

Engaging Learners in Online Learning Environments

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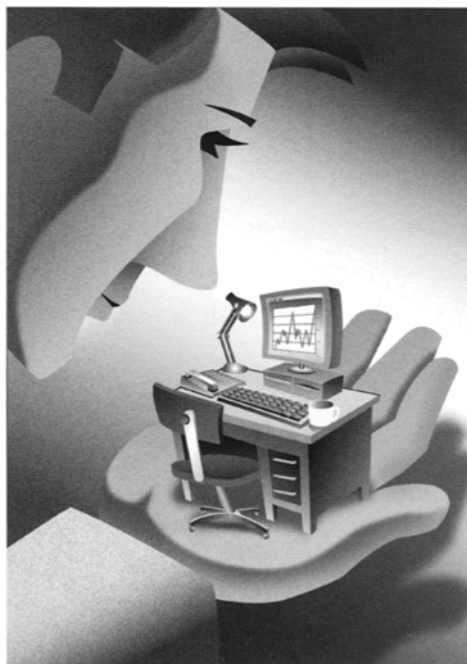
Internet technologies allow learners to access up-to-date information anywhere and anytime, allow just-in-time learning, promote active and independent learning with reflection and support communication between experts and novices. Attracted by these opportunities for learning, many organizations and educational institutions have focused on the technological challenges of buying the right courseware, getting enough bandwidth allocated to online learning and obtaining the latest state-of-the-art online learning platforms and tools. However, hardware, software and infrastructure only provide the necessary conditions for online. State-of-the-art Internet technologies do not ensure that learners are willing or know how to engage in the context of their learning and make sense of the information provided to construct their own knowledge.

This paper attempts to identify and address the assumptions that have been made about the engagement of learners in online learning environments. Research studies have shown that learner engagement is paramount to learning success (Herrington, Oliver, & Reeves, 2003). Engagement here is defined as the “the mobilization of cognitive, affective and motivational strategies for interpretive transactions” (Bangert-Drowns & Pike, 2001, p. 215) that occur during learning activities through interactions with others and worthwhile tasks (Kearsley & Shneiderman, 1998). In the online learning environment, engagement entails mindfulness, cognitive effort and the attention of the learners in that environment. When learners are engaged in the learning process, levels of learning and retention may be increased. Hence, the whole learning experience is enhanced (Kearsley & Shneiderman, 1998). The question then is: “How do we engage learners in online learning environments?”

Assumptions about learners

While online learning environments may provide learners with opportunities to engage themselves in the learning process, it cannot be assumed that these opportunities will be taken up (Crane, 2000). Clark and Mayer (2002) identify two pitfalls in online learning environments with respect to engagement. The first is the failure to accommodate the learning process to the targeted learners. This may place a cognitive overload on learners that results in disengagement. Second is the failure to contextualize the learning activities. Learners may not see the relevance of the concepts or theories presented and become disengaged. These pitfalls may stem from three assumptions that instructors may have of learners:

- learners have acquired the learning strategies to work through the online learning component;



- learners have acquired the knowledge to learn from the online learning component; and
- learners have acquired the attitudes that enable them to use these strategies and knowledge confidently, flexibly, appropriately and independently of the instructor.

Learners have the learning strategies

Learners may lack the learning strategies to work through the online learning component. The multitude of options and choices available to learners may impose a cognitive load on them. Cognitive load may be viewed as the level of mental energy required to process a given amount of information. Cognitive load theory suggests that effective instructional materials promote learning by directing cognitive resources toward activities that are relevant to learning rather than to processes that are an adjunct to learning (Sweller, 1994). When the cognitive resources are directed to the former, learners are more likely to be engaged in the learning process. Based on the study by Hedberg and his colleagues (1993) of learning in a multimedia environment, three possible types of cognitive load can be identified in an online learning environment.

- the structure of the online component: learners know where the information/tool is stored and know how to retrieve and run it
- the response strategies: learners know how to respond when asked questions, how to keep track of concepts covered, how to jump from one topic to another and where to make notes when necessary
- the supporting tools: learners know when and how to use the tools available

When learners lack learning strategies to operate in the online learning environment, the cognitive load may overwhelm them. Even for more experienced learners, if too much effort is involved in navigating and responding to the interactive elements of the online component, and figuring out how to use the supporting tools, mental resources available for comprehension and achievement of the learning goal may be reduced. They may then become disengaged in the learning process. Motivation is a strong factor that influences learners' engagement in the learning process (Stage, 1996), and when learners are experiencing cognitive overload in an online learning environment, they may become de-motivated (Jonassen & Grabowski, 1993).

Learners have the knowledge

Besides the lack of learning strategies, learners may lack knowledge of how to learn from the online component such as a lack of prior knowledge and a lack of strategies for structuring and managing knowledge in their own way. Instructors cannot assume that learners possess prior knowledge that will provide them with the theoretical capacity to understand the learning tasks and information presented in the online environment. However, even if

the learners have the prior knowledge, they may lack the strategies to manage the knowledge they have constructed. These strategies include making connections between new and existing knowledge and developing progression from one learning sequence or task to another (Cavalier & Klein, 1998). As a result, the knowledge that is acquired becomes an isolated fact or concept and is not integrated into a larger scheme (Hedberg et. al, 1993).

Learners have the attitude

It is probable that some learners may just browse through the screens in the online learning component, or read them through once and expect learning just to happen. Some learners may be trying simply to get through the lesson, or trying to get the "right" results without the intention to learn. Such an attitude toward learning may be due to a lack of clear objectives or instructions, a lack of relevance of learning tasks to real-world situations or to the experiences of learners or a lack of urgency for learners to learn. In a case study of ELAST, a simulation program dealing with the elasticity of demand, Yates (1987) observed that some learners "were happy just to enter values, receive feedback that told them they were doing badly and then enter their next decision with very little analysis" (p. 40).

Addressing assumptions about learners

It is clear from the above discussion that instructors cannot assume that learners have the learning strategies, knowledge and attitudes to learn effectively in an online environment. Learners may get lost due to the navigation aspects of the interface, become de-motivated or fail to make connections in the knowledge they have constructed; as a result, they become disengaged from the learning process. Therefore, activities must be designed to support and guide learners as they are given control of their own learning online (Taylor, Sumner, & Law, 1997).

Addressing the lack of learning strategies

In order to address the lack of learning strategies in the online learning environment, we have to consider the issue of cognitive load and ensure that we do not overwhelm the learners. In this section, we focus our discussion on the "learn how to learn online" session and on advance organizers. Although the issues of scaffolding and the facilitating role of the instructor are also crucial in addressing the lack of learning strategies, we have left them to the next section when discussing how to address a lack of knowledge among learners.

"Learn how to learn online" session

Very often, learners are not aware of the structure of the online learning environment, do not know the response strategies to the interactive online elements and do not know how to use the online support tools. To address this

lack of learning strategies, it is necessary for the instructor to conduct a “learn how to learn online” session. Such a session may include outlining technical procedures such as logging on and navigating through the online learning environment, explaining response strategies to running a simulation or searching for information, and demonstrating how to use the various tools available (Potter, 2000; Lim, 2001).

The instructor may also want to set ground rules or guidelines for participation in the online learning environment.

For example, before learners participate in their first asynchronous online discussion, the instructor may outline guidelines for online discussion informing learners of the suitable length for messages being posted, the fact that each message should contain one main point and provide elaborations and justifications for statements made and reminding

learners to post responses not only to the questions posed by the instructor but also to responses of other learners (Lim & Cheah, 2003). Alternatively, these guidelines may be presented as a document (downloadable from the course website) to both learners and instructors prior to the online discussion.

Advance organizers

Advance organizers are “relevant and inclusive introductory materials ... introduced in advance of learning ... at a higher level of abstraction, generality, and inclusiveness” (Ausubel 1968, p.148). Gagné and Driscoll (1988) claim that advance organizers provide learners with a framework that supports them in establishing integrative relationships between new and existing knowledge. Tucker (1990) asserts that learners who are provided with advance organizers while navigating through computer packages are in a better position to organize the new information that is learned. Therefore, the advance organizers provide learners with a structure that guides them on a given task or learning activity as they work through the online learning component. Such a structure addresses the lack of learning strategies, and learners are then more likely to engage in the learning process.

Addressing the lack of knowledge

Scaffolding and facilitating discussions are two strategies that can be employed in the online learning environment to address learners’ lack of knowledge. These strategies may be employed by the instructor, or in the case of scaffolding, may be embedded within the online learning activities or facilitated by peer interactions.

Scaffolding strategies

Scaffolding can be conceived of as composing zones of proximal development (ZPD) through which learners can navigate with the aid of a supporting context, including but not limited to people (Vygotsky, 1978). ZPD are defined by Wertsch (1985) as “distance between the child’s actual developmental level as determined by independent problem-solving and the higher level of potential development as determined through problem-solving under adult guidance and in collaboration with more capable peers” (pp.67-68). This can be perceived as an integrated cognitive system where learners and instructors exercise differential responsibility by virtue of differential expertise and experience. The learner in this cognitive system appropriates the goals and strategies that are manifested in jointly organized activities.

Scaffolding is a two-step process. First, the online learning environment needs to provide the cognitive support to identify strategies for accomplishing learning tasks not attainable by the individual. This support or assistance is then gradually withdrawn as the learner becomes increasingly competent. The cognitive support may include process modeling (Jackson, Stratford, Krajcik, & Soloway, 1996) and question prompting (Ge & Land, 2003). This cognitive support may be provided by the instructors or through peer interactions, or may be embedded in the online learning component.

Process modeling focuses on how an expert’s process of thinking about or solving problems is used as a model for learners who are learning in the same domain. An example is the *Model-It* software that helps model the thinking process of an expert for learners engaged in science inquiry. The software models the questions (such as “What do you expect will happen?”) that learners need to ask themselves when carrying out scientific investigations (such as examining the relationship between auto emissions and aquatic life). Such modeling of the scientific investigation process

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provides scaffolding to help learners reflect upon their own thinking or problem-solving process by comparing and contrasting it to the expert's model (Jackson et. al, 1996).

Question prompts may be used as a scaffolding strategy to help learners focus attention and monitor their learning through elaboration on the questions asked, the issues discussed or the problems to be solved (Ge & Land, 2003). In a study by King (1994) on guiding knowledge construction in science classrooms, the author provides learners with strategy-questioning prompt cards to guide them in making inferences and generalizations. These question prompts are designed to promote connections among ideas within a lesson and to access prior knowledge/experience to promote connections between the lesson and that knowledge. In another study by Lim (2001) on task-orientation in computer-based classrooms teaching economics, the author suggests that learners are more task-oriented when they are provided worksheets with question prompts than when they are not. In both studies, the question prompts scaffold the learning process by directing learners' attention to key variables or concepts (Land, 2000). As a result, thoughtful responses such as explanations and inferences are elicited, and learners are more engaged in the learning task.

Facilitating online discussions

One of the most important components in any educational process is dialogue. Dialogues include instructor-learner discussions, instructor's guidance and feedback, learner-learner discussions and feedback and guidance from other learners. Learning environments with dialogues are rich with experiences and distributed intelligence. Online discussions are increasingly being used in online learning environments to facilitate interactions that support the shared construction of knowledge among participants of a learning community. However, learners often lack the knowledge and learning strategies to participate in such discussions.

Harasim and colleagues (1995) warn, "unless the teacher (instructor) facilitates the networking activities skillfully, serious problems may develop. A conference may turn into a monologue of lecture-type material to which very few responses are made. It may become a disorganized mountain of information that is confusing and overwhelming for the participants. It may even break down socially into name calling rather

than building a sense of community." In order to provide a positive experience and ensure effective discussion for learning, the instructor's role in setting meaningful tasks, participating actively, keeping discussions focused, drawing conclusions and recommending resources for extension of learning are crucial (Lim & Cheah, 2003).

Setting meaningful tasks—Set a task or topic that is meaningful to learners to promote their active participation in discussions. Klemm (1998) suggests that the task or topic should appeal to learners' experiences and vested interests. Figure 1 illustrates starting off an online discussion with a case study in a teacher education course.

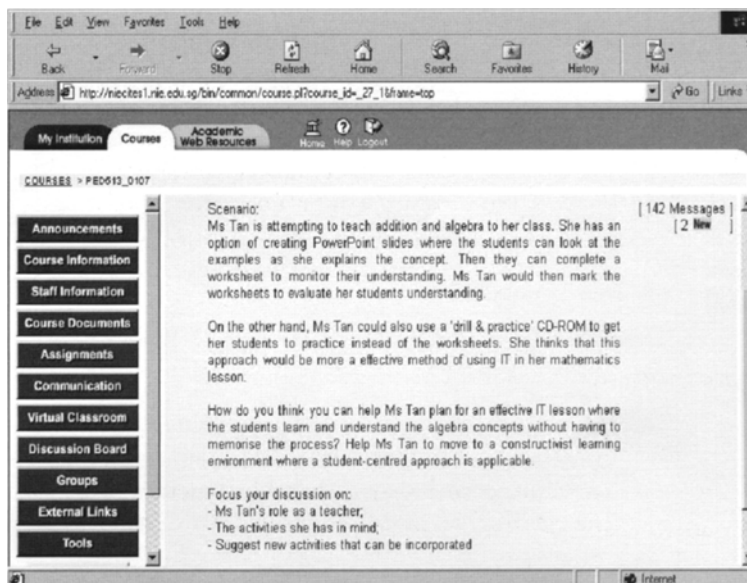


Figure 1: Instructor opening a discussion in a teacher education course

Participating actively by answering queries, providing feedback and posing conflicting views to elicit thinking/reflection—During the discussion, instructors should be active in participation. Answering queries, providing feedback and posing conflicting views to elicit more thinking are some of the roles to be taken up by instructors. A study by Shank (2001) recommends that instructors contribute at least 10% of discussion postings. Research studies have shown that in discussion boards where the instructors are more involved, learners respond with more enthusiasm and regular participation (Harasim et al., 1995). Figure 2 shows the same discussion forum as above in which an instructor acknowledges the contributions of the learners and extends the scope of the discussion.

Keeping the discussion focused—Klemm (1998) recommends that discussions or activities

should be structured to keep discussion focused. Instructors should not allow off topic discussions even though there may be a tendency for participants to stray off topic. Strategies include formulation or reframing questions to redirect the discussions.

the discussions in a previous thread and starts off a new thread on “Constraints of the environment.”

Recommending resources for extension of learning

While responding to learners’ queries as well as providing feedback on the issues being discussed, instructors should search for resources that can be recommended to the learners. This ensures that learners have a better background knowledge of the issues being discussed. It also provides opportunities for learners to explore more deeply into the issues being discussed (Lim & Cheah, 2003).

Addressing the lack of appropriate attitude

Authentic activities have the capability to motivate and encourage learner participation by facilitating learners’ engagement with the instructional message of the online learning component. Learners need to know why they are learning something. Herrington and his colleagues (2003) state that such immersion in authentic activities can provide motivation that is needed for the initial perseverance of an otherwise “discomforting and unfamiliar setting” (p. 69). When such familiarity is developed, learners are more likely to be engaged in the learning process and, as a result, more likely to apply the new knowledge and skills to their work or lives.

Authentic activities include activities that are based on real situations and simulation models that focus on applying new knowledge and skills (Bennett, Harper, & Hedberg, 2001). They include virtual laboratories, case studies and problem scenarios. These activities provide opportunities for learners to examine individually or collaboratively the issue or task from different perspectives that are mediated by various resources, and provide opportunities to reflect on their learning (Herrington et. al., 2003). In this section, we look at problem-solving and simulation-based activities that may provide an authentic online learning environment to address the lack of appropriate attitude among learners.

Problem-solving activities

Many research studies have shown that solving authentic problems helps learners to see the meaningfulness and relevance of what they learn (Jonassen, 1997; Brandsford, Brown, & Cocking, 2000). Unlike traditional direct

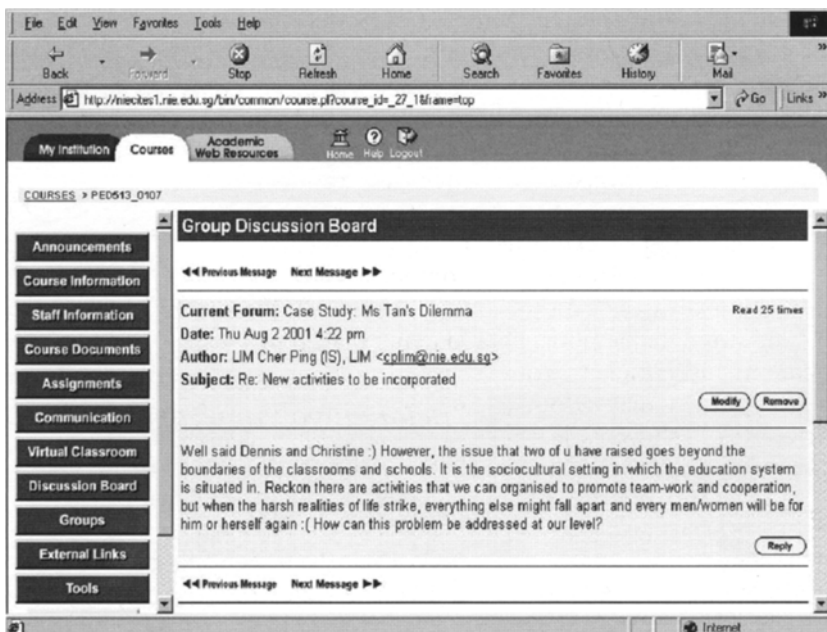


Figure 2: Instructor acknowledging learners and extending a discussion

Drawing conclusions and providing content expertise—Instructors should contribute advanced content knowledge and insights, weave together discussion threads and help participants apply, analyse and synthesise content (Shank, 2001). Figure 3 shows how an instructor weaves together

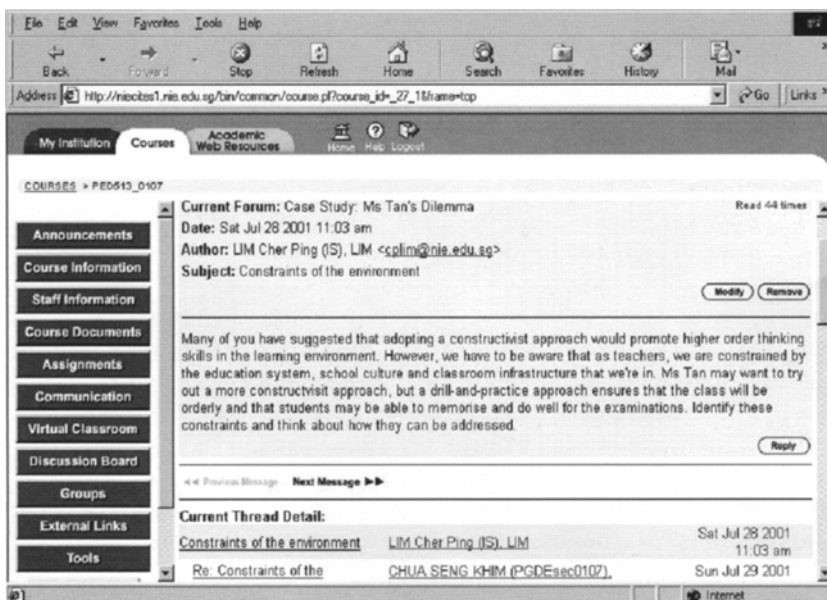


Figure 3: Instructor weaving together discussions and starting a new thread

instruction, learning by problem-solving begins with the presentation of an authentic problem around which the learning will be centered. These problems serve as springboards for inquiry, information-gathering and reflection on theoretical concepts and relationships, industrial standards, norms and practices and culture. Ill-structured problems are messy and complex in nature, with no fixed and “right” solutions. The following is an example of an ill-structured problem presented in a course on effective communication:

“You have overheard two of your IT staff complaining about the lack of clarity in your expectations and instructions. They agreed that you were task-oriented and friendly, but commented on your inability to communicate your ideas and instructions effectively. They also said that many of the staff members were often at a loss to know what to do and how to proceed. What do you think has gone wrong? How do you intend to address the problem?”

The learners in the course are expected to access new information, appraise it critically and apply it to the problem they are presented with — taking into account the context that they are in and converting “raw knowledge into professional wisdom” (Dixon, 2000, p.41). However, learning by solving a problem may make strong demands on learners. These include a high cognitive complexity, since learners are expected to test concepts against reality, and an increase in task management because learners are expected to exhibit learning independence (Perkins, 1991). These demands on learners point to the need to break up the focal problem to sub-problems or question prompts (as discussed above). Based on the focal problem presented above, some of the sub-problems include:

- What is the message strategy that I should employ?
- How can I organize a strategic message?
- What must I emphasize in the message?
- What are my objectives as a communicator?
- Who is my audience?

Such scaffolding acts as a schema or knowledge-based representation that contains the typical problem goal, constraints and solution procedures useful for the focal problem. Although most learners may adopt a more positive attitude toward learning than in traditional direct instruction,

some learners may be incapable of learning in a vastly different paradigm of instruction where they are expected to assume increasing responsibility for their learning. Scaffolding ensures that by placing the control of the learning process at the fingertips of learners, they are not abandoned and left to deal with the complexities of a real-world context on their own (Lim, Tan, & Klimas, 2001).

Simulation activities

Simulations transport learners to another world or environment where they control the action by applying or exploring a knowledge base. Learners observe particular phenomena and learn from the processes and the variables that will affect the simulated actions. Due to being placed in such an authentic environment, learners may adopt a better attitude toward learning and then be more likely to engage in the learning process (Herrington et. al, 2003). In the online learning environment, simulation-based objects using applets provide opportunities for learners to explore abstract concepts and relationships anywhere and anytime, at their own pace.

An example of simulation activities is the integration of *Virtual Economy*, an online simulation package, into an introductory economics course. Unlike pure sciences, the “what if” questions in economics cannot be explored as they would be in a scientific experiment. In the real world it is impossible to change one variable and yet hold all others equal. This makes “what if” questions, which are central in economics, very difficult to answer with traditional textbooks, lecture and discussion methods. Computer-based simulations overcome this problem, and meet the needs of learners who want to see the practical application of theories and the relationship between theories and real-life situations (Lim, In Press). Figures 4 and 5 (see next page) show a simulation carried out with *Virtual Economy* that provides opportunities for learners to manipulate direct and indirect taxes and government spending to explore their effects on the economy.

Such simulations serve three very important pedagogical features: they give learners direct access to the behavior of the object domain; they give intrinsic feedback on learners’ experiment with that domain (Laurillard, 1988); and they provide real-world relevance and utility for the

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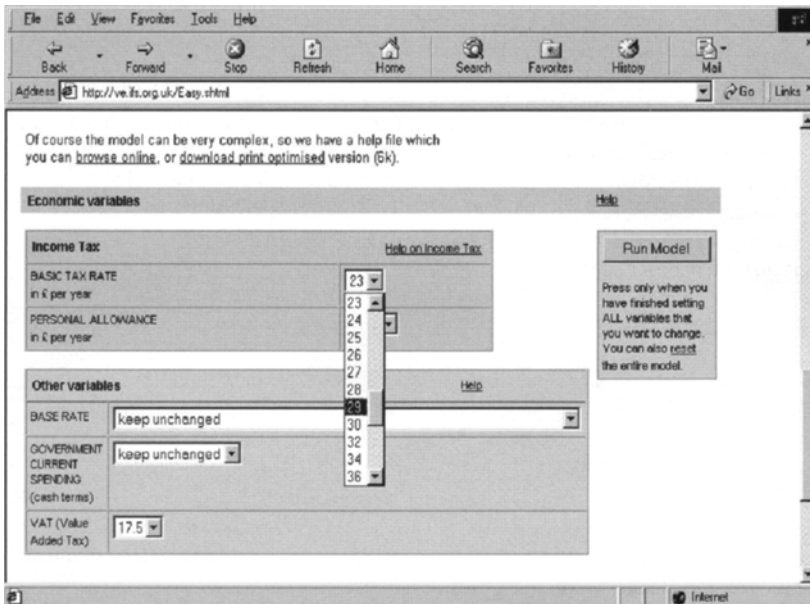


Figure 4: Running a simulation on a change in direct taxes from 23% to 29%.

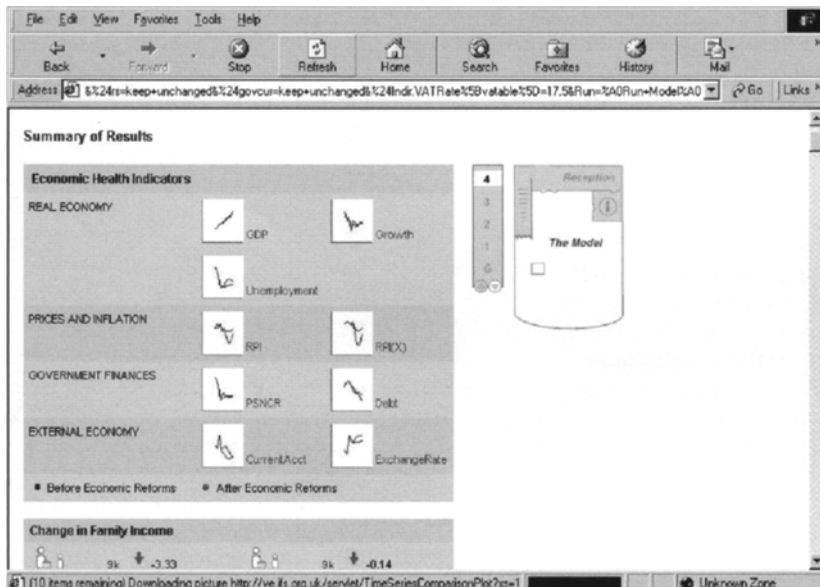


Figure 5: The effect of the change in direct taxes on different economic indicators.

learners (Gredler, 1996). Such experiences fulfill the pedagogical goals of allowing learners to apply theories, use evidence and recognize the legitimate range of application of analysis. In this case, learners are more likely to adopt a proactive and positive attitude towards learning (Lim, In Press).

However, discovering relationships based on real-world data is difficult. The real world is far less organized than many learners expect and exact relationships do not exist. The complexity of the scenario presented may overwhelm the learners since they lack both basic knowledge

related to the scenario and strategies for addressing multifactor problems (Gredler, 1996). Although the use of computer simulation packages may serve as anchors for online activities, scaffolding needs to be in place to link prior knowledge to present learning, guide learners through the multifaceted simulation activities and help them to reflect upon their experiences by linking them to relevant theoretical frameworks. It is only then that learners are more likely to engage in the learning process.

Conclusion

The online learning environment provides opportunities for learners to have control over their learning process and become more engaged in it. However, online learning is by no means a replacement of the old formula “the instructor is everything, and the learner is nothing” with its opposite of “the learner is everything, and the instructor is nothing.” Before involving learners in the online learning component, the instructor has to make sure that the learners are ready for the activities and are able to work through the activities themselves. The instructor cannot assume that learners have the attitude, knowledge and learning strategies to learn independently in the online learning environment. These assumptions need to be addressed by the instructor and/or the online component. They include “learn to learn online” sessions and advance organizers to address the lack of learning strategies, scaffolding strategies and facilitating discussions to address the lack of knowledge and problem-solving and simulation activities to address the lack of appropriate attitude.

The instructor plays a pivotal role in the online learning environment. Instructors have to understand their roles well and adopt the best strategies to enhance the learning experience of the learners in such an environment. Often in online learning literature one encounters the phrase that the role of the instructor changes from being “sage on the stage” in traditional settings to “a guide by the side” online (Harasim et. al, 1995). As learners are creating knowledge for themselves, the instructor’s role is to facilitate this process. Although such descriptions may imply that the instructor can be nothing more than a sort of non-expert but motivational cheerleader (Campos & Harasim, 1999), the role of the “guide by the side” is pivotal for effective learning in online environments. Such a role includes recognising the potential and limitations

of each learning medium (face-to-face, stand-alone and online), organizing and carrying out activities to provide guidance, providing strategic support and assistance to help learners assume control of their own learning and reflecting upon and readapting activities accordingly.

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