Enhancing Participant Business Process Perception through Business Gaming

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Abstract

This paper proposes the use of interactive, continuous business game constructions to be used as an educational tool to enhance participant business process perception (participants' understanding of the functioning of business processes). The proposal is based on the experiential learning theory and the present business process modelling discussion. The authors discuss how business game models could be enhanced to pay attention to the process nature of business operations. On the basis of this discussion the authors argument and represent a new business game construction based on continuous processing. Furthermore, some preliminary findings of the game utilization in a university course are represented. The emphasis of the paper is on business process gaming, not business process simulation. The difference between these two is that the focus of simulation is on designing processes, but the focus of gaming is on facilitating business process perception of game participants. This paper also emphasises that organizational learning occurs when individuals within an organization tackle problems and learning and understanding business processes is an essential element for business process change projects to succeed.

1. Computer-Based Learning Environments

Isaacs and Senge [10] state that computer-based learning environments (**CBLE**s) – like business games - build on a long tradition of experiential education theory. This theory points to the significance of learning through direct experience opposed to learning through 'instruction'. In experiential education theory learning is said to occur through the resolution of conflicts over different ways of dealing with the world.

Kolb [12] describes a model of experiential learning (Lewinian model) which is an integrated process that begins with here-and-now experience followed by collection of data and observations about that experience. The data are then analysed and conclusions of this analysis fed back to the actors in the experience for their use in the modification of their behaviour and choice of new experiences. Thus, in this model learning is conceived as a four-stage cycle shown in figure 1. Immediate concrete experience is the basis for observation and reflection. Observations are assimilated into a theory from which new implications for action can be deduced. Implications or hypotheses then serve as guides in acting to create new experiences.

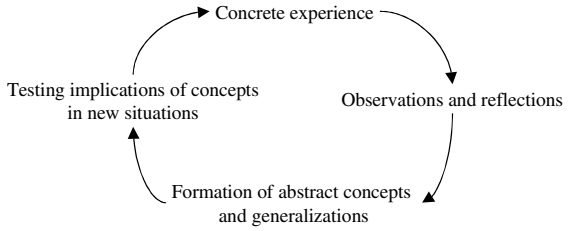

Figure 1: The Lewinian experiential learning model by Kolb [12].

Kolb [12] notes that the emphasis is on here-and-now concrete experience to validate and test abstract concepts. Kolb argues that immediate personal experience is the focal point for learning. This experience gives life, texture, and subjective personal meaning to abstract concepts and at the same time provides a concrete, publicly shared reference point for testing the implications and validity of ideas created during the learning process. The second emphasized aspect of this learning model is that training is based on feedback processes [12]. The information feedback provides the basis for a continuous process of goal-directed action and evaluation of the consequences of that action.

Also Argyris and Schön [1] have described this process with slightly different terms. In their model the

process moves from discovery of problems, to invention of solutions, to production of solutions in action, to reflection on the impact of these actions, and then back to discovery. Isaacs and Senge [10] argue that if this learning cycle operated effectively, new insights about the real world would be continually discovered and embedded in improved mental models. Decisions would be invented based on new mental models, those decisions would be enacted and then outcomes would be reflected upon to produce new insights.

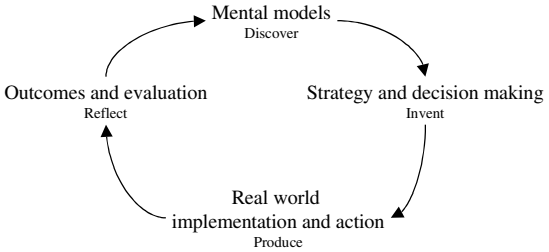

Figure 2: The learning cycle in management situations by Isaacs and Senge [10].

Isaacs and Senge [10] mention that the designers of CBLEs argue that the ideal learning cycle fails to operate effectively in organizations because of limits at each point in the cycle (these limits affecting the ideal learning cycle are embedded to the cycle in figure 3.):

- Decision-makers have diverse and typically tacit mental models, making the development of strategies a process of negotiation among competing recommendations, not a rational comparison and testing of alternative assumptions.
- Delays between when decisions are made and their impact may be very long, often many years for strategic decisions. In general, these delays make it more difficult for the decision-makers to see the connection between decisions and their outcomes.
- Additional delays between action and perceived consequences arise because of the time needed to collect, disseminate and interpret data.
- Actions taken in one area may have significant effects in distant parts of the system, but these effects may obscure to the original actors. Thus, decision-makers can not see the consequences of their decisions.
- Differences in mental models held by decision-makers can lead to widely different interpretations of available data. Furthermore, the sources of the data may be rarely investigated and tested.
- Environmental factors, such as uncontrollable and unanticipated changes in markets, economic, conditions, or competitor actions inevitable alter the impact of decisions. This is true especially over the long time spans relevant to organizational actions. Isaacs and Senge call these factors Confounding factors.

As the CBLE is placed to the previous ideas this results in the cycle presented in figure 3. In this figure Isaacs and Senge [10] use the term 'virtual world'. This figure illustrates us how a virtual world or a CBLE can turn visible the learning limits that are obscure in real world. Thus, CBLEs provide a rapid, unambiguous, and systemic feedback on actions taken. They provide a relatively low-risk setting in which differences in mental models can be explored and tested. CBLEs can reflect back previously tacit assumptions and can provide insights into the nature of the complex interactions that determine the consequences of managerial decisions.

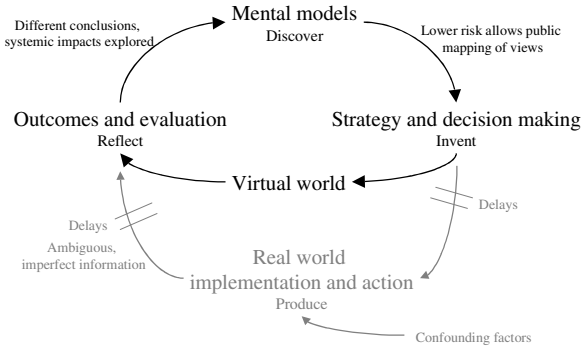

Figure 3: The impact on learning using virtual world [10].

2. Business Processes

The increasing power of customers, competitors and the constantly changing business environment has forced many organizations to recognise the need to move away from focusing on individual tasks and functions to focusing on more communicated, integrated and coordinated ways of work. Organizations are taking a radical look at the underlying business processes and systems, which make them successful. Such efforts are often labeled as business process reengineering, employee empowerment, total quality and customer focus, time-based competition, team-based organization, and so on [3, 5, 11]. Central to many performance improvement efforts is an emphasis on processes. The assumption is that a business can be defined as a set of interrelated processes that are logically and continuously evolving to satisfy a set of common customer-oriented objectives [5].

A business process can be defined as a set of interrelated work activities characterized by specific inputs and value-added tasks that produce specific customer-focused outputs [20]. Keen [11] defines a business process to be any work that meets four criteria: it is recurrent; it affects some aspects of organizational capabilities; it can be accomplished in different ways that make a difference to the contribution it generates in terms of cost, value, service, or quality; and it involves coordination. This definition includes both the traditional workflow definition of a process and the soft business processes, which lack obvious inputs, output, and flow

patterns. Giaglis et al. [8] note after an examination of the business process re-engineering literature that – although there is no clear definition of the term - the business process definition generally include the following elements:

- Business processes are decomposed into a number of more elementary steps (tasks or activities).
- The processes have internal or external customers (a person or another process). Processes should strive to satisfy the expectations of their customers so that they provide added value to the organization.

Kueng and Kawalek [13] define a business process model to describe how business cases have to be carried out. These models highlight certain aspects and omit others.

Dutta and Manzoni [5] discuss about the importance of identifying and improving processes in performance improvement programmes. They argue that instead of being hierarchical and functional organizations should transform towards a process view of an organization. This process view emphasizes how an organization actually does what it is required to do across departments and functions. The focus in the process view is on trying to communicate how an organization works together to create value for its customers, as opposed to how it is structured.

Hammer argues [9]: *The problems that afflict modern organizations are not task problems. They are process problems… We are slow because some of our people are performing tasks that need not to be done at all to achieve the desired results… We are inflexible not because individuals are locked into fixed ways of operating, but* ***because no one has an understanding of how individual tasks combine to create a result, an understanding absolutely necessary for changing how the results are created****… In short, our problems lie not in the performance of individual tasks and activities, the units of work, but in the processes, how the units fit together into a whole*. This description by Hammer brings forward the very essential problem in which we are proposing one potential solution tool.

3. Business Games and Process Training

There are two main types of processing a simulation [4, 23]: continuous and discrete event. The choice between these two in any particular case is determined by the nature of the system to be simulated and the purposes that the simulation is intended to achieve [4].

Discrete simulation (or discrete event simulation) refers to an abstraction which relies on a step-by-step representation [23]. In discrete event simulation it must be possible to view all significant changes to the state of the system as distinct events that occur at specific point in time [4]. The simulation then achieves the desired behavior by modelling a sequence of such events, treating each individually. In general in this kind of batch-processed or non-interactive model, all behaviour subroutines are spelled out beforehand, in the computer code and no human input is required during the simulation [22].

Continuous simulation refers to the abstraction of the real process being simulated to a set of mathematically continuous functions [23]. A continuous simulation views changes as occurring gradually over period of time and tracks the progress of these gradual changes [4]. This is an interactive model, in which the model's performance periodically is adjusted to account for input supplied by the modeller while the model is running. This requires the model to stop in midstream and pose a question to the modeller. When the model receives the answer, it will proceed accordingly [22].

Today, the vast majority of business games follow the batch-processed manner. Already Forrester [6] describes (batch-processed) business simulations to be black boxes, which do not allow the participants to see the events and transactions to happen. Forrester calls this kind of training to be external teasing, which is disappointingly unrewarding. Forrester states*: The emphasis in the business game is on the external manifestations, not on the internal structure and its implications*. The main stream of business games is still - almost 40 years later – representing business processes hidden from the business game participants. Of course, the aims for the use of business games can be diverse and batch-processed business games are often invaluable training tools. However, from the business process perception point of view business games have not been relevant educational tools. Despite this we feel that the kind of experiential learning taking place in business game sessions is much too valuable to be neglected in process oriented training. As a solution we are looking for a method to describe business processes with business games and to allow the game participants to realise the process nature of cross-functional business operations.

4. A Process-Oriented Proposition

We argue that managing change involves employee empowerment, communication, process vision development, and process-based team formation. The constructive business game solution we are putting forward seeks to give support on these activities. We are looking for a tool to establish self-management and collaborative teamwork among individuals who should rather be motivated than directly guided. However, we are not trying to offer tools for making visions of future processes but to offer a platform with which to share understanding of how business processes generally proceed and evolve. Furthermore, we are not suggesting a tool for analysing and designing organizational processes, as commonly is already proposed in business process change management discussion.

What we are suggesting here is a tool to support a change of mentality through training and education to create an environment for later change. A tool that could

be used in the initiation phase of a business process change project facilitating rethinking why we do activities in certain ways and how we should do them. As Davenport [3] has noted one key concern prior to business process re-engineering is to fully understand the information needs of autonomous business units, and processes across the enterprise. Kueng and Kawalek [13] note that a business is a complex system which is made up of many people, each of whom has his/her own beliefs about how it should operate as well as their personal hopes, aspirations and motivations. This kind of general knowledge should be the ground for further process change processes.

Isaacs and Senge [10] argue that CBLEs can enhance organizational learning by making explicit the assumptions and logical inconsistencies in the operating policies of an organization. These environments will foster shared understanding of complex organizational processes and systems. Kueng and Kawalek [13] state that human action is driven by goals (goals declare what has to be achieved or avoided by a business process) and this is the reason we need goals. Kueng and Kawalek explicate the following reasons for goal setting. First, we need to be able to state what we want to achieve so that we are then able to define the necessary activities, which a business process should encompass. Secondly, a clear understanding of goals is essential in the management of selecting the best design alternative. Furthermore, a clear understanding of goals is essential for it to be possible to evaluate the operating quality of a business process. And finally, a clear expression of goals makes it easier to comprehend the organizational changes that must accompany a business process redesign.

Pritchard and Armistead [18] suggest several things of business process management that should be taken care of:

- The inability of an organization to determine and communicate its view of processes or the way it intends to use that perspective can create a level of cynicism among its members.
- The achievement of the organization's longer term strategic ambitions for its processes is made possible by the translation and cascade of high level goals and objectives right the way down through the business.
- Process data creates complexity in the management of performance data and while the systems often already exist or can be quickly developed to support this, what seems to take time is nurturing an understanding of the relationship between process measurement and other metrics.
- Organizations face the paradox of trying to ensure standard service delivery on the one hand, while introducing more empowered working styles which create the greater flexibility required to meet changing customer requirements.

In general, we feel that the above statements match with the objectives mentioned often in connection with business game training. Senge and Fulmer [19] argue that properly designed and conducted managerial microworlds provide a way of anticipating the consequences of contemporary decisions and involving a number of people in both the learning process and the opportunity of sharing mental models.

Morecroft [16] states that learning takes place when people discover for themselves contradictions between observed behavior and their perceptions of how the world should operate. Thus, managers should experiment with models, try their own what-ifs, and use simulations to trigger wide-ranging discussion.

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Lane [14] describes that if we want to help managers react to problems, it is necessary to examine their mental models of how these problems work and, if necessary, help them to change these mental models.

According to de Geus [7] one reason for putting mental models into computers is that in working with dynamic models, people discover that in complex systems cause and effect are separated in time and place. He mentions that to many people the insight to these causal phenomena is counterintuitive, thus, we are not able to find other trigger points than the most immediate causes to create the requested effects. The use of dynamic models helps us to discover other trigger points, separated in time and place from the desired effects.

Business games have not been connected to business process management discussion unlike process prototyping and simulation tools. However, we see some potential in business games to support process perception of employees. This is possible if the processing method of business games would describe explicitly and continuously the flow of time. Kueng and Kawalek [13] note that amid the many debates about various modelling formalisms little attention is paid to the value of making goals explicit or to the fundamental purposeful nature of the system we are modelling. The advantage of business games in contrast to process simulation techniques is that business games are interactive. By this interactivity we mean that the participants are part of the business process and are in continuous interaction with other participants, customers, suppliers and funding.

Yu and Wright [24] note that the software tools supporting business process re-engineering are suitable for generating descriptive enterprise models, but few tools posses the capability of identifying the major strategic driving force for change. This kind of discussion should be conducted in an early phase of the change project and we see that conversational nature of the phase could be intensified with the use of games.

The treatment of time in business games remains little discussed. Thavikulwat [21] argues that how time is treated in a computerised gaming simulation circumscribes the issues the simulation can address, the procedures that participants must follow, and the work that the administrator must do. The way time is treated may limit the issues that can be addressed and that the gaming simulation must allow a clear distinction between the short and long term. Thus, the pacing of time is critical. For example, if time moves fast, participants' decision-making depends more on gut-level attitude, less on time-consuming analysis. If time moves continuously, when participants decide can be more consequential than what they decide. Thavikulwat notes that in simulation, as in life, "time is of the essence". The management of time is an essential theme in the new business game construction described in this paper.

Thavikulwat [21] sees four different simulation drive-design possibilities (administrator-driven, participant-driven, clock-driven, and activity-driven simulation). A clock-driven simulation advances time in concert with the computer's internal clock. Thavikulwat mentions that this design would be elegant in games that allow for interdependence among participants. Furthermore, Thavikulwat mentions one clock-driven business simulation, Chiesl's [2] marketing simulation.

Chiesl [2] quests for realistic business episodes into the university classrooms. He mentions that interactive computer terminals offer the possibility to construct dynamic simulations without a fixed time period or a specific number of required decisions. Chiesl calls this technique interactive gaming. Chiesl states that present (this is in 1990) business games are time fixed format games and their decisions are based on a predetermined decision interval, for instance, quarterly or monthly reports. According to Chiesl, this does not represent the working of today's dynamic business world. Chiesl asks for continuous data input and output when students want it, not when game designers allow the students to input and output at some arbitrary discrete time format. An interactive business simulation would offer the students a more realistic environment than the fixed-time format business game. Thus, participants experience a business environment that has the appearance of being true and real.

Chiesl [2] argues that an interactive real time simulation offers a more realistic environment than standard business simulations because students are able at any time in the simulation to change their input variables without waiting until the next fixed time period. Furthermore, Chiesl argues that the students' requests are instantaneously answered, although this can not always be the case as usually the outcomes of decisions take some time to realise. Another exception to the majority of business games is that Chiesl's interactive simulation does not require a specific set amount of decisions be input each time period. Thus, students can change one, some, all, or no variables whenever they choose.

Besides of Chiesl [2] the only two references we have found mentioning real-time processing are Patz [17] and Lawrence [15]. According to Patz [17], simulations should become continuous rather than discrete processes. Decision rules should be entered at any time, and competitive results continue to occur whether or not any decision rule changes have been made. Patz notes that this will require a multitasking environment running several programs simultaneously. This is what has been realized in the construction described in this paper.

Furthermore, Patz [17] notes that a simulation may run continuously with participants entering new decision rules at their discretion or as indicated by current market conditions. Overall, this means that simulations may assume the day-to-day character of ongoing business while encouraging the development of long range strategies. Why these kinds of structures have not been constructed before? Patz may give us one possible explanation: simulation purposes, for the most part, are decided by coding convenience rather than pedagogical, conceptual, or theoretical relevance.

We argue that to better describe the present business environment – and most of all the business processes - business games should include the influence and importance of time to be embedded in the business game. Besides of this, the new business game construction (REALGAME) described in this paper includes a holistic view of business (all major business functions and stakeholders) to be represented for the game participants. Furthermore, the construction includes the ability to configure the business game to describe different business environments.

The time argument means that the connection between players, supply market, customers and capital market needs to be interactively processed. What is essential is the role of time in simulating the time-bound internal and external business processes, decision-making, and the communication between the companies and different stakeholders. What is suggested here is a real-time/on-line/continuously processed business game. In an on-line processed business game different business events and processes take place continuously and concurrently, and often in varying frequency. The participants steering the company perceive all the market events and internal processes on-line. What ever happens can be seen without a delay and action can take place instantly, if only the participants realise and need to do so. Thus, the game emulates the real world processes of business environments with the major exception that the internal simulation time is accelerated compared to the real world. In managing this kind of environment the participants' ability to perceive processes and causal dependencies is essential.

The on-line processed game (REALGAME) is developed in Turku School of Economics and Business Administration and Turku Centre for Computer Science during 1997-1999. REALGAME is validated through cooperation with an industrial partner in the game construction phase. Through this cooperation the game

was planned to describe actual business operations and functions of a business unit of a large company operating in the food sector.

This new game construction has been used six times in teaching during 1999 and 2000. REALGAME is planned to describe the causal dependencies in decision-making better than the batch processed business games. Parts of the functions of REALGAME are introduced in figure 4.

In REALGAME there are 4-12 competing companies and the markets, suppliers and funding organisations are common to all participating companies. The companies steered by the participants include the materials process from suppliers through manufacturing to customers, purchases, sales, marketing, monetary flows stemming from the different phases of the manufacturing, purchases and sales, and funding. All the mentioned functions in the game are configurable to represent different kinds of business environments.

REALGAME game has been programmed with a Rapid Application Development (RAD) tool (Delphi) in Windows environment. Delphi enables the use of databases and supports user-defined inherited objects. Both of these resources have been noticed to be inevitable for the creation of REALGAME. Databases are needed in order to record all the detailed business transactions taking place during the game run. Without the object oriented development environment it would not have been possible to create a truly configurable business game environment.

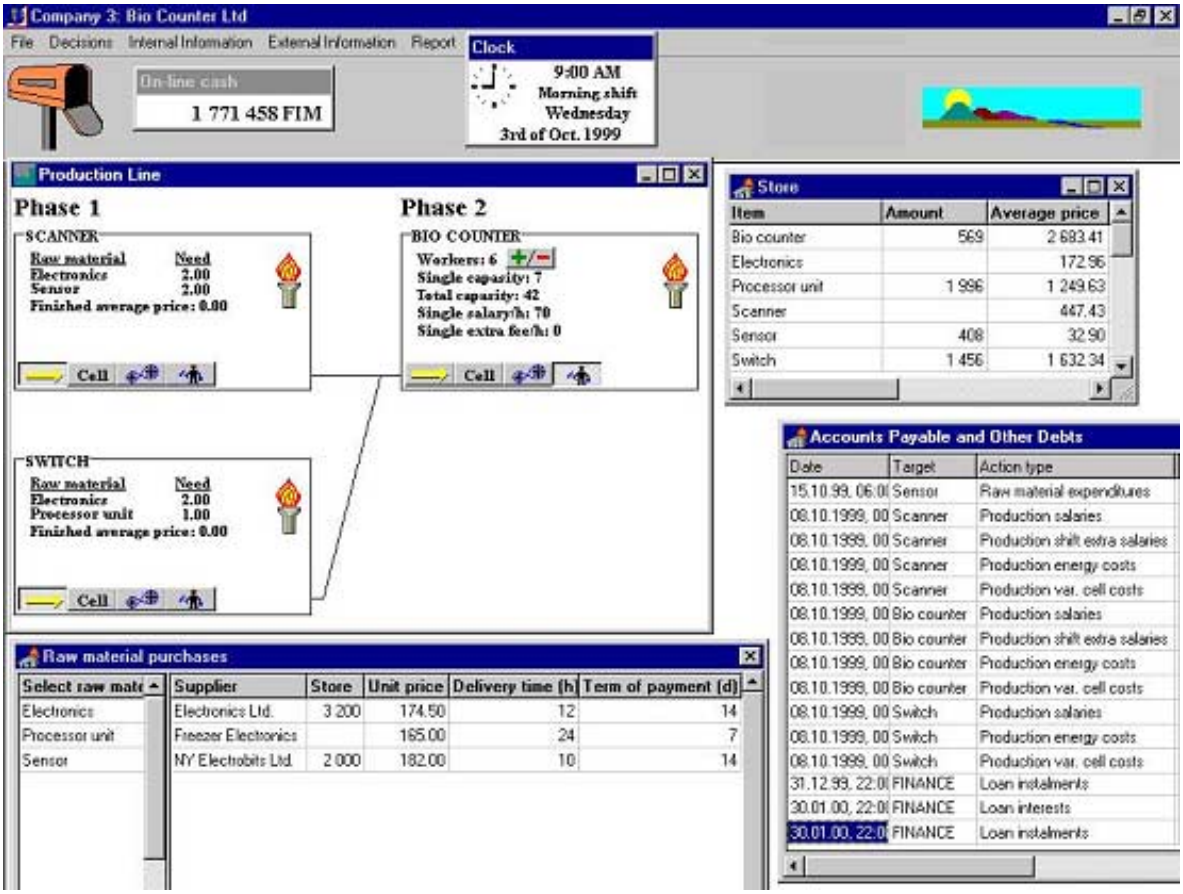

Figure 4: Parts of the business processes of REALGAME.

In continuous game processing the functions are executed in a continuous and iterative manner. Different steps can enact simultaneously or apart. Different iterative decision loops may occur in the same pace or in a different pace. The process is never ending and easing off the decision-making results most certainly in troubles. Furthermore, the participants are part of the game processes. This means that they see the changes in their environment to evolve on-line. We feel that this is a major difference if we compare continuous processing to batch-processing: the participants are organic part of the business processes and are able to witness and see them, and – most of all - are able to continuously interact with this process.

Kueng and Kawalek [13] give us some encouragement in constructing continuous game models by arguing that: *It is common to describe business methods as a number of discrete steps. However,*

intuitively it seems unlikely that requirements will be elicited in one and only one step. Given that we are dealing with problems that are complex, subjective and dynamic, it would seem to be better to take an adaptive and cyclical approach. Actually we go one step further, the processes of REALGAME are continuous for the game participants.

Actually, REALGAME does not operate in true real-time processing. True real-time processing would mean that each and every independent game object (e.g., a customer or a supplier) would have its own internal Timer object (an internal clock triggering independent object events automatically and self-sufficiently), which would activate independently of everything else in the game and process all object specific tasks and processes. Very early in the development of the game this kind of true real-time processing was tested but proved to be impossible to use. This is because of the Windows operating system, which allows only a limited number of active Timer objects to be used at a time. However, the processing is continuous in the sense that:

- the game time is clock-driven, smallest increment in time being one hour,
- the participants are not tight to make decisions in specified points of time but can make decisions whenever during the game they choose,
- the decisions made in each point of time can be single decisions or several decisions but no decision batches are required,
- the participants may choose to run reports at any point of time, and
- the participants see the internal and external business processes to evolve, e.g., hour by hour, depending on the game parameters.

Davenport [3] introduces a five level framework for process innovation. We feel that the REALGAME construction described above could be a useful tool to help establish especially the goals of levels *Identify processes for innovation* and *Understand existing processes*. REALGAME might be useful also to *Develop process vision*.

5. Description of the Game Case and Lessons Learned

Some experiments have already been carried out to train the unfolding of business processes with REALGAME. We will shortly report some findings from one training session. The session was carried out with students. We acknowledge that the training needs of students and company employees are different. REALGAME however includes three different game speeds and these game phases face the participants against different kinds of decision problems. The first phase is about rehearsing basic business material process tasks. The second one concentrates more on optimising cross functional processes as a whole, and the third one is for rehearsing the strategic dimensions of decision-making. This way we feel that the game can be used in different kinds of training sessions, from simpler student games to more complex company employee games.

The REALGAME experiment described here was carried out in Turku School of Economics and Business Administration on course *Corporate Information Systems*. This course is an Information Systems course with emphasis on IS tools skills. The aim of the course is to give the students readiness (a) to understand the importance of enterprise systems in the business operation context, (b) to be able to take advantage of enterprise systems, and (c) to resolve different business reporting needs. In spring term 2000 145 students enrolled on the course. The course included 14 hours of lectures during a seven-week period with emphasis on the use of different computer tools commonly used in business organisations. One of the tasks introduced to students was to describe business processes with a process modelling application. The tool used in describing business processes was Process Guide (PG). PG is a commercial computer application developed by QPR Software Ltd (http://www.qprsoftware.com). PG is a tool that can be used to create business process models to illustrate the current status of operations and monitor and measure performance in areas such as lead time, costs and quality.

One of the aims of *Corporate Information Systems* is to give the students a holistic view of business processes and the role of corporate information systems in this holistic structure. Based on this aim the teacher of the course (the author of this paper) decided to combine an imaginary business game case with the use of PG. The researcher hoped to gain knowledge on how a real-time processed business game would suit to be used as a business process case description tool. This business game case would then be modelled with PG. Both the use of the business game and creating the process model with PG were done independently by the students. The students were told to carry out the assignment either alone or in groups of two students.

The case was described, the tools represented and the assignment carried out as follows:

- Both tools used (REALGAME and PG) were introduced to students. The game configuration used was as a network game, all the students in the class competing against each other.
- The assignment was introduces in the lectures and also included as a web page on the course pages. The assignment included a detailed description of computer task steps to be taken in order to start the business game.
- As the students independently carried out the assignment they first initialised the business game to be used in the computer they had logged in by starting a DOS batch file deleting old game data and then copying the start situation from the network to the computer in use.

- Then the students were supposed to start the game market application and as the last step start the business game decision-making application.
- After they had played the game long enough to get an understanding on how the delivery process was processed in the game, they were supposed to illustrate and document a specific business game delivery case as a PG case.
- The students were supposed to return the PG case descriptions (the PG process flow file) to the teacher to be evaluated and given performance marks. With PG the students first created a process flow chart. For the tasks in the process flow chart the students entered case specific values to a certain process measure. The measure used in the exercise was lead-time and the values for the lead-time were supposed to take from the processes simulated with REALGAME. After the values had been entered to the tasks the students were asked to browse through the different analysis tools of PG, e.g., a Gantt chart.
- Last, after all the previous steps the students were asked to return a questionnaire on how they experienced the use of the business game as a case description tool being the base for a process modelling task. This questionnaire was filled out by individual students (even if the student was part of a group) and returned anonymously.

Despite a preliminary REALGAME test run in the computer classes, the students faced technical problems. The test was too short in time to reveal that the capacities of the computers in use were too low. Overall, 21 students directly stated that they had technical problems with the game but we have every reason to believe that almost all of the students faced technical problems.

The analysis of the questionnaire used produced the following results. 71 students of the total of 129 students taking part on the exercise returned the questionnaire. 56 of the students had previously taken part to some other business game training with some other business game. Most of these had played the old game of the school, which is a typical batch-processed total enterprise business game. Table 1 introduces the distribution of answers on the question concerning REALGAME process training potential.

Question	Yes	No
Did the real-time processed business game include teaching potential to be used as a tool to clarify the flow of business processes?	N= 49 72.1 %	N= 19 27.9 %

Table 1: The results of the question concerning REALGAME process training potential.

Appendix A includes student responses to two further questions: *Your general comments on the use of the real-time processed business game*? and *If you did think that the real-time game included potential to clarify business processes describe which processes can best be clarified*? Although there is a lot criticisms in these answers we certainly see some encouraging issues here. There were several answers hinting that the Lewinian experimental learning cycle [12] was functioning in the exercise. As we were expecting that an experimental and reflective stand to the game exercise would increase the learning value of the experiment we were a bit disappointed. Thus, the students did not take the full advantage of the possibility to open testing and practical experimentation. However, we are inclining to believe that this was because of the limited time for the exercise and some shortcomings in the exercise design. The time used to the exercise must be long enough for the students to really get familiar to the processes. This probably means that the exercise must be carried out like in conventional business game training so that the students are all gathered together at the same time and compete against each other. Besides of securing the needed time for the exercise this will also bring along the competitive situation between the participants, which will further enhance the interest of the game.

6. Conclusions

We have argued the need for an interactive, process-oriented business game construction. As the findings from the game process training so far have been encouraging, the aim of our future research is to further study whether the construction gives the participants a better understanding of the dynamics and processes of the present business decision-making environment. We will further experiment with REALGAME in similar course exercises described in this paper. Furthermore, we are even more interested in to be involved in enterprise resource planning and process change management projects where REALGAME would comprise an opening training session, which would introduce process concepts to project participants and offer them common language needed in consequent project phases.

As an overall conclusion from the introduced experiment we argue that there is educational potential in the use of business games describing business process flows. However, the teaching session has to be carefully briefed and motivated. The use of a business process game as part of a real business world enterprise resource planning or process change management project will certainly represent further demands for the training session. For more information about REALGAME business processes see http://www.tukkk.fi/~tlainema.

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Appendix A

This REALGAME experiment was carried out in Turku School of Economics and Business Administration on course **Corporate Information Systems** in April 2000. This course is an Information Systems course with emphasis on IS tools skills. The aim of the course is to give the students readiness (a) to understand the importance of enterprise systems in the business operation context, (b) to be able to take advantage of enterprise systems, and (c) to resolve different business reporting needs. In spring term 2000 145 students enrolled on the course. The student answers were given in Finnish and the author of this paper has translated them into English. Some answer to the question: ***Your general comments on the use of the real-time processed business game?***

- With games you get a proper feel of the complexity of business decision-making! The game must be played, e.g., two days at a time in order the "idea" to become clear. This was missed in this game and this is why understanding and evaluating this game is difficult. (International marketing, 3rd year)
- It was needless waste of time to mix the game with this exercise. (Accounting, 3rd year)
- Store management and production process well implemented but strategic decisions are not well enough presented. (Accounting, 2nd year)
- ... The phases of delivery process were better represented from the game than would have from a text case. (Accounting, 3rd year)
- Good from the stand of point of understanding the holistic process but the realism with the game was so and so. (Marketing, 2nd year)
- We should be able to play the game more in order to fully understand the process that the game was intended to describe. If the game functions better and the game would be played at the same time with other companies it would be a good teaching tool. (Accounting, 4th year)
- Quite good thing that one had to think more oneself when one made the process model description. I think a text case is much simpler. OK! (International marketing, 2nd year)
- If the game only would work all right it would be just nice alternative "teaching method". It would be a good thing if there were more response on the success of gaming as the game proceeds. (Information systems, 2nd year)

- Helps visualise chains of tasks and through this the functioning as a whole. (International marketing, 2nd year)
- The game crashes a lot but it clearly includes potential because it represents well the different business functions. It also well describes the dependencies of functions. (Accounting, 2nd year)
- The game did not adequately represent the successive dependencies of business tasks. All the functions were separate from each other behind menus. You have to in advance yourself piece together the order of the functions. I think that the game does not teach you anything, on the opposite it mixes your ideas. (Accounting, 4th year)
- There certainly is potential as soon as the technique works all right and the system crashes are prevented. It is not meaningful to play the game alone with the computer. Only in group-use competing against others it is fun and interesting. (Marketing, 2nd year)
- There certainly is potential but the game was not best possible for this exercise. The process of the game was too lean as a case to be used in connection to PG. We would have needed a more detailed process to be represented with PG… (Accounting and Finance, 2nd year)

Some of the answer to the question: ***If you did think that the real-time game included potential to clarify business processes describe which processes can best be clarified?***

- Best can be clarified the offer – order – delivery – invoicing chain. … Also the competition situation is illustrative if the game can be played "a day at a time" against other companies. (International Marketing, 3rd year)
- The store management necessitated by the production process, and the importance of well-timed deliveries. (Accounting and Finance, 2nd year)
- The delivery process, I guess, although I was confused by the perpetual changes in time and the changing of production shifts… Besides the situations did not follow each other so that the gaming would have been easy… All gaming without any longer absorption and, for example, the product to be sold is the ultimate culmination of theorisation. It is really hard to enter into the game effectively if you do not know anything about delivery and order management times, if you have not made acquaintance yourself to the processes of the company… (International Marketing, 2nd year)
- The different phases in order – delivery process were easily to be discovered. Furthermore, the influence of purchases and funding to company operations were clearly expressed with the use of the game. I did not familiarise myself with the marketing process but the impression of it remained quite incomplete. Thus, there is potential mainly in order – delivery process, purchases, and the monetary process. (Accounting and Finance, 3rd year)
- You immediately noticed that with a more competitive offer you get more orders. The complaints of the customers about late deliveries were realistic. (Accounting and Finance, 2nd year)
- ... I think that the fast speed of the game and delivering the orders in time were challenging. On the other hand it was good that the game company functions were not taught before the playing but we were forced to ourselves realise what different functions to take care of when playing. (Information Systems, 2nd year)
- Purchases, production, delivering, invoicing and funding are well represented. The real-time processing of the game increases the fascination and gives the game an intensive nature. I think the processes have been logically represented and they are diverse. This gives a good basis for the game to be used as a training tool. Also taking under consideration of the different time spans of receivable and payable gives depth and realism. (Accounting and Finance, 2nd year)