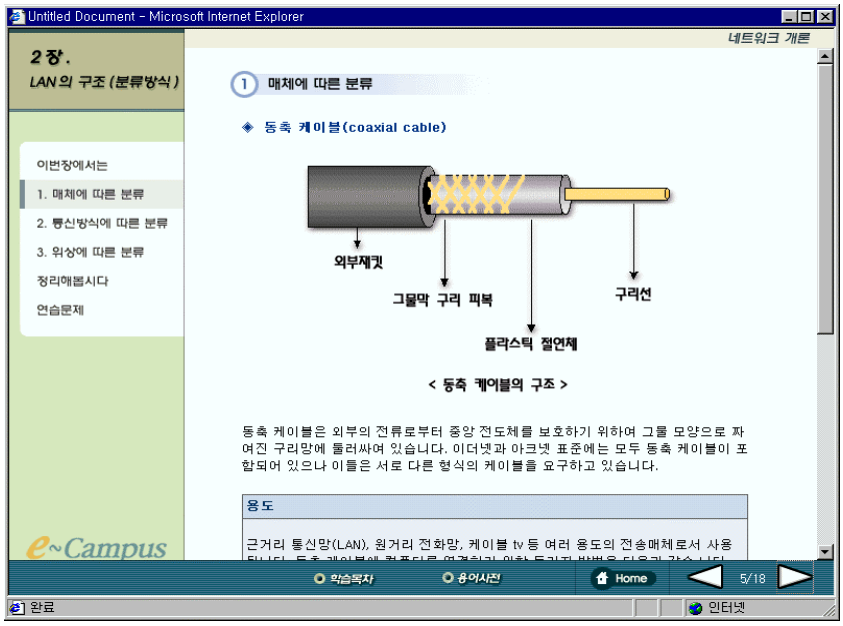
APPENDICES

Appendix A. “My Home” of e-Campus

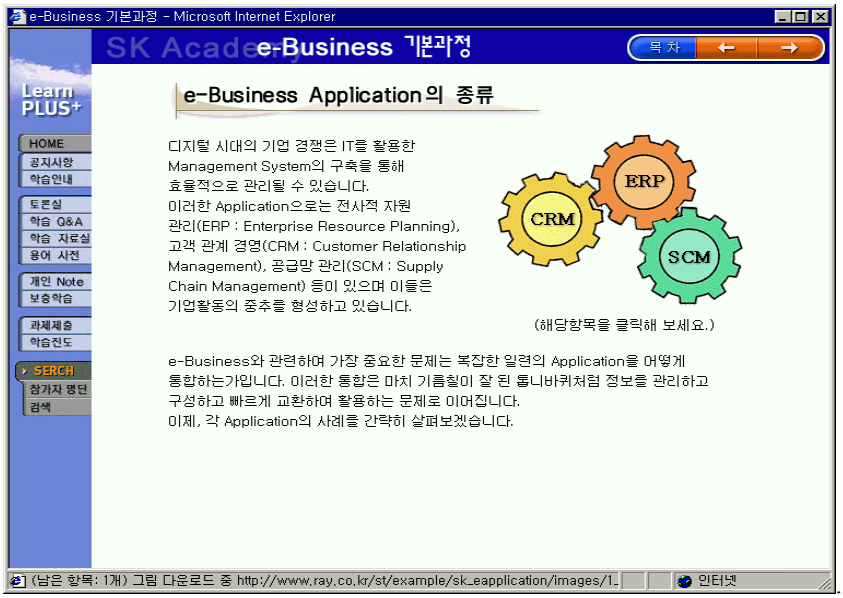


Appendix B. Examples of the user interface design of WBI

1. “Introduction to the Network”, SDS “e-Campus” (http://www.e-campus.co.kr)

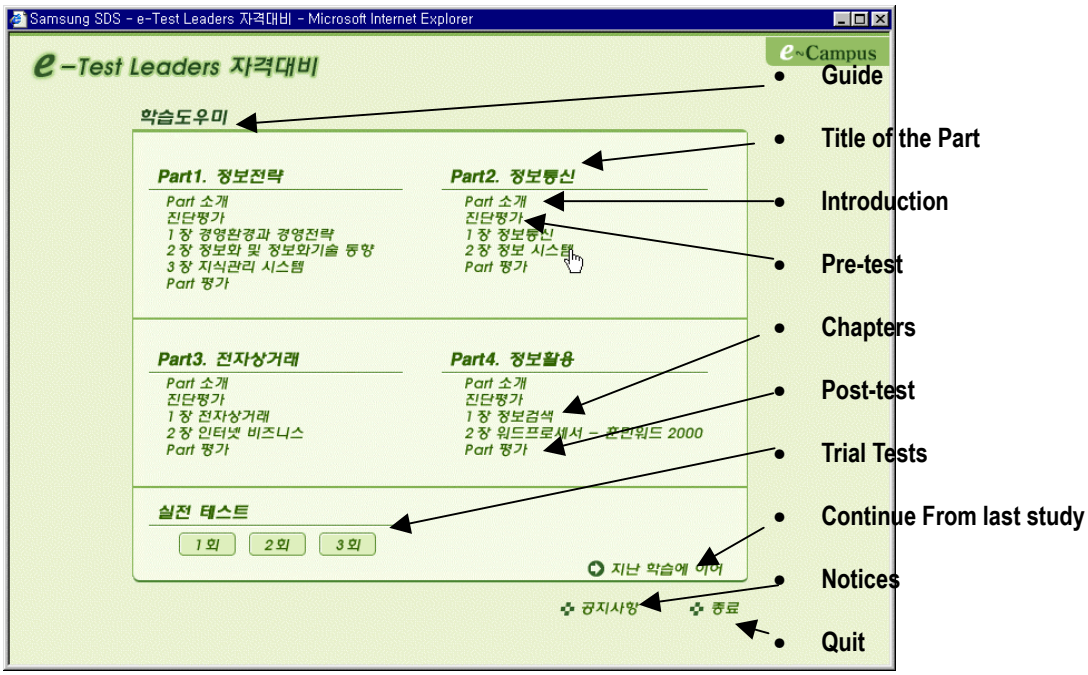


2. “Introduction to e-Business”, SK Academy, (http://www.skacademy.co.kr)



Appendix C. The <Notices> of “e-Test Leaders A”

Appendix D. Home of “e-Test Leaders A”

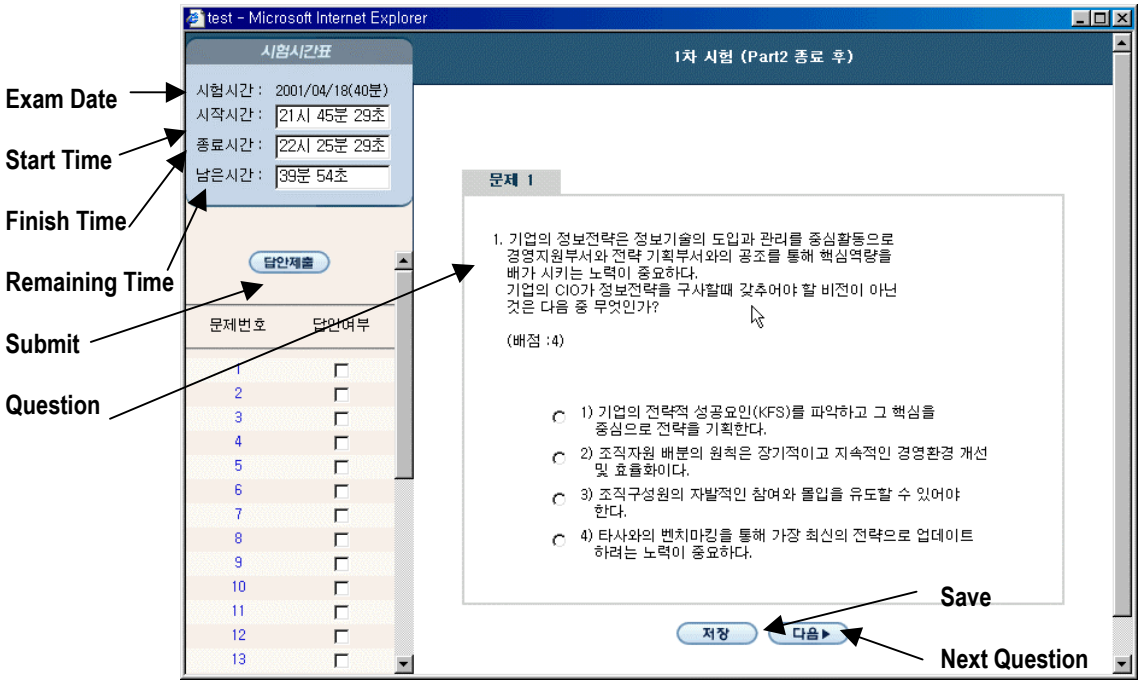


Appendix E. Examples of <Introduction > pages

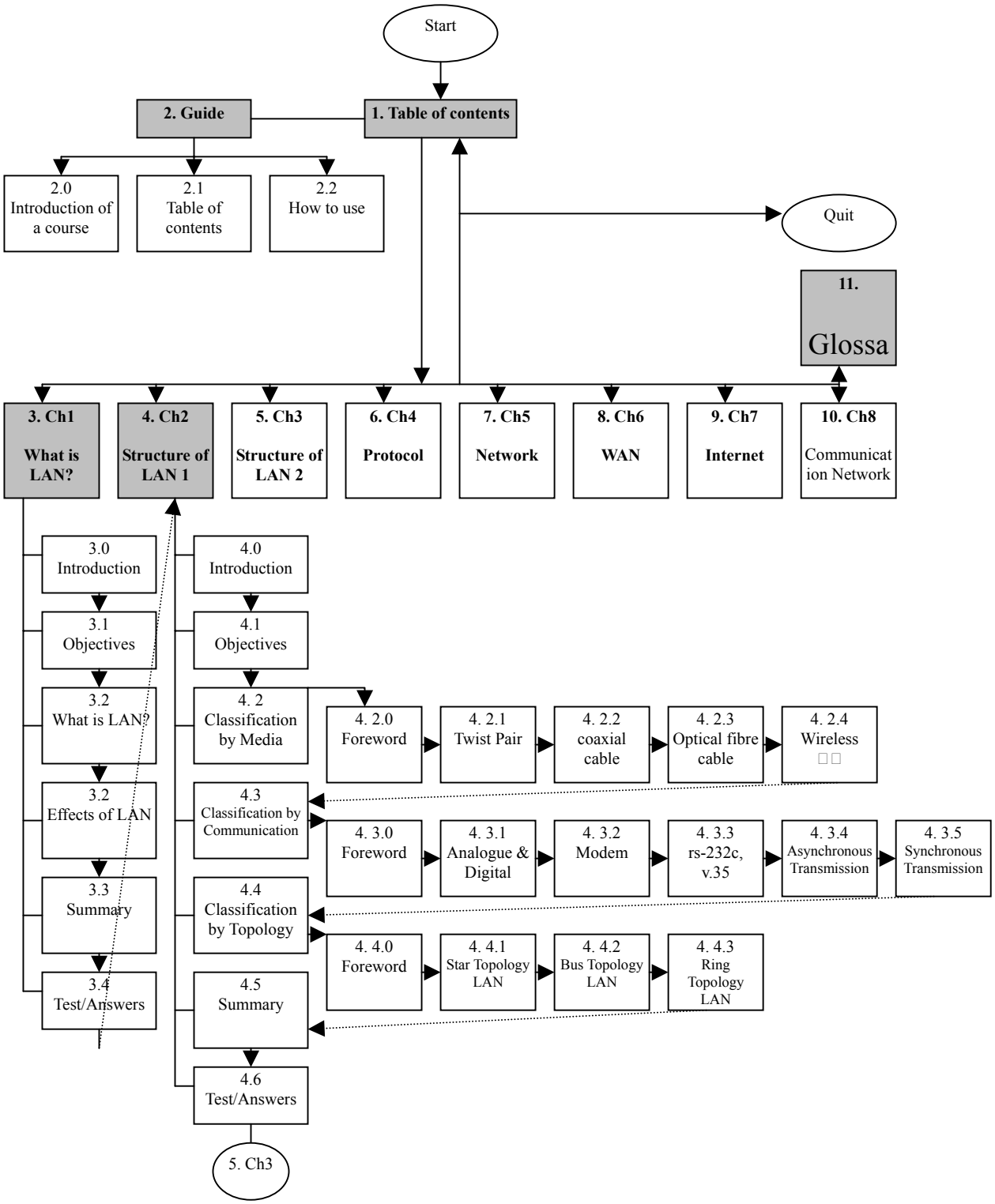
1. The <Introduction> page of Part 1, “e-Test Leaders A”

2. The <Introduction> page of Chapter 1, “Introduction to Networks”

Appendix F. The basic interface of <Examination>



Appendix G. An example of hierarchical flowchart, "Introduction to Networks"



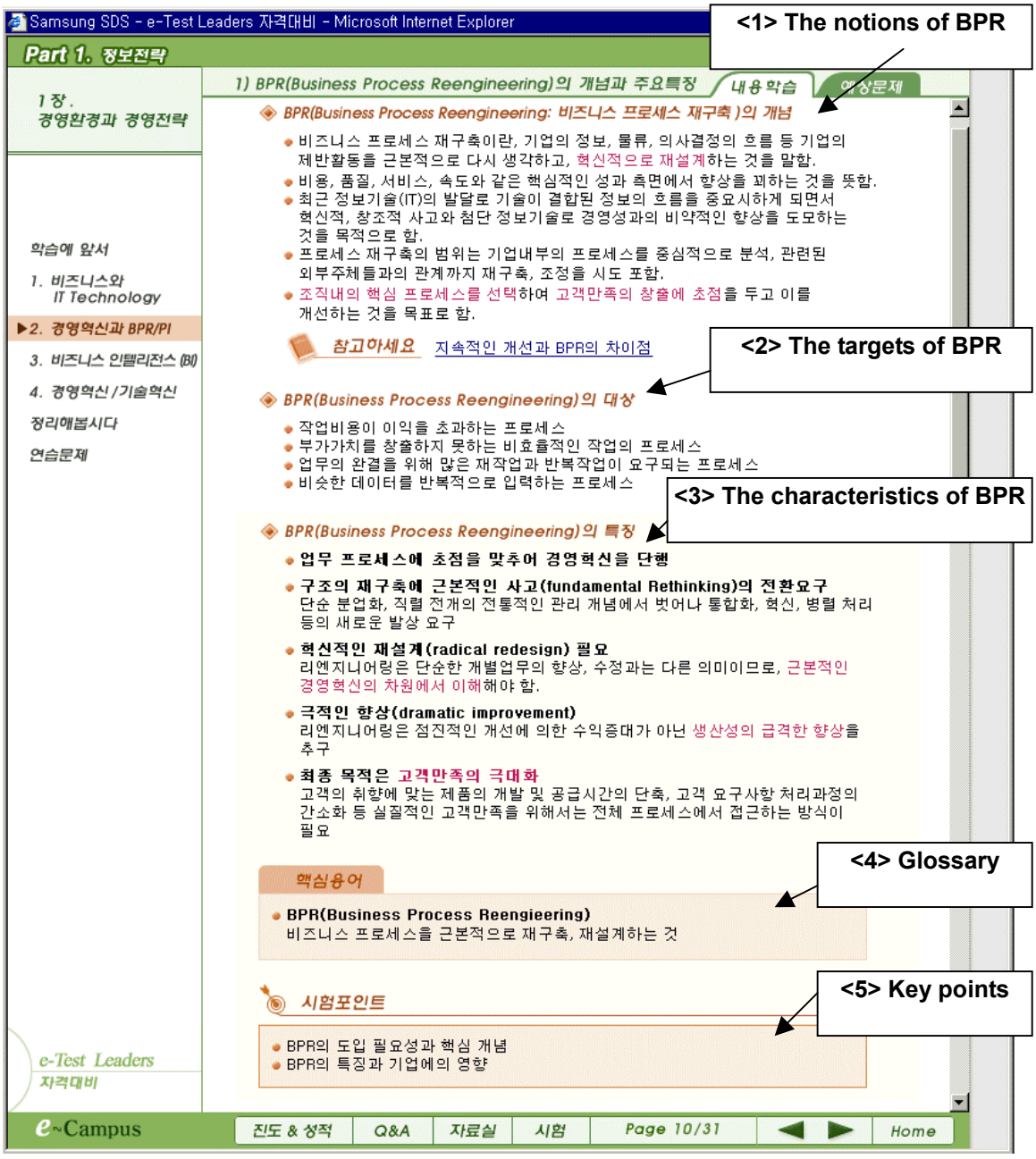
Appendix H. The presence of the tutor in e-Campus courses – some examples

Appendix I. Learning objectives of <Chapter 1> in <Part 3>, "e-Test Leaders A"

- Know the strong and weak points of electronic commerce
- Understand the types of commodities and the extents of their business
- Apply as well as understand the notions of various technologies of e-Commerce
- Understand the foundational factors and skills to build e-Commerce
- Acquire a knowledge of the laws and regulations about e-Commerce

(Translated by the author)

Appendix J. Translation of the notions and characteristics of BPR



1) The notions and the characteristics of BPR (Business Process Reengineering)

<1> The notions of BPR (Business Process Reengineering)

- BPR is the innovative reengineering of an organisations' structure by considering fundamentally the activities such as information processing, physical distribution processes, and the flow of decision management, etc.
- BPR is an effort to improve results in essential parts of organisations such as expenditure, quality, service, and speed
- BPR is intended to make rapid progress in management results by means of innovative and creative thinking, and use of advanced IT as the information processing becomes important with the advancement of IT.
- BPR comes from analysing the internal processes of organisations to reconstructing and adjusting the relationship with the organisation on the outside.
- BPR is to innovate the essential process in organisation for the purpose of improving the customer satisfaction.

<2> The targets of BPR

- Processes where work expense exceeds profit
- Ineffective work processes that cannot produce added value
- Processes which require re-operative and repetitive work for accomplishing the task
- Processes to input similar data repetitively

<3> The characteristics of BPR

- **Carry out management innovation by focusing on the work process**
- **Require fundamental rethinking for restructuring**

  Require new thinking such as integration, innovation, and parallel processes, breaking away from conventional conceptions of management such as simple divisions of labour and serialised processes
- **Need for radical redesign**

  Reengineering must be understood in the context of fundamental management as it has a different meaning from the improvement or adjustment of simple individual tasks.
- **Dramatic improvement**

  Reengineering pursues dramatic improvement in productivity rather than improvement in profit according to gradual progress.
- **The ultimate purpose is to maximise customer satisfaction**

  The focus on total process is necessary for customer satisfaction, e.g the development of a product suiting the customer's taste, the shortening of supply times, simplified processes for solving the customer's need.

<4> Glossary

BPR (Business Process Reengineering)

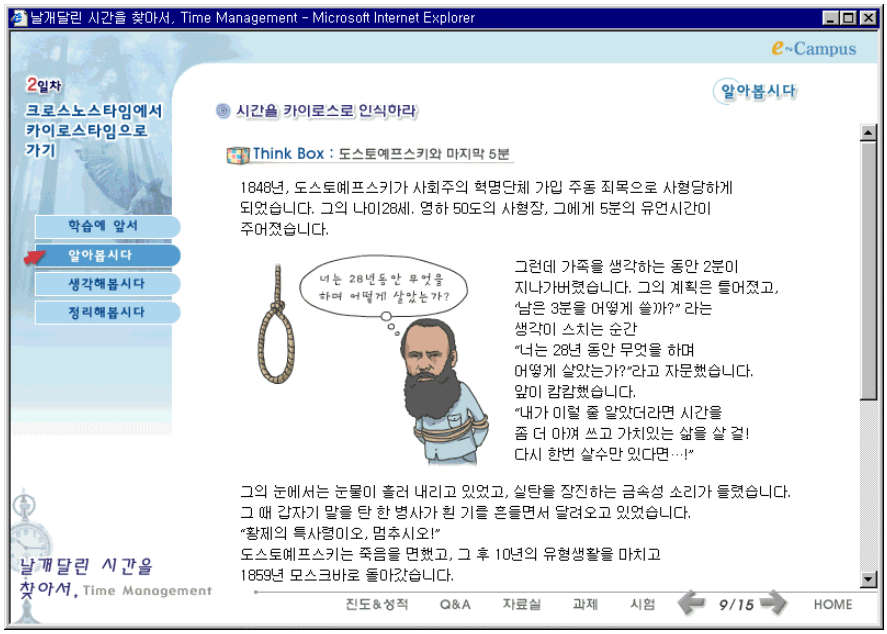
is to fundamentally reconstruct and redesign business processes

<5> Key Points

- The necessity to introduce BPR and the core notions of BPR
- The characteristics of BPR and the influences on business practice

(Translated by the author)

Appendix K. “Catch the flying time, Time Management”, e-Campus



Appendix L. Interview with the instructional designer of "e-Test Leaders A"

(Extract from a 60 minute interview, 30th July, 2001)

The Author: In general, how long does it take the learner to complete the course?

The Designer: A month.

The Author: I guessed it would take more than a month because the presented contents are quite massive.

The Designer: Yes, I guess so. The contents of this course are larger than other courses.

The Author: I think the contents are quite difficult to understand. Why is that?

The Designer: It is because this course has been developed as preparation for a 'qualifying exam'.

The Author: what is the 'qualifying exam'? Is it for 'certification' or 'diploma'?

The Designer: Samsung SDS has developed an 'e-Test' for qualification. Currently, many companies in Korea take part in the test. Especially, the 'e-Test Professional' qualification is officially recognized by the government.

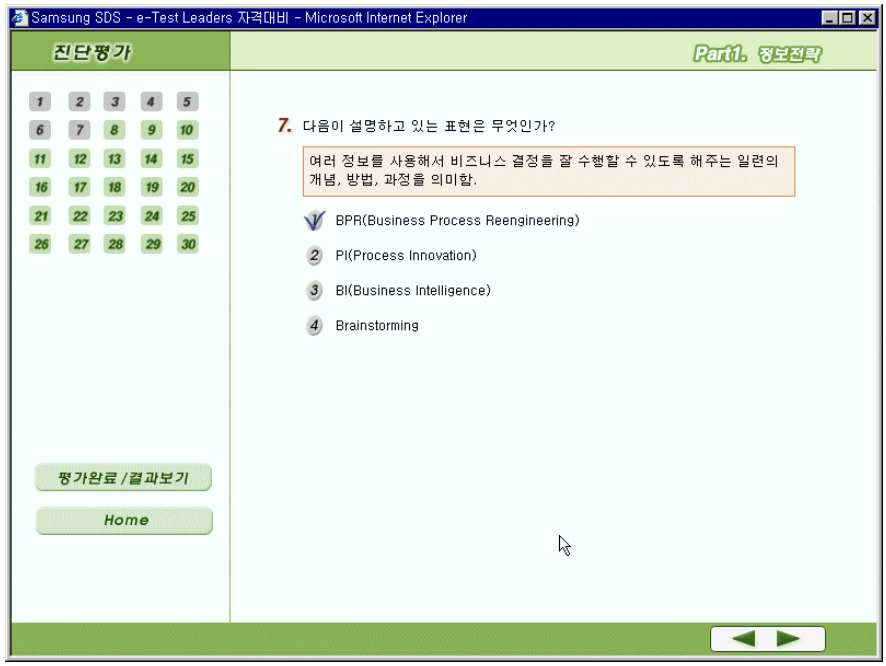
The Author: I see. How is the feedback?

The Designer: What feedback?

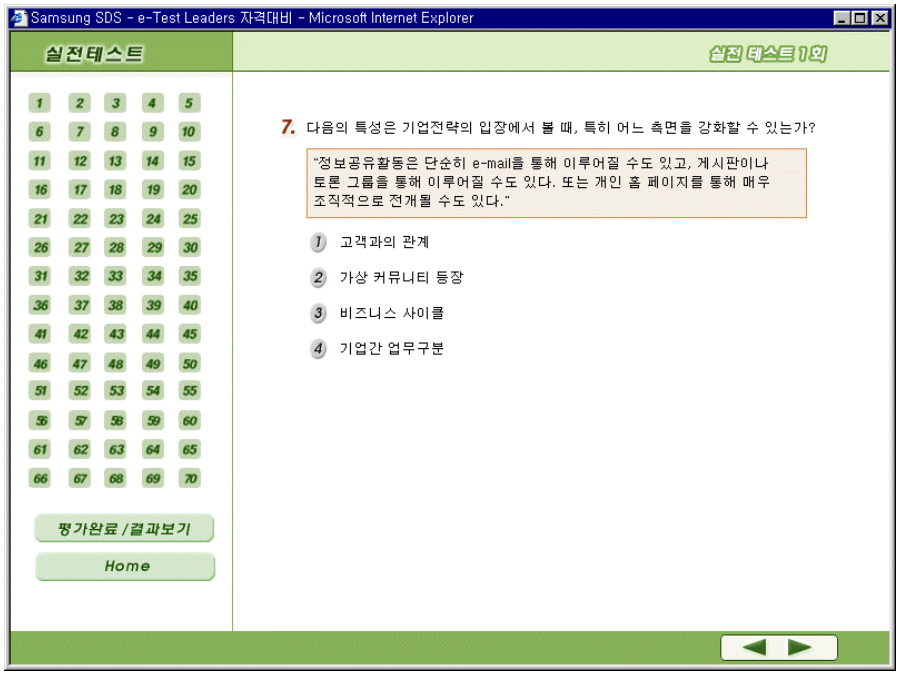
The Author: The response from users, such as good or bad, difficult, useful, and so on.

The Designer: Well, after the course, we normally do questionnaires. In general, we simply check how much they are satisfied with the tutor and the course itself. The users normally express their satisfaction with the result. Anyway, cyber education is just average kind of thing, isn't it? Nothing special.

Appendix M. Question 7 of <Pre-test> in <Part 1>, “e-Test Leaders A”



Appendix N. Question number 7 in <Trial Exam 1>

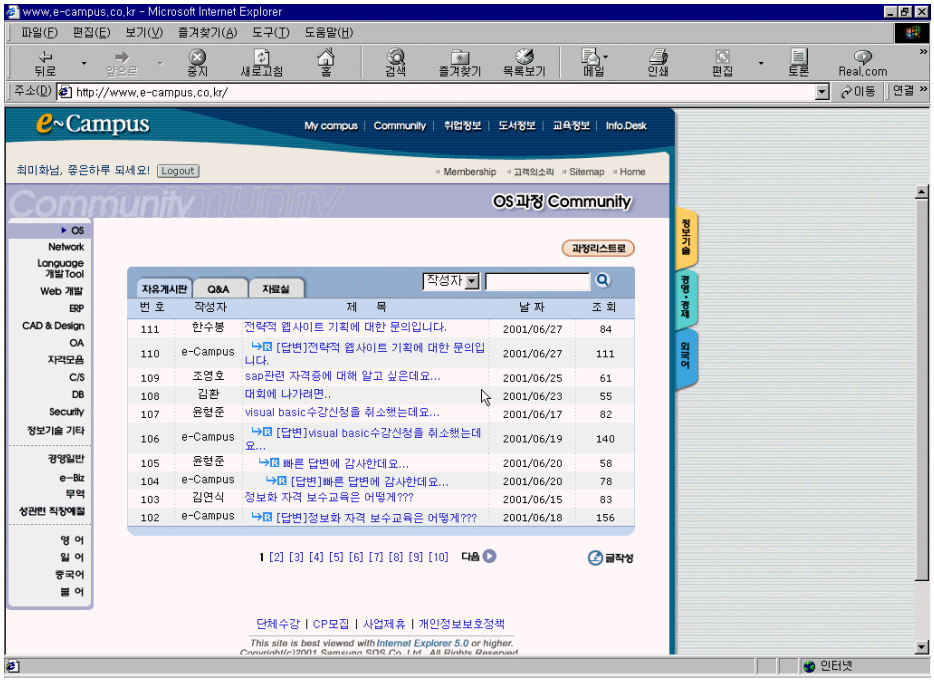


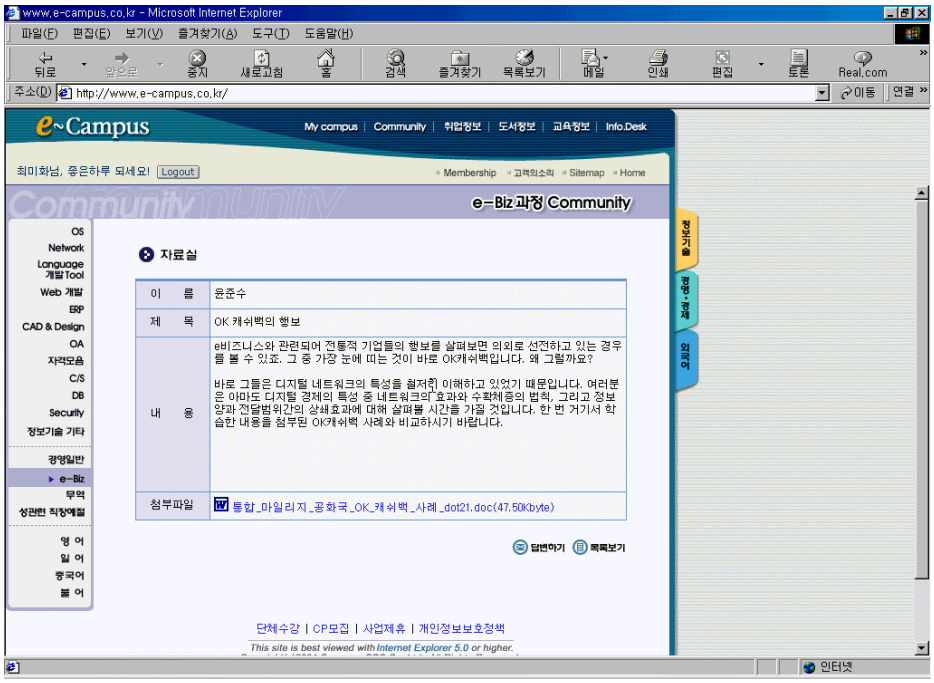
Appendix O. The learning objectives of <Chapter 2>, <Part 4>

- **Understand** the basic notions of word processing software
- **Understand** the basic functions and terms of word processing software
- **Understand** the basic menus of 'Hunmin Word 2000', **set up** the preferences, and **use** them.
- **Use** menus in order to prepare a new document
- **Draw** tables and charts and **print** the document
- **Use** the various function such as <Edit>, <Insert>, <Options>, etc.

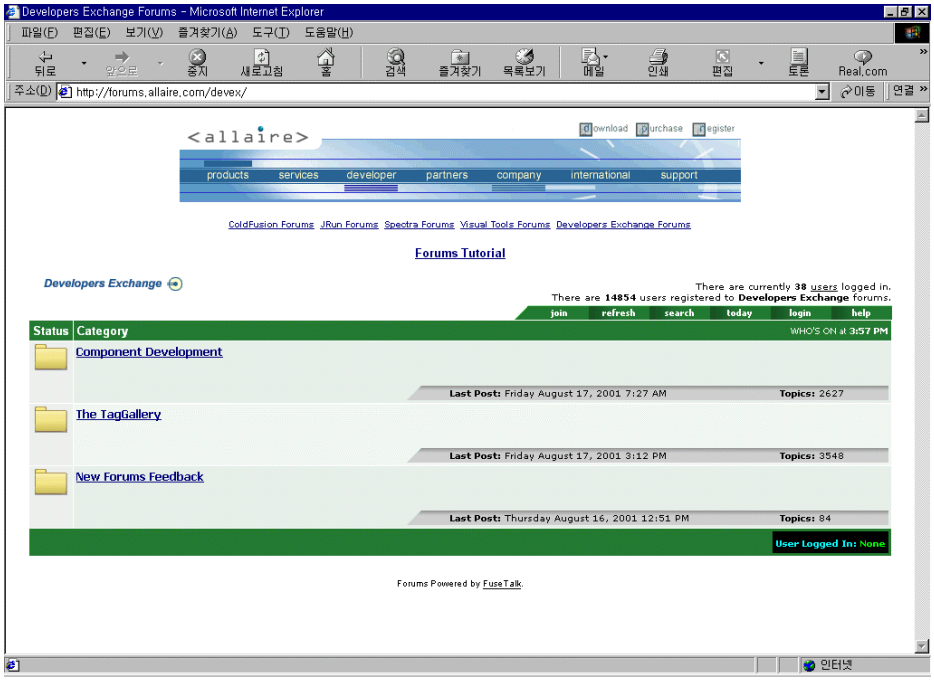
(Translated by the author, bold emphasis is added)

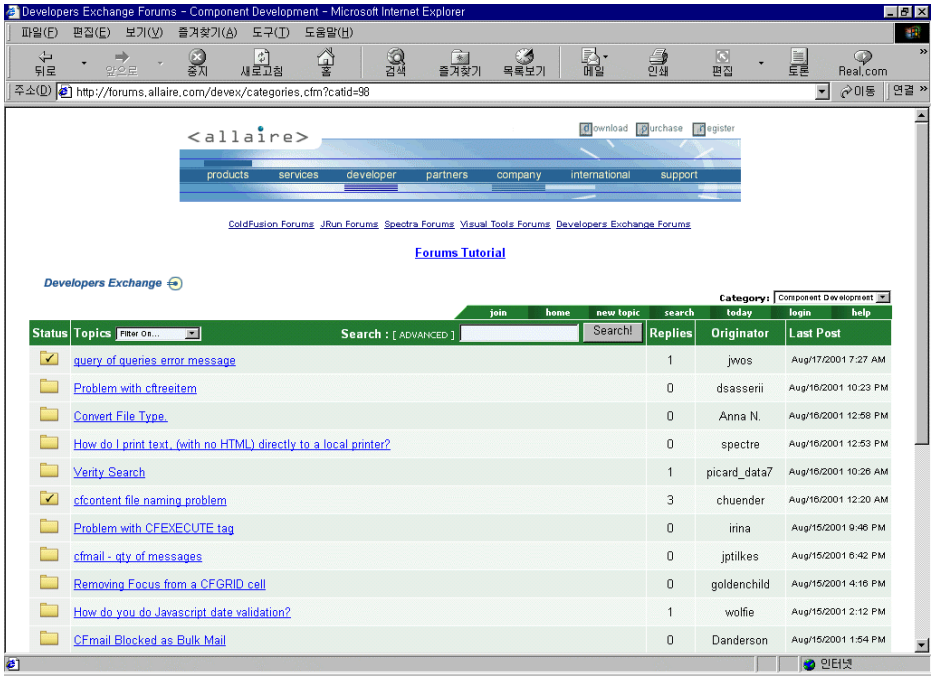
Appendix P. An example of <Communities>





Appendix Q. An example of <Discussion>, “Allaire”(http://forums.allaire.com)





Appendix R. An example of the assessment, “Catch the flying time, Time Management”, e-Campus